

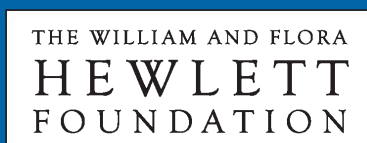
SCOPE AND EFFECTS OF REDUCING TIME DEFICITS VIA INTRAHOUSEHOLD REDISTRIBUTION OF HOUSEHOLD PRODUCTION: EVIDENCE FROM SUB-SAHARAN AFRICA

The Levy Institute Measure of Time and Consumption Poverty

Ajit Zacharias, Thomas Masterson, Fernando Rios-Avila,
and Abena D. Oduro

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the intrahousehold division of unpaid work in Sub-Saharan Africa



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1 INTRODUCTION

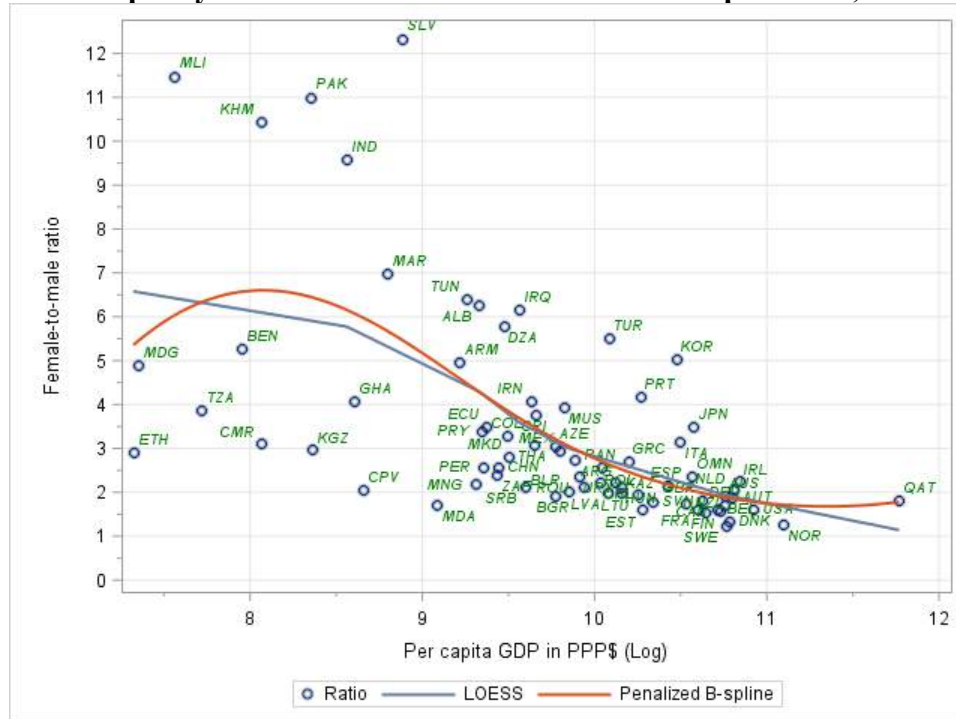
Gender disparity in the division of responsibilities for unpaid care and domestic work (household production) is a central and pervasive component of inequalities between men and women and boys and girls. Reducing disparity in household production figures as one element of the goal of gender equality enshrined in the United Nations' Sustainable Development Goals (SDGs), which 193 countries have committed to advance as part of the UN's 2030 Agenda for Sustainable Development, launched in 2015. Tracking the progress has not been a reassuring task so far. The UN website that serves as the knowledge platform for the SDGs reported, based on recent data from 90 countries, that “women devote on average roughly three times more hours a day to unpaid care and domestic work than men, limiting the time available for paid work, education and leisure and further reinforcing gender-based socioeconomic disadvantages.”¹

A cursory examination of available cross-country data indicates that higher per capita GDP—the neoliberal panacea for most societal malaise—provides little bulwark against the gender inequality in household production (Figure 1-1, below). Consider the cases of Ethiopia (ETH) and Mexico (MEX), which both had a similar level of gender inequality, as measured by the ratio of average time spent by women on household production to the average time spent by men (2.9). However, per capita GDP (in purchasing power parity [PPP] dollars) in Mexico was about \$18,000 in 2014—nine-times higher than in Ethiopia. Similarly, while Tanzania (TZA) and Costa Rica (CRI) have similar levels of gender inequality (3.9), the latter is about eight times as rich (\$16,000) as the former. Iran's (IRN) per capita GDP is about three times that of Ghana (GHA, \$5,000) but they have a similar level of inequality (4.0).² Finally, South Africa (ZAF) and Oman (OMN) have the same level of disparity (2.4) but South Africa's per capita GDP of \$13,000 is only one-third of Oman's. The dispersion in the gap seems less pronounced among high-income countries (above \$40,000 per capita GDP) but several low- and medium-income countries are as unequal as the rich countries.

¹ Source: <https://sustainabledevelopment.un.org/sdg5>; accessed July 3, 2020. The UN put forward Target 5.4 that pertains to the unpaid provision of domestic services and care of persons, referred to here as “household production.” See Esquivel (2016), Rai, Brown, and Ruwanpura (2019), Razavi (2016), and Zacharias (2017) for related discussions.

² The so-called civilizational factors may not help much: almost 90 percent of Iran is Muslim while about 70 percent of Ghanaians are Christian.

Figure 1-1 Gender Disparity in Household Production and Per Capita GDP, 2014



Sources: The female–male ratio for 73 countries is computed from Charmes (2019; Charts 3 and 4). GDP per capita, PPP (current international \$), is from the *World Development Indicators* (World Bank) accessed July 3, 2020.

Note: The curves fitted by locally weighted polynomial regression and penalized B-spline methods are labeled respectively “LOESS” and “Penalized B-Spline.”

