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Understanding inequality within households

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Abstract

To describe and understand the economic inequality in a given society, it is necessary to understand intra-household inequality. Households can hide important inequalities, but can also be essential units for redistribution in society. This paper gives an overview of within-household distributions in different settings, both between the adults and also between adults and children. It documents that there are substantial inequalities within households in some contexts and that these often, but not always, disfavor women and children. The paper also discusses the importance of intra-household allocations for poverty and inequality measurement. Methods that assign each household member a per-adult share of household consumption leads to underestimation of inequalities and miss-classification of poverty. In comparison, structural models seem to do better in predicting individual poverty when disaggregated data on allocation within households are not available. Main determinants of power in household decision-making are also discussed, and relatedly, so are two important policy questions: Are targeted transfers to women good for female empowerment? And, are targeted transfers to mothers good for child outcomes? The empirical evidence is clearly pointing to targeting being beneficial for female empowerment, but the evidence is less clear when it comes to child outcomes

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1 Introduction

Economic inequality has received increasing attention from researchers and policy-makers over the last few decades. Concerns about fairness have spurred this debate (Almås et al, 2020; Piketty, 2020), and it has been argued that some groups do not benefit from the economic growth that has taken place (Atkinson et al, 2011; Moffitt, 2015). It has also been argued that inequality reduces welfare and economic growth (Dabla-Norris et al, 2015; IMF, 2017). Most of the debate concerns inequality in income and consumption (Attanasio and Pistaferri, 2016; Jenkins and Van Kerm, 2011). Note that income and consumption are different when individuals save, borrow, or receive or give transfers. This chapter focuses on inequality in consumption, rather than income. One rationale for this is that consumption enters an individual's utility function and, therefore, consumption may constitute a more appropriate measure of economic well-being. The chapter will also, to some extent, discuss inequality in consumption and leisure combined, leisure being another variable that enters directly into the individual's utility function.

Measures of consumption are often derived from expenditure. For simplicity, this chapter uses the terms expenditure and consumption interchangeably, but it is important to point out that the link between expenditure and consumption is not always straight forward. Most measures of expenditure do not take into account in-kind transfers, such as food stamps and lunch provided by employers, or home production requiring both time and good inputs, such as child care.

The existence of households, where members usually share resources to some degree, makes the study of individual consumption inequalities challenging. First, consumption expenditure is often measured at the household level. To construct measures of consumption inequality, researchers therefore often use *equivalence scales* to take account of household size and through these arrive at individual-level measures, see e.g., the Milanovic (2019) dataset "All the Ginis", a data set that uses an equivalence scale approach to measure inequality across individuals and has been argued to be the best source of inequality measures for global comparisons (Smeeding and Latner, 2015). The simplest form of an equivalence scale is to divide total household expenditure by the number of household members, i.e., use per capita measures. Other equivalence scales account for the economies of scale in the households which arise when household members share public goods.

In the most recent publications from the OECD, the equivalence scale applied is the square root of household size (OECD, 2020a). This means that if you have a four-person household, individual consumption is set to total household expenditure divided by two. However, basing inequality measures on household-level data and assigning consumption to each household member using equivalence scales may hide important inequalities within households, because consumption might not be equally distributed between household members. Thus, using household-level data combined with equivalence scales may underestimate inequalities across individuals in a society (see for example Lise and Seitz (2011)). Second, in the cases where individual-level data is available, for example registered expenditure from credit card data, inequality may be overestimated because there is often sharing and economies of scale within the household.

Studies of inequality often ignore the question of resource sharing in the household and the measurement challenges just described (Chiappori and Meghir, 2015). Yet, identifying within-household inequalities is crucial to understand and address policy questions concerning issues that are fundamental to development, such as poverty, gender equality and child development. This chapter discusses how consumption inequality within households can be accounted for, and presents empirical evidence on within-household consumption. The paper also discusses the implications of within-household inequality to poverty measurement and targeting of anti-poverty policies.

The discussion in the paper is structured around two ways of studying allocations within households. First, in Section 2, allocation of consumption using direct measures of consumption expenditure for adult household members is discussed. Second, Section 3 explains how theoretical household models, structural assumptions and partial information on individual expenditure can be used to structurally estimate within-household inequalities between adults. In this section, extensions to children's consumption shares as well as time use are also discussed. Section 4 concerns implications of within-household inequality for the measurement of inequality and poverty in a society, drivers of within-household inequality, and the importance for policy. Last, the paper is summarized in Section 5.

2 Direct measures

This section discusses how direct measures of consumption expenditure and its allocation within households can be used to assess within household inequalities. First, the methodology is described, and second, existing empirical evidence is discussed.

2.1 Methodology: Direct measures

The household consumes a combination of private and public goods. Private goods can only be consumed by one person in the household, for example food and clothing. Public goods, on the other hand, are goods for which the consumption of one household member does not affect the consumption of another household member, such as rent and heating. Note that the distinction between private and public goods is not always clear-cut. There may be some goods that act as a public good in some ways, e.g., (the availability of) a car, but once it is in use by one household member, it cannot be used by another household member, unless the two household members want to go to the same location. First the distribution of private goods is discussed. Second, two different ways to think of the allocation of public goods are described. Throughout it is assumed that all goods can be characterized as either private or public, with the caveat that in reality, not all goods are necessarily easily classified in this respect.

To measure within-household private consumption inequality directly, we need information on how much each household member consumes of all private goods. Most surveys provide information about consumption of private goods at the household-level without specifying who is consuming what, with two notable exceptions. First, some surveys divide certain categories of expenditure, typically clothing, into men's and women's expenditure. Second, surveys may also ask specifically how much of a given type of expenditure, most commonly food, is allocated to each household member. In both cases, the information allows identification of individual consumption of that particular private good. Such goods are referred to as *assignable goods*. However, in most cases where surveys include information on assignable goods, they represent a relatively small fraction of household consumption of private goods and hence using these limited data to directly estimate inequality within households may give biased estimates of overall inequality. Section 3 explains how data on assignable goods can be used in combination with structural assumptions to give a more comprehensive estimate of within-household inequality.