Admittedly, employment and education are crucial to women’s empowerment. We expect that greater empowerment would lead to a less unequal distribution of household responsibilities. Recent estimates from an econometric model that used pooled time-use data from 18 developed and developing countries are suggestive in this regard (Alonso et al. 2019). The time spent on household production by men and women, respectively, is specified as dependent variables in separate models. Explanatory variables include different dummies for having a partner, having a child, two levels of educational attainment (secondary education and more-than-secondary education), two categories of employment (full time and part-time), and country of residence. Also, the number of children and age of the individual are included as regressors. The authors estimate that full-time employment reduces the average daily time spent by women on household production by about three hours relative to those women that are not employed. But, women that are employed full time are likely to spend a little over five hours

daily on employment. That is, employed women often confront a “double workload” (Benston [1969] 2019, 8).

On the other hand, full-time employment reduces men’s hours of household production only by an hour and 30 minutes. Consequently, we would expect employment to have a notable impact on reducing the gender gap (as measured by the difference in average hours)³ in household production. The estimated partial effects of educational attainment higher than secondary education on hours of household production indicate that raising educational attainment can alleviate the gap. However, its impact is smaller than that associated with employment (Alonso et al. 2019, 11–12) and unlikely to lead to sizable reductions in the rather high levels of inequality.

Long-term trends in gender disparity in home production are hard to study because of the paucity of data. Even for the rich countries, only a handful of nationally representative samples are available before the 1990s. Using data for seven countries, Alonso et al. (2019, 13) estimate that the conditional average daily minutes spent on household production during the 2000s was lower by 30 minutes for women and higher by 40 minutes for men when compared to the period 1961–89.⁴ It is also instructive to look briefly at the unconditional (simple) estimates because neither the direction nor the pace of change needs to be uniform over time.

Let us consider the United States, which has conducted the most time-use surveys prior to the present day. We focus on married men and women to abstract from the changes that have occurred in family composition, especially the rise of single-female-headed families and single-person households over the period under study.⁵ During a period of a little over half a century, the ratio of female to male median hours has fallen from 7.6 to 2.2 because men’s hours have risen while women’s hours have fallen (Figure 1-2, below). Much of the decline in women’s daily hours seems to have occurred between the mid-1960s and mid-1980s (from 340 to 240

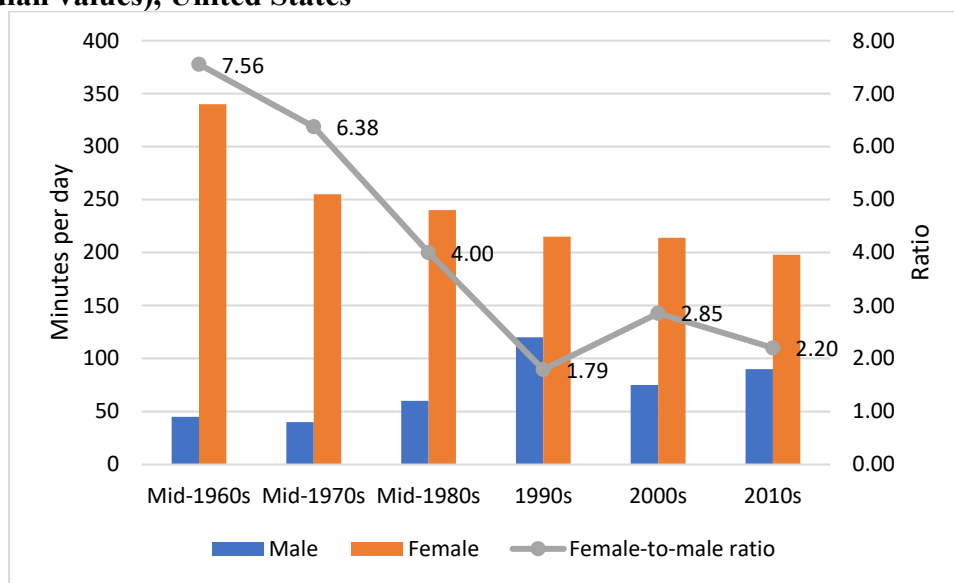
³ It is important to note that a reduction in the absolute gap need not be accompanied by a reduction in the relative gap (i.e., ratio of female to male hours, the metric that we used in Figure 1-1) unless the percentage decline in female hours is larger than that in male hours. Indeed, a reduction in the absolute gap is perfectly consistent with an increase in the relative gap.

⁴ The reported estimates are those associated with a dummy for the 2000s. The regressions include time dummies for the 1990s and 1961–89 (omitted dummy). Additionally, country fixed effects and controls for age, educational attainment, employment status, marital status, having children, and number of children are included in the model. Time-use surveys from Canada, Finland, France, the Netherlands, Norway, the United Kingdom, and the United States were used in the analysis.

⁵ The proportion of households without children (persons under 18 years of age) also rose substantially over the period. We did not omit married individuals in households without children due to the relatively small sample sizes of the pre-2000 surveys. However, the qualitative patterns that we report here are robust to their exclusion.

minutes), coinciding with a sharp increase in the labor force participation rate (LFPR).⁶ The decline since then has been smaller (from 240 to 198 minutes) and the change since the 1990s—a period marked by relatively little change in women’s LFPR —has been particularly small (only about 15 minutes or so). We can also observe that the fall in the time spent by women was not always matched by a rise in the time spent by men. For example, between the mid-1960s and mid-1970s, women’s time falls by almost 100 minutes *and* men’s time also decreases, though by a small amount (5 minutes). It is also interesting that compared to the 1990s, women’s *and* men’s time in the latest period is shorter, with men’s time falling by a bigger amount. Hence, the higher gender disparity in the last two decades relative to the mid-1990s occurred because men’s hours fell at a faster rate than women’s hours. In sum, the US experience indicates that narrowing gender disparity in household production takes a rather long time and requires a drastic increase in women’s employment. Further, the temporal patterns of change in hours spent on home production are likely to be different for men and women.

Figure 1-2 Trends in the Time Spent on Household Production by Married Men and Women (median values), United States



Sources: Authors’ tabulations from the American Heritage Time Use Studies (AHTUS) (Fisher et al. 2018) and American Time Use Surveys (ATUS) (Hofferth et al. 2020). The statistics pertain to married men and women, 18 to 64 years of age. The total number of observations amounted to 70,962 from the AHTUS (for the period 1965–2009) and 42,793 from the ATUS (for the period 2010–19).

⁶ Data from the US Bureau of Labor Statistics show that women’s LFPR increased from 39 percent in 1965 to 55 percent in 1985. During the next decade, their LFPR rose by another 4 percentage points. The LFPR fluctuated in the narrow range of 57–60 percent between 1995 and 2019. For discussion of the LFPR’s recent stagnation, see, *inter alia*, Abraham and Kearney (2018), Blau and Kahn (2013), Hook and Paek (2020).

Feminist scholars and political activists have articulated that the redistribution of household production responsibilities from females to males is important for its own sake, as well as for achieving gender equality in labor market outcomes (Bruyn-Hundt 1996; Elson 2017; Esquivel 2016). Indeed, the SDGs' incorporation of a target regarding a more equal sharing of household reproduction burdens is a testament to the decades of activism and advocacy emphasizing that inequality on this front is not purely or even primarily a "private family matter" but a matter of public policy. Yet, difficult questions remain about public policies and collective actions that would reduce inequality, especially in poorer countries. A limited consensus seems to have emerged regarding the effectiveness of certain policy initiatives (e.g., paid paternity leave).⁷ But, many of them are likely to have only limited efficacy in the poorer countries due to their structural features such as the widespread absence of formal wage labor and weak welfare states.

Our study contributes to the literature on the intrahousehold distribution of household production by placing the question within a framework of analyzing deprivation. We also apply that framework to better understand the interactions between poverty and the gendered division of labor in four sub-Saharan African nations: Ethiopia, Ghana, South Africa, and Tanzania. Central to our framework is the notion that attaining a minimal standard of living requires command over an adequate basket of commodities *and* sufficient time to be spent on home production (Bentson [1969] 2019, 6; Vickery 1977, 28; Zacharias 2011). Household production for satisfying the minimum requirements for the reproduction of the family as a unit involves cooperation and conflicts between family members (Sen 1987). Meeting those requirements produces benefits for all—including those beyond the household. For example, eating homemade meals is generally a cheaper (and often more nutritious) alternative to purchasing ready-to-eat meals, but shopping for the ingredients, cooking, and cleaning up afterward takes time and effort. Cooperation by family members in these tasks can make the limited budgets of low- and moderate-income families go farther. However, cooperation can involve disputes about who does what and how much. Redistribution of household production responsibilities is a rearrangement of the status quo and, therefore, likely to generate conflicts. Individual interest may not coincide with collective interest (or at least that of some other family members). That discrepancy can become a factor affecting the nature of the conflicts in such instances.

⁷ We return to this question in the report's final chapter.

The nature of the conflicts may depend on how far the individual's interest in reducing her overwork aligns with that of other family members' interests about how they spend their time and their concern for the family's economic well-being and the well-being of the overworked person. Perceptions about "overwork" and gender ideology will play powerful roles in shaping these conflicts. Our focus here is not on the interpersonal intrafamily conflicts regarding household production, but the limits on redistribution imposed by objective conditions that are beyond the "choice" of individual family members.

Ours is hardly the first effort to understand disparities in the intrahousehold division of labor in sub-Saharan Africa. Therefore, we begin with a review of the existing literature (section 2). We then turn to outline our two-dimensional measure of deprivation—the Levy Institute Measure of Time and Consumption Poverty (LIMTCP)—and present evidence regarding the gender disparity in time deficits that we observe in our data.⁸

Women are far more prone to time deficits than men, and the main factor behind their greater vulnerability is the disproportionate share of household responsibilities that they shoulder; however, time deficits among men seem to be mainly driven by long hours at the job. The findings motivate the questions regarding the feasibility and effectiveness of redistribution of household responsibilities to alleviate time deficits and their impoverishing effects (section 3). We develop a framework to assess the mechanics of redistribution among family members and then apply it to gender-based redistribution. Confronting the method with the data, we can derive the maximum extent to which redistribution—either among all family members, between sexes, or between husbands and wives—can lower the incidence of time deficits (section 4). In section 5, we turn to alternative principles of distributing household production responsibilities among family members and examine their impact on the LIMTCP. The final section concludes by discussing some policy questions in light of the study.

⁸ We have developed estimates for a set of countries (in a given year): Argentina (2005), Chile (2006), Ghana (2012–13), Korea (2009), Mexico (2008), Tanzania (2011–12), Turkey (2006), Ethiopia (2015), and South Africa (2015). Detailed analysis of the results and information regarding sources and methods can be found in the following list of references: Zacharias, Antonopoulos, and Masterson (2012) for Argentina, Chile, and Mexico; Zacharias, Masterson, and Memiş (2014) for Turkey; Zacharias, Masterson, and Kim (2014) for Korea; Zacharias et al. (2018) for Ghana and Tanzania; Zacharias, Masterson, and Rios-Avila (forthcoming) for Ethiopia and South Africa.

2 REVIEW OF LITERATURE

As in all regions across the globe, women and girls across sub-Saharan Africa are responsible for performing unpaid household work, i.e., household chores and caring for children, the elderly, and the sick. Boys and men are less involved in these activities, with men being less involved than boys. The gender gap in the distribution of unpaid household work reduces women's participation in paid work, tends to push them toward part-time work and the informal sector, and contributes to the gender wage gap. Increasing attention is being paid to women's unequal share of household work. Reducing women's burden of domestic work and childcare is one of the targets of the fifth SDG. To design effective policies to reduce this gap, a clear understanding of the different factors that explain the inequality in the distribution of household work and its persistence is essential.