In the relatively few cases where all private goods are measured as assignable, one can estimate within-household inequality in private consumption. However, private goods constitute a relatively small fraction of total household expenditure (20-30% in the Netherlands and Japan, see Cherchye et al (2012) and Lise and Yamada (2019)). There is therefore a need to incorporate public goods in our consumption inequality estimates. With the direct measurement approach, there are two obvious candidates as to how to think about the allocation of public goods between the adult household members. First,

one may assume that the allocation of public goods is the same as the allocation of private goods, and second, one may divide the consumption of public goods equally between the spouses. Both of these approaches can be challenged as they make explicit assumptions about the consumption of public goods as well as the underlying individual preferences and household decision making process, e.g., how each household member trade-offs private vs. public consumption and how individual preferences are aggregated in the household decision making process. In general, using the second approach (assuming equal public goods consumption) provides lower estimates of within-household inequality than the first, especially when private good consumption is very unequal. In Section 3, how underlying preferences and key parameters in the decision making process can be estimated using structural approaches is discussed, but for now, when discussing the empirical evidence in the next section, both approaches are used to illustrate the importance of the choice of method.

Empirical evidence: Direct measures

While most surveys collect data on at most one or two assignable goods, there are some notable exceptions. This section presents five papers based on surveys with information on the allocation of individual consumption for a comprehensive set of private goods.

Table 1: Overview of allocation of household expenditure, studies with direct survey evidence

	Country	Year	Method 1		Method 2	
			Woman	Man	Woman	Man
Bargain et al (2018)*	Bangladesh	2004	44	56	46	54
Bonke and Browning (2009)	Denmark	1999 - 2005	52	48	51	49
Cherchye et al (2012)	Netherlands	2008	51	49	50	50
Cherchye et al (2017)	Netherlands	2012	51	49	50	50
Lise and Yamada (2019)	Japan	1993 - 2013	32	68	46	54

Note: The table reports how assignable household expenditure are allocated between women and men. "Method 1" assumes that the allocation of public goods is the same as the allocation of private goods, and "Method 2" assumes that public goods are equally divided between the two adults.

*The paper estimates allocations separately for households with one, two and three children. The table reports calculated allocations to woman and man for household with two children, but allocations in one and three children households are very similar.

Table 1 shows the reported allocation of household expenditure for these papers. As described above, it is natural to think about two approaches

for how to take public goods into account. "Method 1" assumes that the allocation of public goods is the same as the allocation of private goods, while "Method 2" assumes that public goods expenditure are split equally between women and men. Some of the studies also report allocation to children. Children are often thought of as public goods within the household, and they are treated as such in this section. In Section 3.2.2, the share of household expenditure allocated to children is discussed further.

The table shows that in some countries, households distribute resources more equally than in others. In Denmark and the Netherlands, resources are almost equally distributed between men and women and the distribution is not very sensitive to the choice of method used to include public goods. In Bangladesh and Japan, on the other hand, the distribution of private goods is much more unequal and therefore the overall inequality is more sensitive to the choice of method for inclusion of public goods. Bangladeshi women receive 44% of private assignable expenditure and Japanese women receive only 32% (Method 1). When public goods are assumed to be shared equally between women and men, these shares increase to 46% and 44%, respectively (Method 2).

3   Structural measures

Household models are based on economic theory and assumptions about preferences and how they are aggregated, i.e., the decision-making process. These models can be used together with structural assumptions to estimate the allocation of expenditure when detailed individual-level data is not available for all goods. The most common approach is to combine structural assumptions with a *collective household model*, often using data on one or more private assignable good(s). Structural models have several advantages; they allow for the inclusion of public goods and the identification of different mechanisms that determine household outcomes even when the available data is scarce.

Below, the collective model and the concept of the "sharing rule", also referred to as "consumption shares" or "resource shares", which describes the within-household allocation of resources, is first presented. The literature features a number of structural estimation approaches to identify individual-level outcomes based on household-level data. The approaches in the pioneering work by Browning et al (2013), Lewbel and Pendakur (2008) and Dunbar et al (2013), which are central in the literature on within-household consumption inequality, are presented second. Third, some of the available evidence on the estimated within-household allocations, with a focus

on empirical evidence from the past decade is reviewed. The review starts by considering consumption inequality between adults, before extending the discussion to include children and time use. Finally, a brief discussion of how well structural estimates predict consumption shares, is included.

3.1 Methodology: Structural measures

The collective model was pioneered by Pierre-André Chiappori in his 1988 and 1992 work through the two articles "Rational Household Labor Supply" and "Collective Labor Supply and Welfare". Since then, the model has been extended and used in numerous contexts. In this paper, one version of this model focusing on consumption allocations is presented first, then an extension that take account of time use decisions is shown.

3.1.1 General set-up

Assume a household that consists of two decision-makers, here considered to be spouses, denoted a and b. Each decision-maker has preferences over the allocation of the household resources, denoted $U^a(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b)$ and $U^b(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b)$, respectively, where $\boldsymbol{Q}$ is a vector of public goods and $\boldsymbol{q}^i$ is a vector of private goods consumed by spouse $i = a, b$. Note that this utility function allows for "caring" between spouses; in other words i does not only care about his or her own private consumption, but also the spouse's private consumption. Children are in this model considered as public goods, which is common in the household literature (Browning et al, 2014).