2.1 Theoretical Perspectives

Several theoretical models have been developed to explain the distribution of unpaid household work within couples. The experiences of families and households in the global north have influenced the design of these models. Three models have gained currency in the literature. These are the time availability theory, resource-based theories, and the gender ideology theory.

The time availability theory hypothesizes that within couples the partner who spends more time in paid employment outside the home will spend less time on household work (Bianchi et al. 2000; Geist and Ruppanner 2018; Gough and Killewald 2010; Lachance-Grzela and Bouchard 2010). Since the number of hours in a day is fixed, time spent in paid employment reduces the amount of time spent on housework. This begs the question of what determines who will spend more time in paid employment outside the home. In the African context, the time availability theory should be framed differently because paid wage employment is the exception rather than the norm for both women and men. Self-employment, which is the norm, provides greater opportunity for partners to negotiate time spent on domestic work since, unlike paid wage employment, there is greater flexibility to decide how to arrange the working day. In the context of self-employment, it should be expected that there will be less inequality in the distribution of household work between wives and husbands. A study using time-use data from Australia found that self-employed fathers did not spend more time on

domestic work than fathers who were paid employees (Craig, Powell, and Cortis 2012). The time availability theory does not consider the participation of children in housework and childcare (Geist and Ruppanner 2018). This is particularly important in the sub-Saharan African context where both girls and boys sweep, wash dishes, wash clothes, fetch water and firewood, and bathe younger siblings. By delegating these tasks to children, the time women spend performing these chores can be reduced.

The resource-based theories take into account more explicitly the unequal distribution of power that may explain the distribution of unpaid care work. The partner with the greater share of the couple's resources (financial) is thus endowed with the bargaining power to negotiate for less time spent on housework (Brines 1994; Geist and Ruppanner 2018). It is expected that as a woman's earnings increase relative to their spouse's, they will spend less time on housework. Another strand of the resource-based theories focuses on women's absolute earnings. As women's earnings increase, they spend less time on housework because they can afford to acquire labor-saving devices and outsource some domestic chores (Gupta 2006). The resource-based theories have been criticized because of the focus on the couple (Geist and Ruppanner 2018). This is of pertinence for the sub-Saharan African context where households do not always comprise a nuclear family and where the extended family offers additional networks to rely on for support for housework. Other family members (for example, mothers and mothers-in-law) can perform some of the household tasks of wives. Bargaining based on financial resources may be less relevant for explaining the division of labor between spouses in these contexts.

Gender norms and values, however, can counteract the effect of women's resources on their bargaining power as well as the conclusions predicted by the time availability theory. Gender ideologies influence how women and men perceive themselves and the roles they consider they must perform. The gender display theory recognizes the role of social norms and perceives housework as a symbolic enactment of gender relations, where attitudes toward gender roles drive couples to display their "proper" roles in the household. In their study, Evertsson and Nermo (2004, 1273) wrote, "women and men take part in gender deviance neutralizing behavior; that is, they exaggerate behaviors that contradict a deviant economic identity (e.g., breadwinner wife and supported husband). In these unconventional families, women do more housework than predicted by their labor market work hours and relative

resource models, whereas men do less.” So, for example, when a woman’s share of the couple’s income exceeds a critical level, instead of doing less housework because she earns more than her husband (as predicted by the resource-based models), she does a larger fraction of housework to “prove herself” as a good woman (e.g., Evertsson and Neramo 2004; Shelton and John 1996; Zuo and Bian 2001) and she is penalized at home for being successful in the workplace. Killewald and Gough (2010) present a contrary review. Using a panel-data set of US couples, they find a nonlinear relationship between women’s absolute earnings and time spent on housework, but do not find evidence to support the compensatory gender display theory. As women’s earnings increase, the time spent on housework reduces but at a declining rate. They conclude that “the continued high levels of housework by high-earning wives show that more than money is needed for wives to achieve parity with their husbands in household labor time” (Killewald and Gough 2010, 1001).

In sub-Saharan Africa, gender norms that prescribe specific roles and functions to women and men are still quite pervasive (Feinstein et al. 2010). This review will examine the existing literature on the distribution of household chores between women and men in sub-Saharan Africa with a focus on Ghana, Ethiopia, Tanzania, and South Africa.

2.2 Empirical Studies

2.2.1 Data and Methodology

There is a growing literature that presents evidence from nationally representative surveys on the distribution of unpaid care work between women and men in sub-Saharan Africa. Data on how individuals allocate their time across paid work, unpaid work, leisure, and personal maintenance can be obtained from time-use surveys designed for this purpose and from time-use modules included in household surveys. Labor force surveys sometimes contain modules that collect information on how respondents spend their time across these activities. In a few cases, household production activities recorded in time-use surveys have been integrated into national accounting systems in an attempt to monetize their household production contribution and compare the distribution of paid and unpaid work between men and women (Mitik and Decaluwé 2009; Oosthuizen 2018; Amporfufu et al. 2018).

There are also instances where the absence of national data (Arora 2015) or the peculiarities of the study render the usage of national data impossible and makes the collection of the researcher's own data necessary (e.g., Ndlovu, Mohapatra, and Luckert 2018; Arku and Arku 2013; Getahun 2018). For example, in analyzing the determinants of women's domestic work for the various theories of unequal distribution of housework, Getahun (2018) used data from a household survey of 502 married women in rural Ethiopia. Similar data arrangements were made by Arku and Arku (2013) in their study of how housing structures in which couples lived can affect men's unpaid care work contribution; in South Africa, Ndlovu, Mohapatra, and Luckert (2018) provided evidence on how income transfers like pensions can affect time allocation for domestic and market work by women and men.

In most instances, the analyses of the distribution of unpaid care work have been descriptive and based on gender, age bracket, and other socioeconomic variables. Studies that use econometric regressions in estimating the determinants of unequal distribution of unpaid care work are relatively few (Getahun 2018; Costa et al. 2009; Robles 2010; Simister 2013; Wodon and Ying 2010; Lawson 2008; Arora 2015; Herrera and Torelli 2013; Ndlovu, Mohapatra, and Luckert 2018). Econometric models that have dominated in the regression analysis have been simple ordinary least squares (OLS) (Wodon and Ying 2010; Getahun 2018; Costa et al. 2009) and probability distribution models (probit and tobit). Proponents for the use of linear models such as OLS argue that linear models are more robust to measurement errors and are more likely to produce statistically significant results compared to tobit models with more zeros. Again, given that unpaid care work is fundamentally a female's responsibility, recording zero hours of work is unlikely, especially in the African context (Getahun 2018). On the other hand, tobit models are preferred where the analysis involves censored data since linear models yield inconsistent and biased estimates (Robles 2010). The tobit model, however, assumes that the probability of observing both censored and noncensored values depends on the same variables. But it is reasonable to expect the personality profile of people involved in a given activity to differ from those who are not, so there is likely to be a sample-selection bias in the decision whether or not to do housework (collect water, for example) and whether or not to enter the labor market. Herrera and Torelli's (2013) study of ten sub-Saharan African countries,⁹

⁹ The data combined samples of 1-2-3 surveys (nested surveys that collect data on different statistical populations, i.e., individuals, production, units, and households) from eleven capital cities in ten sub-Saharan African countries: Benin, Côte d'Ivoire, Togo, Cameroon's two main cities, Madagascar, Burkina Faso, the Democratic Republic of

as well as Costa et al.'s (2009) study in Ghana, account for selection bias by applying Heckman's sample selectivity procedure. Although Herrera and Torelli (2013) estimate a Heckman model in addition to a tobit, the authors only commented on the tobit model's results due to problems encountered with the specification of the selection equation and unrealistic estimated coefficients. For the Ghana study, Costa et al. (2009) used distance from the nearest market and presence of community water infrastructure as instruments. Econometric concerns relating to endogeneity in women's earnings have also been addressed by Simister (2013). Using nationally representative surveys from five African countries, Simister (2013) applied a two-stage least squares regression method to control for endogeneity in a wife's earnings by using her education and age as instruments in predicting her earnings. The results were, however, similar to that of the OLS specification.

Regression discontinuity analysis has been used by Ndlovu, Mohapatra, and Luckert (2018) in South Africa. In an attempt to investigate the role of income transfers on paid and unpaid work, Ndlovu, Mohapatra, and Luckert (2018) recognized that the causal effect of an income transfer to the household is a function of the difference between the income allocation to the household during a period when the individual lived in a pension household and when they did not. Meanwhile, observing both potential outcomes is not possible. The regression discontinuity analysis aims at recovering the average casual effect through an estimation of the conditional expectation functions at both sides of the age thresholds.

2.2.2 Patterns in the Distribution of Unpaid Care Work in sub-Saharan Africa

Unpaid care work comprises housework, care for the sick, children, and elderly living in the household, and unpaid community services, including services provided to other households (Budlender 2008). The focus of this paper is on the first two categories of unpaid care work.

Irrespective of whether unpaid care work is defined to include the care of the sick and elderly in the household and irrespective of the data source, estimates of the time spent on unpaid care work and the incidence of unpaid care work find that women disproportionately shoulder the burden. In a study that reviewed empirical evidence from time-use surveys conducted in five sub-Saharan African countries (Benin, Madagascar, Mauritius, South Africa,

Congo, Mali, Niger, and Senegal. A description of these surveys can be found in De Vreyer and Roubaud (2013, 9).

and Ghana¹⁰), Charmes (2006) found women to be more involved in domestic and care activities than men: 4.7 times more in Madagascar, nearly four times (3.79) in Mauritius, 3.04 times more in South Africa, and 3.1 times more in Benin. In Ghana, women spent 5 hours 42 minutes a day on household activities (childcare, sweeping, cooking, garbage disposal) compared to 3 hours and 8 minutes by men. Less time is generally spent on collecting firewood than fetching water. In South Africa, fetching water and collecting firewood accounted for between one hour to more than two hours a day. Much less time is, however, found by Floro and Komatsu (2011) using the 2000 South Africa national time-use survey. They estimated the time spent in fuel and water collection to be 14.43 minutes for women and 5.71 minutes for men. The fetching of water and collecting of firewood was also noted to be associated with child labor, such that in Benin, Madagascar, and Ghana, girls and boys aged 4–14 spend 41 minutes and 38 minutes, respectively, fetching water (Charmes 2006). Using data on time use from a 2013 primary household survey in two rural districts in Mozambique, Arora (2015) found that men spend about 6.4 hours per day on primary care activities while women spent about double that time (11.7 hours). The evidence in Tanzania, as documented by Fontana and Natali (2008), is no different from what has already been discussed. Using the time-use survey undertaken by Tanzania's National Bureau of Statistics (NBS) in 2006 as an add-on module of the Integrated Labour Force Survey (ILFS), the authors used descriptive statistics in discussing the average time spent per day by gender in ten main activities. Women spent three times the time spent by men on household activities and care. In terms of time spent collecting water, women spend an average of 30 minutes per day compared to 20 minutes for men, with rural women spending much more time than urban women on this activity. Estimating the overall mean time spent water collection at 27 minutes per day, about 85 percent of women were estimated to be overburdened with the task compared to 15 percent of men. Also, more than 60 percent of those overburdened with water collection were found to belong to poor households, with about 85 percent of them being women who are both income- and time-poor. Findings were similar for fuel collection in Tanzania.