The collective model is based on two fundamental assumptions (Chiappori, 1988, 1992). First, the outcome is Pareto efficient, meaning that no other choice (within the available choice-set) would have been preferred by all the household members. Second, the decision-making process is stable, implying that a household facing exactly the same economic environment with exactly the same choice-set will behave in the same way tomorrow as it did today. These two assumptions can be formalized into the household maximizing the weighted sum of the two spouse's utility function subject to the household's budget constraint:

$$\max_{\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b} \quad \mu U^a(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b) + (1 - \mu) U^b(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b)$$

$$\text{s. t.} \quad \boldsymbol{P}'\boldsymbol{Q} + \boldsymbol{p}'(\boldsymbol{q}^a + \boldsymbol{q}^b) = Y = Y^a + Y^b$$

where $\boldsymbol{P}$ and $\boldsymbol{p}$ are the prices of public and private goods, respectively, and Y^i is spouse i's income. $0 \le \mu \le 1$ and $(1 - \mu)$ are spouse a and b's respective

Pareto weights. μ can be interpreted as a's bargaining power. If μ is zero, then b acts as a dictator, while if $\mu = 1$, a acts as a dictator. Importantly, a higher μ implies that the household decision will move along the Pareto frontier in the direction of higher utility for a. The Pareto weight is a function of prices, income, and distribution factors. Distributions factors are variables that can only affect the decision-making process through their impact on the Pareto weight, μ. Examples of such factors are relative income, relative education, and divorce laws (Browning et al, 2014) and are further discussed in the **Measurement, drivers and policy** section.

3.1.2 The sharing rule

To describe how resources are allocated between the two adults, and thus get an estimate of within-household inequality, the concept of the sharing rule is used. This is the theoretical equivalent of consumption shares (or resource shares).

Consider a situation in which all goods are privately consumed and where spouses have non-caring preferences, i.e., both decision-makers only care about their own private consumption and not their spouse's. In this case, spouse i's utility function is given by $U^i(\boldsymbol{q}^i)$. The decision process can be decomposed into two stages:

1. *Sharing phase*: Spouses decide how to split household income (referred to as the sharing rule)

2. *Consumption phase*: Each spouse allocates their share between the goods available

The decision process takes place in the "sharing phase" where the solution can be denoted by ρ^a indicating the share allocated to a. The advantage of the **sharing rule** is that it contains all the information needed to understand household resource allocation (Chiappori and Meghir, 2015). The disadvantage of the sharing rule is that it only applies to the case with private consumption and non-caring preferences. However, Browning et al (2014) show that the sharing rule can easily be adapted to caring preferences if the spouses' utility function is of the form $U^i(\boldsymbol{q}^a, \boldsymbol{q}^b) = u^i(\boldsymbol{q}^i) + \delta^i u^{-i}(\boldsymbol{q}^{-i})$, where δ is the "caring parameter" and indicates how much the spouse cares about his or her partner.

3.1.3 The conditional and generalized sharing rules

Public goods account for a substantial fraction of household expenditure and can have important implications for inequality. Therefore, a focus on a

sharing rule based on private consumption is not sufficient and can lead to a biased measure of within-household inequality. The sharing rule can be extended to allow for consumption of public goods. To do so, two strategies have been proposed.

The first strategy gives the *conditional sharing rule*. To use this approach, one simply needs to modify the sharing rule described above.

1. *Sharing phase*: Spouses decide on public consumption and how to split the remaining household income (the conditional sharing rule)

2. *Consumption phase*: Each spouse allocates their share between the goods available

A drawback with this approach is that although the conditional sharing rule takes account of public goods in a first stage, the conditional resource shares resulting form this method focus on the shares of private goods consumption and disregard the public goods consumption. This might be problematic when considering inequality for two reasons (Chiappori and Meghir, 2015). First, there is not a monotonic relationship between the conditional sharing rule and the distribution of bargaining power because more bargaining power to one spouse might result in larger public goods expenditure, which is not reflected in the conditional resource share that only accounts for share of private consumption. Second, as the conditional sharing rule disregard public goods consumption (i.e., how much each spouse consumes of the public good), it might give biased estimates of within-household inequality.

Another approach to take public goods into account is to use personalized prices (or *Lindahl prices*) for public goods. As before a two-stage process can be used.

1. *Sharing phase*: Spouses decide on individual Lindahl prices for public goods and the distribution of income (the generalized sharing rule)

2. *Consumption phase*: Each spouse allocates their income on private and public consumption under a budget constraint using their personal Lindahl prices

Using the generalized sharing rule is better than both the conditional sharing rule and the "normal" sharing rule as it takes into account both consumption of private and public goods, but requires very detailed information and is therefore often not feasible.

3.1.4 Extension: Time use

The collective model presented above only takes consumption into account. However, individuals do not only derive utility from goods they consume, they also obtain utility from leisure. Leisure is normally thought of as the time an individual is not working, but can also be the time an individual is not working *or* engaging in household production (such as housework and childcare). If one only considers a sharing rule based on consumption of private and public goods, this can be misleading since within-household inequality in consumption can be correlated with inequalities in time use. As an example, it might be the case that a partner that receives a large share of household expenditure also has less leisure. If that is the case, the within-household inequality would be lower when time use is considered together with expenditure.

The collective model can be extended to include time use. The simplest model including time use, assumes that an individual spends time on two "activities": work, m^i, and leisure, l^i. The time spent working is paid with a wage, denoted w^i. Each individual has preferences over consumption and leisure. Time spent on leisure, increases an individuals utility directly. Working, on the other hand, creates income for consumption and therefore increases utility indirectly. Individual income consists of two elements: the earned wage, $w^i m^i$, and transfers, X^i, such as child and disability benefits. The household's maximization problem can then be written as:

$$\max_{\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b, \ell^a, \ell^b} \quad \mu U^a(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b, \ell^a, \ell^b) + (1 - \mu) U^b(\boldsymbol{Q}, \boldsymbol{q}^a, \boldsymbol{q}^b, \ell^a, \ell^b)$$

$$\text{s. t.} \quad \boldsymbol{P}'\boldsymbol{Q} + \boldsymbol{p}'(\boldsymbol{q}^a + \boldsymbol{q}^b) = Y = Y^a + Y^b$$

$$Y^i = w^i m^i + X^i$$

$$L^i = l^i + m^i$$

where L^i is total available time for leisure and work for individual i. The model can easily be extended to include home production, see, e.g., Browning and Gørtz (2012) and Chiappori and Mazzocco (2017). Note that including home production is common in the empirical approaches discussed below.

The derivation of the sharing rule when including time use is similar to the method described above. This revised sharing rule makes use of the household's total potential income. Each spouse's potential income is defined as the sum of his or her wages multiplied by available hours (leisure + working hours) and any transfers received.

Consider again a situation in which all goods are privately consumed and where spouses have non-caring preferences. In this case, spouse i's utility

function is given by $U^i(\boldsymbol{q}^i, \ell^i)$. The decision process can be decomposed into two stages:

1. *Sharing phase*: Spouses decide how to split the household's *total potential income* (referred to as the sharing rule)

2. *Consumption phase*: Each spouse allocates their share between the private goods available and leisure

The inclusion of public goods can be done using the same approaches as described above.

3.1.5   Estimating the collective model

An important question is how one can derive the sharing rule in the collective model from available data with the help of structural assumptions. Intuitively, if one knows men and women's preferences, it is straight forward to calculate μ or ρ. In a pioneering paper, Browning et al (2013) propose one approach for doing so. They make the structural assumption that an individual's preferences is the same if he or she is single or in a couple. In datasets containing information about both single-households and couple-households, it is then possible to estimate individual preferences for expenditure from the data on single-households. These can be compared to expenditure in couple-households and if the household expenditure are different between single-households and couple-households, it must be due to the decision-making process. Using this approach, information about assignable goods eases the estimation, but is not a requirement for identification (Browning et al, 2013, p.1276). Browning et al (2013)'s approach, which allows for estimation of the sharing rule, was a major innovation relative to earlier methods, which could only identify marginal effects, e.g., how an extra dollar would be allocated. However, the method has some drawbacks. First, it does not account for children. Second, data on single-households is not always available, especially not in lower income countries.Third, it requires quite a lot of price variation in the data. Fourth, it rests on the relatively strong assumption that single women (men) and women (men) in couples are similar and have the same preferences.

These drawbacks have been addressed in succeeding work. Lewbel and Pendakur (2008) build on Browning et al (2013) and propose a method that requires less price variation, and Bargain and Donni (2012) extend it to households including children. Furthermore, Dunbar et al (2013) move away from the assumption that singles and individuals in couples have the same preferences and instead rely on an identification strategy that requires an

assignable good per person. This assumption is however not sufficient to identify resource shares of each household member, and the approach additionally makes the assumption that resource shares are invariant with total expenditure and about the similarity of preferences across individuals either within the household or across different households. A challenge of Dunbar et al (2013)'s approach is that consumption shares cannot depend on distribution factors. More recent papers, such as Tommasi and Wolf (2018), Tommasi (2019), and Penglase (2021) develop this model further.

As the preceding paragraphs illustrate, the literature offers different approaches to structural estimation of the collective household model and within-household consumption allocation. What they all have in common is that they are based on a number of strong assumptions. Thus, whether they are able to accurately predict resource sharing and within-household inequalities is an important question. At the end of the next section, empirical work that sheds light on this question is discussed.

3.2 Empirical evidence: Structural measures

Numerous contributions have estimated the collective model and through this arrived at consumption shares for adult household members as well as for children. Below, an overview focusing on adults is first provided before evidence on allocation to children is considered.

3.2.1 Consumption inequality between adults

Table 2 presents an overview of studies that estimate within-household consumption using structural models, and the estimated consumption share for the woman and the man in household (Panel A). Most of these studies account for children in the household. Children's consumption shares are reported in Panel B, and will be discussed in more detail later (in Section 3.2.2). Note that some studies report consumption shares for each child in the household without specifying the number of children. In these cases, the consumption shares do not sum to 1.

The table displays large variations in the within-household allocation of consumption across countries and family types, but also within countries. Starting with European countries, resources are quite evenly distributed between women and men in the UK, while it is more unevenly distributed in Spain. In France, the women receive 1.2 times more than men in households with no children, while this is evened out when children are present where women receive 0.95-0.97 of men's shares (Bargain and Donni, 2012). In low- and middle-income countries, there are larger inequalities in the allocation of

resources between adults. In particular, women tend to receive a lower share than men.

Two frequently studied countries are Malawi (four studies) and Bangladesh (three studies). In these countries, consumption shares for women and men appear to have become more equal over time. In Malawi, Dunbar et al (2013) report women's consumption shares in a range from 0.44 to 0.87 of men's consumption shares (depending on the number of children), while Dunbar et al (2019) estimate women's consumption shares to be 0.92 - 1.14 of men's consumption using data from 2016-17. The latter numbers are similar to the estimates from Lechene et al (2020), but higher than estimates from Penglase (2021). Similarly, using data from Bangladesh for 2011-2015, Brown et al (2020) and Calvi et al (2020) estimate women's consumption shares to be 0.76 and 0.77 of men's consumption share, respectively, while Lechene et al (2020) use data from 2015 alone and estimate the share to be equivalent to 0.94 of men's consumption shares.

3.2.2 Extension: Children's consumption share

So far, the paper has considered the distribution of resources between adults. However, households often include one or more children, and many studies on within-household consumption primarily concern allocations to children. Child consumption and investments in children have long-term implications for the inter-generational transmission of inequality. Table 2 gives an overview of recent studies using structural assumptions to estimate children's consumption for different household compositions (Panel B). For households with more than one child, the number reported is the total consumption of all the children in the household, unless otherwise specified.

The table provides several insights. First, children typically have lower consumption share than adults, regardless of the number of children. Given that children (especially young) consume less food than adults do, and food typically makes up a large chunk of private consumption, this is not surprising. Second, children's consumption share does not increase proportionally with the number of children. For example, in Malawi in 2016, the child in households with one child has an average consumption share of 27%, while in households with three or four children, the children account for a share of 40% in total, or 10-13% each (Dunbar et al, 2019). Third, the consumption shares of children in lower income countries does not tend to be lower than in higher income countries.