¹⁰ The South African survey was a specific ad hoc survey, while the Benin and Madagascar surveys were specific surveys attached to continuous permanent surveys, and the Mauritius survey was a specific module included in the multipurpose household questionnaire. Furthermore, the Ghana Living Standards Survey (GLSS) included questions on time use for housekeeping activities in its third round (1991–92), fourth round (1998–99), and fifth round (2005–6).

Using the 2005 Ethiopian Labour Force Survey, Robles (2010) found that women spent 36 hours per week on housework (fetching water, collecting firewood for own consumption, and other forms of domestic work) compared to 7 hours spent by men. In a survey of selected rural communities in five countries, including Ethiopia, Karimli et al. (2016) found that women spend more time than men on housework and care work.

Studies using South Africa's 2000 time-use survey (Mitik and Decaluwé 2009; Floro and Komatsu 2011) and 2010 time-use survey (Oosthuizen 2018) found that women spend significantly more time on housework and care work. Floro and Kumatsu (2011) found statistically significant time differences between men and women regarding how much time is spent on household work. Women spent almost five hours (294 minutes) on average per day on household work compared to nearly two hours (112 minutes) on the same activities for men. Using the 2000 time-use survey, Mitik and Decaluwé (2009) found that women spend about 52 percent of their labor time on household work compared to 27 percent in the case of men. A similar pattern prevails among children: girls' contribution to household work is about twice that of boys. Women and girls spend more than 65 percent of their total time on household work. The gender gap in household work persists: in 2010, women spent, on average, 3.9 hours per day on housework and providing care compared to 1.6 hours by men (Oosthuizen 2018).

Roncoli (1985) and Ardayfio-Schandorf (1986) observed that Ghanaian women were burdened with the responsibility of food processing, cooking, childcare, fetching water, and fuelwood. Haddad's (1991) study reported an average of 20 hours per week in housework for women compared to an average male contribution of 5 hours per week using the time-use module in the 1987–88 Ghana Living Standards Surveys (GLSS). Using data from the time-use module contained in the fifth GLSS, conducted in 2005–6, Ferrant, Pesando, and Nowacka (2014) estimated that out of an average of 13 hours per day that Ghanaian women spend on total work, 60 percent of that is devoted to unpaid work activities. This is dominated by cooking and childcare tasks taking 20 percent and 35 percent of their unpaid work time, respectively. Other unpaid activities such as fetching water, collecting firewood, washing clothes, and washing dishes required approximately the same amount of time—contributing to an average of 4 percent to 5 percent of total working time each and representing a total of three hours per day. Although Ghanaian men participate in unpaid domestic activities, Ghanaian women performed between two-thirds and three-quarters of household work. Similar findings are obtained by

Amporfu et al. (2018), who estimated the value and distribution of paid and unpaid work using data from Ghana's 2009 time-use survey. Women spent, on average, ten more hours per week on housework than did men.

National averages mask the heterogeneity in participation in unpaid care work among different categories of women and men. Rurality can influence who performs unpaid care work and how much time is spent on it. In Ethiopia, the incidence of unpaid care work is lower among rural men compared to urban men, and the time spent on these activities is shorter compared to urban men. Almost all rural women undertake unpaid care work and, on average, spend 27 more hours per week on these activities than men compared to urban women who spend, on average, 17 more hours per week (Robles 2010). In Sierra Leone, women aged 15 years and older spent an average of 46 hours and 34 hours per week on domestic work (cooking, washing motor vehicles, sweeping, disposing of garbage, ironing clothes, shopping, taking care of children, running errands, fetching wood, and fetching water) in rural and urban areas, respectively. This compared to 23 hours and 12 hours, respectively, for men (Wodon and Ying 2010).¹¹

Participation in unpaid care work and the time that women and men spend performing these tasks vary across the age profile. In Ghana, women and girls spend more time than men and boys on housework across the entire age distribution (beginning from 10 years). The gender gap peaks for the population aged 25–35 and begins a steady decline beginning from the population aged 50 years. The gender gap in the provision of care is initially biased against women and is widest among the population in their mid-twenties and thirties, after which it declines sharply. The gender gap in the provision of care does not remain biased against women. Among the population aged 60 years and above, men spend more time than women in the provision of care (Amporfu et al. 2018). A similar pattern is found in South Africa using both the 2000 (Mitik and Decaluwé 2009) and 2010 time-use surveys (Oosthuizen 2018). The time men spent on housework was highest among men aged 60 years and above. In Lesotho, on average, men aged 55 years and older spend more minutes of the day on cooking and other domestic activities (not including fetching firewood and water) than do younger men, while among women those aged 65 years and above spend, on average, fewer minutes involved in these activities compared to women in the other age groups (Lawson 2008). Older women aged

¹¹ The data used for the study is the Sierra Leone Integrated Household Survey, 2003/4.

55 years and above spend more minutes collecting firewood and water than younger women, while among men there is a decline in the amount of time spent on these activities until age 45.

In South Africa, there are distinct differences in the amount of time spent on domestic work by racial group. Compared to Colored, Indian, and White women,¹² the share of time spent on domestic work by African women is the highest, while the share of time spent on these activities by White women is the lowest. Even though irrespective of racial group men spend a lower share of their time on domestic work, African men spend a greater share of their time on domestic work compared to other men, while Indian men spend a lower share of their time on these activities. The gender gap in the share of time spent on domestic work is highest among Africans, at 24.9 percentage points, and the lowest amongst Whites, at 17 percentage points (Mitik and Decaluwé 2009).