Another interesting aspect of child consumption is whether some children are prioritized; do boys receive more than girls or does the first-born child receive more than later-born children? The discussion of this evidence is

Table 2: Overview of estimated consumption shares using structural models

	Country	Year	Panel A		Panel B	Notes
			Woman	Man	Children	
Bargain and Donni (2012)*	France	2000	55	45	-	No children
			36	38	27	One boy
			38	39	23	One girl
Bargain et al (2014)**	Côte d'Ivoire	2002	52	48	-	No child
			46	42	12	One child
			45	41	14	Two children
			43	40	17	Three children
Bargain and Martinoty (2019)	Spain	2006 - 2007	42	58	-	No children
		2008 - 2011	46	54		
Bargain et al (2021)***	UK	1978 - 2007	53	47	-	No children
			42	39	19	One child
			35	34	32	Two children
			31	31	39	Three children
Brown et al (2020)	Bangladesh	2011 - 2015	25	33	16	For each boy
					15	For each girl
Calvi (2020)	India	2011 - 2012	47	53	-	No children
			32	47	21	Children
Calvi et al (2020)	Mexico	2018	34	29	16	For each child
	Bangladesh	2011 - 2015	27	35	13	
Dunbar et al (2013)****	Malawi	2004 - 2005	40	46	14	One child
			27	52	21	Two children
			24	52	24	Three children
			27	44	29	Four children
Dunbar et al (2019)	Malawi	2016 - 2017	37	36	27	One child
			33	35	32	Two children
			32	28	40	Three children
			30	30	40	Four children
Lechene et al (2020)	Albania	2012	24	28	14	
	Bangladesh	2015	29	31	12	
	Bulgaria	2007	37	30	19	For each child
	Iraq	2012	24	27	4	
	Malawi	2016 - 2017	27	31	12	
Penglase (2021)	Malawi	2010 - 2016	29	36	11	For each non-foster child
					15	For each foster child
Tommasi (2019)	Mexico	1997 - 2000	31	41	28	One child, no Progresa
			29	29	33	Two children, no Progresa
			28	40	33	Three children, no Progresa
			34	38	27	One child, Progresa
			32	35	32	Two children, Progresa,
			31	36	32	Three children, Progresa

Note: The table reports estimated consumption shares for adults (women and men) in Panel A, and for children in Panel B. "Children" indicates that the number of children is not specified. "For each child" indicates that the consumption shares are reported for each child (or each girl or boy) in the household.

* The paper reports consumption shares for two models, the above is in accordance with their complete model in Table 5 in the paper.

** The paper provides several estimation strategies. The reported numbers are from Model (d) in Table 3 of the paper. The paper reports shares for households with no, one, two and three children separately. As the results are similar, only estimates for households with two children are reported.

*** The paper provides estimates for couples where the women is out of the labor market and where she is on the labor market, separately. As the estimates are quite similar, the table only reports estimates for couples where the woman is on the labor market.

**** The paper provide several estimations methods; the estimates in this table are from Table 4 of the paper.

considered to be beyond the scope of this paper, but interested readers are referred to the following papers discussing priorities across children within households: Chowdhry (1995), Giannola (2021), Hanushek (1992), Jayachandran and Pande (2017), and Penglase (2021).

3.2.3 Extension: Time use

So far, the focus has been on the allocation of *consumption* in a household. However, individuals do not only derive utility from goods they consume, they also obtain utility from leisure. A consistent finding in the time use literature is that men tend to work more and engage less in household production than women do. At the same time, men and women tend to spend a similar amount of time on leisure (Browning and Gørtz, 2012; OECD, 2020b). There is also a lot of heterogeneity within households: often one partner does a lot more work and enjoys less leisure than the other. Browning and Gørtz (2012) argues that there are three leading reasons why such heterogeneity is observed; (i) the partners have different preferences over consumption and leisure, (ii) wages and productivity in home production varies, and (iii) power is distributed unevenly and the spouse with less power does more work. To be able to say something about the importance of these explanations, the distribution of both leisure and consumption within the household must be considered.

Table 3 provides an overview of papers that estimate resource shares taking time-use into account. Note that all of the studies in the table either consider children as public goods (and do not estimate their resource share) or are based on data from households with no children present. Cherchye et al (2015, 2017, 2018) provide estimates for upper and lower bounds of the sharing rule (using a revealed preference approach) for American households from 1999-2009 and for Dutch households from 2012. They find that women's consumption shares are between 40% and 50% in the US, and between 43% and 55% in the Netherlands. The estimated upper bound for the Netherlands is quite similar to the directly observed consumption share for private assignable goods for women in the same study (Cherchye et al, 2017), 51/50% (see Table 1).

Lise and Seitz (2011) and Lise and Yamada (2019) provide point-estimates for consumption shares in the UK and Japan, respectively, both taking time use into consideration. Lise and Seitz (2011) show that women's consumption share has gradually increased over time from 35% (birth cohort 1910) to 44% (birth cohort 1960). Using unique panel data on Japanese households, Lise and Yamada (2019) study within-household allocations of consumption and time-use, and how these change over time. Each household is observed for up

to 20 years, and for each year the data-set contains information on private consumption for the woman and the man in the household, expenditure for everyone in the household, labor market information and detailed time-use data. Lise and Yamada (2019) document significant gender differences in consumption and time-use. Men consume about twice as much as women (see Table 1, Method 1), but also account for the majority of the household's market hours (70 percent). When taking account this unequal division of time-use, women's resource share is estimated to be 44%, significantly higher than the observed fraction of consumption of 32% and much closer to the estimated fraction when sharing public goods equally (see Table 1, Method 2).