2.2.3 Determinants of Time Spent on Housework in sub-Saharan Africa

The theoretical literature suggests factors that will explain the distribution of unpaid care work between women and men within households. The time availability theory suggests that the type of employment (full-time/part-time) and employment status (wage employed/self-employed) will explain the amount of time spent on unpaid care work. The resource-based theories point to the income, earnings, wealth, and education of individuals as determining factors. The gender ideology theories identify gender norms and social, cultural, and religious values as critical factors such that they may counteract the influence of economic factors. Beyond the explanatory variables identified by these theories, other factors have been identified that can explain the distribution of housework. These are housing structure and living arrangements (Arku and Arku 2013; Robles 2010; Herrera and Torelli 2013), parenting (Ferrant and Thim 2019), and access and availability of utility services (Arku 2010; Costa et al. 2009; Wodon and Ying 2010; Coulombe and Wodon 2008; Charmes 2006).

¹² These are racial categories in South Africa.

2.2.3.1 The relevance of the time availability, economic bargaining, and gender ideology theories for sub-Saharan Africa

There are not many studies using sub-Saharan Africa data sets to investigate the relevance of these theories. This is largely because few countries have time-use data sets and, in those countries with these data sets, data may not have been collected on individual earnings, individual asset wealth, or gender ideology variables.

A recent small-scale study in Ethiopia by Getahun (2018) investigated the determinants of women's unpaid care work in Bahir Dar and its nearby rural villages using a cross-sectional data set comprising 502 married women and employing a multivariate hierarchical linear regression model to test the time availability theory, economic bargaining theory, and gender ideology perspectives on housework. Housework was defined to include activities such as: cooking, cleaning, and washing; local shopping for consumption; childcare and care of other household members; and doing other reproductive routines for the household. Recognizing the influence of the extended family structure on the contribution of time to housework, the author included other members living with the family aside from children and spouse as an explanatory variable. Time spent on household activities was regressed on women's employment status (time availability indicator), women's years of schooling and their loan receipt status (indicator for resource control or bargaining power), and indicators of traditional gender ideology or display (traditional=1; otherwise=0). A woman is considered as traditional in her ideology/display if she responded "yes" to at least two out of three questions on gender ideology variables.¹³ Getahun (2018) found support for all three theoretical propositions. Even though the study did not test the gender display theory, the size and significance levels of the coefficients of the years of schooling and loan receipt status variables reduced when the gender ideology variables were introduced.

The only other study in the papers surveyed that includes variables to capture employment status (and therefore investigate the time availability theory) is Wodon and Ying's (2010) study on Sierra Leone. Employment is captured using three dummy variables, i.e., whether the person worked in the past 12 months, did not work in the past 12 months, or was inactive (the default). It would be expected that individuals who worked in the past 12 months

¹³ The gender ideology variables included: (1) a woman's job is to take care of housework as my husband's job is to work for our living; (2) Does everything in the house go wrong when a woman instead of her husband works outside? (3) A husband is not experienced in housework activities, but a woman is.

would spend less time on domestic work than the inactive. On the contrary, rural women and men who worked in the last 12 months spent more hours per week on domestic work than the inactive, and there was no significant difference between urban women and men who worked and the inactive. These findings need to be accepted with some caution because the number of hours worked per week in the past 12 months is not adequately controlled for in the analysis.

Support for the economic bargaining model has also been provided by Ndlovu, Mohapatra, and Luckert (2018) in a study that uses the regression discontinuity model to investigate the effect of women's and men's pensions on the allocation of time between leisure, market work, and domestic work in rural South Africa. Receipt of pensions by women reduces men's leisure time and increases the time they spend on domestic work while men's pensions increase women's leisure time and reduce the time spent on domestic work.

There are mixed findings for the relationship between women's and men's education and the time they spend on housework. In Getahun's (2018) study on women's time spent on housework, the years of schooling of women and their spouses are included as explanatory variables. Spouses' education has no effect on women's time spent on housework, while there is a negative relationship between women's education and their time spent on housework. A significant negative effect of education is found for both urban and rural women's time spent on housework in Ethiopia, with the effect of education on housework increasing from the lower to higher education levels (Robles 2010). In contrast, in Sierra Leone, education is only important for rural women, with an unexpected positive sign (Wodon and Ying 2010). Using the fourth round of the GLSS, Costa et al. (1999) found for Ghana that although no significant relationship was established between women with at most a secondary education and their weekly time spent on domestic activities, having a tertiary education was significant in reducing the time spent on domestic activities for women.

Education has no effect on the time spent on domestic work by urban men in Sierra Leone (Wodon and Ying 2010) and rural men in Ghana (Costa et al. 2009). Rural men in Sierra Leone with a primary education spend more time on domestic work than do men with no education, while men with a secondary education spend less time (Wodon and Ying 2010). In Ethiopia, education reduces the time spent on domestic work by urban and rural men, with a stronger effect among urban men.

For eleven cities in ten sub-Saharan African countries, Herrera and Torelli (2013) found that male's contribution to housework increases with years of education. This is, however, not the same for women; their contribution remains virtually unchanged irrespective of the years of education.¹⁴ This may be a signal for low support for the resource theories in the sub-Saharan African context.