Table 3: Overview of women and men's estimated resource shares using structural estimation taking time-use into account

| | Country | Year | Resource shares | | Notes |
			Woman	Man	
Browning et al (2021)	Denmark	2001	53	47	
Cherchye et al (2015, 2018)	US	1999 - 2009	40 - 50	50 - 60	
Cherchye et al (2017)	Netherlands	2012	43 - 55	45 - 57	
Lise and Seitz (2011)	UK	1968 - 2001	35	65	Birth cohort 1910
			37	63	Birth cohort 1920
			39	61	Birth cohort 1930
			41	59	Birth cohort 1940
			42	58	Birth cohort 1950
			44	56	Birth cohort 1960
Lise and Yamada (2019)	Japan	1993-2013	44	56	

3.3 How well do structural models predict consumption shares?

To date, there is only one paper that directly tests how well structural models predict consumption shares. Bargain et al (2018) use a dataset from Bangladesh that includes detailed expenditure data for each household member. To estimate the collective model, they use an approach building on Dunbar et al (2013). As assignable good, they mainly use clothing (as this is commonly used in the literature), but they also try other goods such as food and non-food private expenditure. Overall, the structural estimation performs well when predicting allocations between parents and children, but less so when predicting sharing between adults only. The authors argues that

this is because estimating sharing between adults requires more structure and assumptions in the model. An important limitation of Bargain et al (2018) is that the authors do not have information on the allocation of public goods. These goods are the most difficult to allocate, but given their importance in total household expenditure, they may be the most important to understand.

Brown et al (2020) indirectly test the empirical fit of structural models. Using data from Bangladesh, they find that structural estimates from a collective model provides a better match with observed nutritional outcomes than measures based on per-adult household indicating that structural models perform well in predicting consumption shares.

So far we have discussed how well the estimated outcomes from structural models correspond to actual outcomes. We now turn to a brief discussion of how well fundamental *assumptions* in the collective model holds up empirically. one central assumption is that household decisions are Pareto efficient. The evidence on this assumption is mixed: Udry (1996) reject the assumption in Côte d'Ivore, while Attanasio and Lechene (2014) and Bobonis (2009) cannot reject it in Mexico.

Furthermore, the main assumptions in Dunbar et al (2013) have been tested in some papers. Recall that Dunbar et al (2013) relies on two main assumptions. First, the authors assume that resource shares are invariant to total expenditure. Menon et al (2012), Bargain et al (2018), and Cherchye et al (2015) find evidence supporting this assumption. Second, the authors assume that individual preferences are either similar within the household (SAP) or across different households (SAT). Bargain et al (2018) do not reject the SAT assumption for clothing, but they do reject it for other assignable goods such as food. Evidence on the SAP assumption is mixed. Bargain et al (2018) reject it for all goods, while Dunbar et al (2019) and Brown et al (2020) find evidence in favor of it for clothing in Malawi and food in Bangladesh.

4 Measurement, drivers and policy

This section first discusses the consequences of within-household inequality to overall measurement of inequality and poverty. Next, drivers of within-household inequality, referred to as distribution factors in the collective model, are discussed. A particular focus is given to relative income contributions as a driver of within-household inequalities. In the end, the section provides a brief discussion of the implications for policy, with a particular focus on gender-targeted cash transfers.

4.1 Implications for inequality measurement?

Sections 2 and 3 show that, in some contexts, there are substantial within-household inequalities. To understand how these inequalities affect global inequalities, i.e., whether global inequalities are underestimated, there is a need for more comprehensive and harmonized global studies on allocations across and within households. However, existing studies provide some evidence on the importance of within-household inequalities when estimating overall inequality in a society.

First, Lise and Seitz (2011) show that, in the U.K., consumption inequality is underestimated by 50% when within-household inequalities are not accounted for. They also study the evolution of inequality over time and find that while the between-household inequality increased substantially between 1970 and 2000, within-household inequality has actually decreased in the same period. Thus, if within-household inequality had been taken into account, the overall inequality in society would have been relatively constant over the time period.

Other studies taking account of within-household inequalities show that conventional measures of poverty and societal inequalities are underestimated, for example in the US (Cherchye et al, 2015, 2018), Malawi (Dunbar et al, 2013), and India (Calvi, 2020). De Vreyer and Lambert (2020) find that in Senegal, 14 percent of households that are classified as non-poor using traditional poverty measures (e.g, using per-capita measures) include poor individuals. In the Netherlands, Cherchye et al (2015) find that when taking the resource allocation within households into account, the share of individuals below the poverty line increases from 11% to 15-18%. Dunbar et al (2013) shows that for Malawi, assuming equal resource shares across individuals within the households yields a poverty rate of 91 percent (defined as living below $2 per day). However, when taking into account that household resources are not divided equally across household members, the authors estimate that 60 percent of men, 85 percent of women, and 95 percent of children live below the poverty line.

In sum, understanding within household inequalities are important for the measurement of both poverty and inequality, and understanding the actual level of inequality within households as well as the determinants thereof, is important in order to design knowledge based policy to address concerns related to poverty and inequality. The drivers of household allocations and the implications for policy are discussed in the next section.

4.2 Drivers of household allocations and policy

The evidence presented so far details the existence of large household inequalities in consumption across gender and generations and its consequences for inequality and poverty in the society as a whole. To further understand existing inequalities and advice the design of policies to reduce such inequalities, it is important to understand the determinants of the within-household allocations. Such policies are typically targeted to households based on indicators that assume resources to be equally distributed within the household (Brown et al, 2019). As shown throughout this paper, this is rarely the case.

The determinants of within-household resource allocations (and therefore within-household inequalities) have been quite extensively studied with a focus on how household decision-making is influenced by observable characteristics of the society and the individual household members.

4.2.1 Societal characteristics

A society's institutions, sex ratios, norms and historical gender roles may be important factors determining within-household allocations. Chiappori et al (2002) develop a collective model to study how sex ratio and divorce laws affect female labor supply in the US. The idea being that when there are less women than men, and the divorce laws are more favorable towards women, this increases the wife's bargaining power within the household. The structural estimates show that when women are more scarce, they work less and their husbands work more. Furthermore, women living in states with divorce laws that are more favourable to them, work less than women living in states with less favourable laws. Dunbar et al (2019) show that women receive a larger share of household resources in matrilineal compared to patrilineal villages in Malawi (but the authors are unable to identify any significant difference in share allocated to children between these different villages).

Arguably even more directly relevant for policy, Voena (2015) studies the effect of the introduction of unilateral divorce laws in states that impose an equal sharing of property in the US on household savings and female employment. She estimates a dynamic model of household decision-making using time and state variation in US divorce laws as a natural experiment. In Voena (2015)'s sample, women have, on average, a lower share of the couple's assets than their husbands. Thus, the implementation of unilateral divorce laws in states with equal sharing of property at divorce can be thought of as increasing women's bargaining power, because they can credibly choose the outside option (without the consent of their husband). Consistent with this, the paper shows that in states where property is divided equally, the

introduction of the law increased women's resource shares.

In a recent paper, Calvi (2020) use a similar strategy to study the effect of an increase in women's bargaining power on within-household resource allocation in India. She exploits amendments to inheritance laws, where women were granted the right to inherit their natal property and thereby improved their bargaining power, as a natural experiment. The study shows that the amendments significantly increased women's resource shares and improved their health.

Although the discussion here shows that there are a number of papers that discuss societal features as drivers for within-household inequalities, the main body of contributions focus on individual characteristics as drivers. Such individual characteristics as drivers are discussed next.

4.2.2 Individual characteristics: Relative income

Turning to individual characteristics within the household, relative wages, relative income, relative education and relative age, have been discussed (Chiappori and Meghir, 2015). Most of the literature focus on relative income and wages, and this section adopts this focus.

Income and wage differences for the spouses in the household may affect, and is often assumed to affect, bargaining power within households. This is suggested by the collective model and confirmed by research focusing on decision-making power directly (Attanasio and Lechene, 2002; Almås et al, 2020). A more indirect way of testing whether bargaining power is affected by share of income is to look at whether relative income differences between spouses matter for consumption allocations. As long as preferences are different, and households are acting as described in the collective model, the relative income shares will matter for budget allocations.

The literature examining the effect of income or wage differences on household consumption has a long tradition (Thomas, 1990, 1993; Hoddinott and Haddad, 1995; Haddad et al, 1997; Case and Deaton, 1998). This literature mostly considers *correlations* between relative income (broadly defined) and expenditure patterns. A number of studies also provide structural estimates based on collective household models (Blundell et al, 2007; Browning and Gørtz, 2012; Cherchye et al, 2012; Dunbar et al, 2019; Lise and Yamada, 2019). These studies generally find positive effects of income shares on consumption shares. In other words, the more a person earns relative to his or her partner, the more private consumption he or she enjoys.

Some authors have also used natural experiments to identify how relative income affects decision-making power. For instance, a seminal paper by Lundberg et al (1997) studies the effect of a change in the UK Child Benefit

law where child benefits were shifted from men to women. They find that this shift increases expenditure on women's and children's clothing and reduces the expenditure on men's clothing. This finding was replicated by Ward-Batts (2008) using the same law change. Exploiting the fact that the 2008 financial crisis caused higher unemployment among men than women in Spain as a natural experiment, Bargain and Martinoty (2019) study the effects of women's relative labor market opportunities on household decision-making. Estimating a collective household model on consumption data from childless couples and singles, they find that when the husband's unemployment risk increases relative to his wife, her consumption share increases significantly. Using a reform in the pension system in South Africa, Duflo (2003) finds that pensions received by women had a positive effect on girls' anthropometric status, indicating that girls received a higher consumption share of food than prior to the reform. Duflo (2003) is unable to identify any effect on boys, and pensions received by men do neither affect boys nor girls' anthropometric status.

As relative income is identified as an important driver behind allocation choices within households, targeted transfer programs have been suggested as effective tools to i) reduce inequality among adults within households by empowering women, and to ii) promote child development under the presumption that mothers would prioritize children more than fathers. The next section discusses such targeting and the empirical evidence related to the suggested positive effects on child development.

4.3 Policy: Targeted cash transfers as a means to alter within-household allocations

A significant portion of cash transfer programs, target women. One of the arguments used to support such targeting is that relative income will be altered which, given the evidence discussed in this paper, would in turn increase women's resource shares and decrease inequality between men and women. Another argument for targeting women is that women to a larger extent than men prefer to spend money on goods and services that benefit children. In the following we will discuss whether we see any shifts in consumption as a result of cash transfers targeted to women. We will mostly pay attention to shifting that may be beneficial for children as this is often the main argument used for female targeting.

As discussed throughout this paper one often lacks direct measures of consumption or resource shares for different household members. Thus, it is usually not straightforward to look at the effect on children of targeted

transfers. Working with household level consumption data, one first thing to look at is whether consumption shifts with mother targeting. Such shift would then reflect different priorities made by mothers and fathers. If consumption shifts towards food or education, it is often taken as evidence that children are prioritised by mothers. Here such indirect evidence focusing on shifting towards nutrition is first discussed, before turning to a discussion of more direct measures based on shifting towards goods assignable to children.

Several studies have used Oportunidades (former Progresa) in Mexico to estimate the effect of conditional cash transfer to women on household expenditure (see, e.g., Rubalcava et al, 2009; Attanasio and Lechene, 2002, 2010, 2014; Angelucci and Attanasio, 2013; Tommasi, 2019). The estimated effects vary somewhat between the different papers, but all of them report that the program altered decision-making power and empowered women in the households. Several studies show a positive effect of cash transfers to women on resource allocations to food (both quantity and quality): Angelucci and Attanasio (2013) find that both the expenditure share on food and the diet quality increases after the cash transfer and attribute this to women being the recipient. Tommasi (2019) shows that the cash transfers are associated with reductions in within household inequality and increases in spending on food. Similarly, Attanasio et al (2012) study a conditional cash transfer program in Colombia targeting women, and find that the budget share spent on food increases after the transfer to the women.

Randomization of gender of recipients of cash transfers has become increasingly popular, but the results on whether gender of the recipient matters to household decision-making are mixed. Armand et al (2020) study a conditional cash transfer program in Macedonia. They find that giving the cash transfer to women increases the budget spent on food by 4-5 percent compared to when a transfer is given to men. In a highly powered unconditional cash transfer program in India, however, Almås et al (2020) find no significant effects on consumption or on nutrition. Furthermore, Haushofer and Shapiro (2016) and Almås et al (2019) study unconditional cash transfers in Kenya where one treatment arm randomized the gender of the recipient. Similar to Almås et al (2020), they do not find any significant differences in consumption choices across recipient gender, but point out that due to small sample sizes they are only able to detect relatively large potential effects.

Is gender targeting supported by empirical evidence showing that such targeting is in fact beneficial for children? One can learn some from the above mentioned evidence, as spending on nutrition may be beneficial to children, but there are also contributions that more directly report effects on children of such targeting, which are discussed in the following. Their findings are somewhat mixed. Using data from Oportunidades, both Attanasio and

Lechene (2002), Bobonis (2009), and Rubalcava et al (2009) find a positive effect of an increase in women's income share on the budget share spent on children's clothing. Rubalcava et al (2009) also find a positive effect on women's income share on educational expenditure. Armand et al (2020) find no difference in budget shares spent on children's clothing, education or health in Macedonia. In Burkina Faso, Akresh et al (2016) find that in times with little rainfall, targeting *men* improves the diet for children (compared to targeting women), but does not make a difference to spending on education, or health expenditure and outcomes. In line with these results, Haushofer and Shapiro (2016) do not find any difference in children's education or children's health expenditure and outcomes when considering the difference between a female and a male recipient in Kenya, keeping in mind the previously mentioned caveat on limited statistical power in this comparison.

Thus, it is not clear that increasing women's bargaining power (by increasing her income share) will have positive effects on children's welfare. There can be several reasons for these mixed results. First, the cash transfers might not have affected the woman's bargaining power either because the amounts are too small or because the time horizon is too short (Chiappori and Mazzocco, 2017). Second, the assumption that women care more for their children than men might be flawed. In order to investigate this question, a small, but growing literature uses laboratory experiments to study household decision-making. Ringdal and Hoem Sjursen (2021) run an incentivized laboratory experiment and ask couples in Tanzania to allocate an endowment between the wife, the husband and tutoring for one of their children. The authors find that whether the husband or the wife makes this decision does not affect the allocation to tutoring, but women receive a higher share of the endowment when they decide how resources are allocated (compared to when the husband makes the decision). In a similar set-up, Schürz (2020) in another study from Tanzania find that women allocate more resources towards school materials than men do. The key differences between the two studies in Tanzania are what children are given (tutoring vs. school materials) and between who the allocations are (wife, husband, and child vs. self and child).

Almås et al (2021) conduct interviews in Tanzania, and randomize whether they interview the mother alone or the couple jointly. The authors ask respondents hypothetical questions about resource allocation between household members (the mother, the father or the child). In terms of allocation across household members, mothers allocate significantly more to children and significantly less to the father. The increase in the allocation to the child corresponds to 3.5% of the budget and is driven by mothers allocating more to children's food and clothing. There is however no difference when it comes to health and educational expenditure. This study also identifies

allocations for different goods / spending categories. They find that mothers allocate significantly more to clothing and food, and significantly less to health and transport expenditure than couples do.

Overall, there might be some kind of specialization within the household when it comes to children. In particular, women tend to allocate more resources towards food (and therefore also nutrition) and clothes. However, when it comes to more direct long term investments such as education, men and women do not differ in their allocation decisions. This might be due to food and clothes being more "homely" tasks that the woman is expected to take responsibility for, while educational investments are a decision made at the household level.

5 Summary

This paper has highlighted some of the evidence related to the household as a source of inequalities as well as a vehicle for redistribution. It has discussed that there are substantial inequalities within households in some contexts and that these often, but not always, disfavor women and children in the household. The paper also documented that poverty and inequality measures that assign each household member a per-adult share of household consumption leads to underestimation of inequalities and miss-classification of poverty.

This paper has highlighted two main methods to take account of within household inequalities: direct elicitation of shares within households and structural estimation of such shares based on more limited direct evidence. Structural collective models are based on a number of assumptions, and in order to relax and test these, one can elicit more direct measures on consumption (and potentially time) allocations, and on decision making power. This is an interesting avenue for further research: one should develop, validate and use more direct elicitation of allocations, but also beliefs, preferences and decision making power for spouses within households. With such direct elicitations, one is equipped to both test and relax the rather strong assumptions made in most structural models today.

The paper also studied the main determinants of power in household decision-making and found that the higher the relative income the higher the decision-making power and consumption for the individual within the household. The paper further discussed how household allocations are important for policy. One important policy that aim to alter within household inequality is gender targeted transfers. Zooming in on the evidence related to whether gender targeting is good for gender equality and children in terms of

spending on food, clothing, health and education it was shown that across all domains, most studies either show a positive or no effect of targeting women. One can therefore conclude that it appears unlikely that increasing women's bargaining power within the household will have adverse consequences for women and children, but whether it has a positive effect depends on the context.

A question related to determinants of household allocations is whether household formation and household structure can be a source of inequality in the society. Since Becker's seminal work (Becker, 1993) there has been awareness that specialization takes place within the household: one of the partners (most often the man) tends to be more active in the labor market whereas the other partner (most often the woman) takes a larger responsibility for the household chores. This has also been confirmed by later empirical investigations (Goussé et al, 2017). The rationale for this specialization is the comparative advantage in the labor market relative to household chores. But, the specialization leads to inequalities in earnings within households which again may translate into inequalities in resource and power in decision-making between men and women within couples (see e.g., Juhn and McCue (2017) for a discussion). It is also likely to lead to inequalities after divorces.

Moreover, the marriage market may work in ways that amplifies gender inequalities in otherwise relatively gender equal societies. *Hypergamy* is that women tend to marry men with higher income potential than themselves. If there is specialization into household chores and labor market activities, the hypergamy may cause initial small differences in income potential to grow into larger income inequalities between men and women as the spouse active in the labor market gains human capital and on the job training. This phenomenon has been shown to be present in modern relatively gender equal societies such as Norway as of today (Almås et al, 2020), meaning that households formation may be a potential last barrier to gender equalization.

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Conflict of interest

The authors have no conflict of interest.

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