The relationship between housework and social norms has often been looked at through the lens of “doing gender” and gender perspectives (Robles 2010; Simister 2013; Ferrant and Thim 2019). In Ethiopia, for example, “all household activities are predominantly considered feminine” (Robles 2010, 308). Ferrant and Thim (2019) note that higher levels of economic development do not automatically lead to a less unequal redistribution of unpaid care work between men and women. The authors attributed this to the persistence of restrictive gender norms against women. They write that “gendered social norms view unpaid care work as a female prerogative and prevent men from assuming equal responsibilities, whatever the regions, socioeconomic classes and cultures” (Ferrant and Thim 2019, 15). In Uganda, for example, the study reported that two-thirds of the population recognize unpaid household work as under women's purview, so that women are responsible for 85 percent of the cooking, 92 percent of collecting water, and 78 percent of childcare.¹⁵

Simister (2013) investigated whether men's share of housework is reduced by “gender deviance neutralization”¹⁶ in Cameroon, Chad, Egypt, India, Kenya, Nigeria, and the United Kingdom. Data for six countries were sourced from the “Work Attitudes and Spending” (WAS) surveys, while the “British Household Panel Survey” data was used for the UK. The study also investigated the impact of husbands' alcohol consumption and domestic violence by men against women. This was to help unmask why bargaining models in previous studies are not successful in explaining gender deviance neutralization by men. The author explains that perhaps domestic violence, which may be associated with alcohol consumption, can explain why men who earn less than their partners are able to avoid household work. Using a two-stage least squares regression method to address the endogeneity of women's earnings, the study

¹⁴ See footnote 1 for details on the data set used for this study.

¹⁵ More information on the Social Institutions and Gender Index Country Study in Burkina Faso and Uganda is available here: <https://www.genderindex.org/country-studies/>

¹⁶ Gender deviance neutralization occurs when a couple in an unconventional situation (such as the woman earning more than her husband) makes up for this by the woman spending more time on housework and the man spending less time than they otherwise should given the woman's share of couple earnings (Evertsson and Neramo 2004).

found that in most countries, men's share of housework increases until women earn between 83 percent and 99 percent of the couple's earnings. Men's share of housework differed across countries, and this was explained by men's resistance to performing housework due to cultural factors like childhood socialization. For example, in Egypt, men's share of the housework was lower than in other countries, and the reduction in men's share of housework occurred when wives earned 50–67 percent of couple earnings. Men in such countries appear to be resistant to doing housework than in more gender symmetric countries like the United Kingdom and Kenya.

2.2.3.2 Household composition

The presence of other household members—children and other adults—can dilute the validity of the time availability theory since other household members in addition to the couple can perform household tasks. The age of the children in the household matters for whether their presence will increase or reduce the time spent by women and men on housework. In Ghana (Costa et al. 2009), Ethiopia (Robles 2010), and Sierra Leone (Wodon and Ying 2010), having children less than six years old in the household increased the time women spent on household work. In contrast to Robles (2010), who has separate categories for infants (less than six years) and children (between five and ten years), Getahun (2018) has one category, i.e., number of children less than ten years, and finds a positive association with women's time spent on housework.

Unlike women, the number of children less than six years old does not appear to affect time men spend on housework in rural Ghana (Costa et al. 2009), Ethiopia (Robles 2018), and in rural Sierra Leone (Wodon and Ying 2010). In contrast, among urban men in Sierra Leone, the number of children aged less than six years old increased the time spent on housework.

As children grow older and can participate in household chores, the time spent on these chores by adults would be expected to decline. Of interest in this case is who benefits from the reduction in time spent on housework—women or men? In Ghana, the presence of children aged between seven and ten years increased women's housework time (Costa et al. 2009) but had no effect on men's time. In contrast, in Sierra Leone, children aged 6–14 years were associated with a decline in time spent on housework by rural women and men (Wodon and Ying 2010) but did not affect urban women and men. In Ethiopia, rural and urban men spent less time on housework as the number of children in the household aged 6–14 increased while

there was no effect for women (Robles 2010). Similar findings on the burden of childcare on women were made by Mitik and Decaluwé (2009) in an explorative study in South Africa. However, Mitik and Decaluwé (2009) noted that as the years pass, children (especially girls) become substitutes for parents in unpaid work, allowing women to increase their market labor supply. Ferrant and Thim (2019) found that having a child in Ethiopia, South Africa, and Peru is associated with 17, 46, and 14 more minutes, respectively, of childcare per day for women.

The burden of housework can be reduced for the individual woman and man if other household members can assist with these tasks. An increase in the number of men in the household tends to increase women's time spent on housework in Ethiopia while an increase in the number of women, irrespective of their age cohort, tends to be associated with a decline in women's and men's time spent on housework in both urban and rural locations (Robles 2010). Getahun's (2018) study also found that the presence of other members of the household in an extended family setting, as seen in many sub-Saharan African countries, has a statistically negative association with women's housework time. The Sierra Leone study does not differentiate the number of adults by sex. Despite this, an increase in the number of adults aged 15–60 years is associated with a decline in time spent on housework by rural women and men (Wodon and Ying 2010). Herrera and Torelli (2013) found that women living in extended household structures, as well as those in polygamous households, make lesser contributions of time to domestic work compared to other household types.

The head of the household's sex is also associated with the time spent on housework (Fontana and Natali 2008). An interesting finding from a descriptive study by Fontana and Natali (2008) in Tanzania was that the time burden in collecting water and fuel, as well as food preparation, is lower in female-headed households than in male headed-households. For example, women in male-headed families spend about 30 minutes longer every day on food preparation than women in female-headed families. Men were also more likely to participate in unpaid housework activities in female-headed households than male-headed households.

2.2.3.3 Marital status

The relationship between marital status and time spent on housework cannot be determined a priori. In the immediate aftermath of marriage, if both partners participate in household chores, it is anticipated that there will be a decline in time spent on housework. However, with the

arrival of children, one would expect that even if childcare is equally shared, there will be an increase in time spent on housework by women and men. The evidence suggests that marriage is more likely to be associated with an increase in the time spent on housework for women. In Robles' (2010) study of Ethiopia, it was found that married women spend more time on housework and married men spend less time than their nonmarried counterparts. In Sierra Leone, being either a married woman or in an informal union is associated with an increase in the time spent on domestic work. The burden is higher for women in informal unions. The relationship between marital status and time spent on housework is ambiguous for men. With the exception of urban men in informal unions, for whom such unions are associated with a decline in the time spent on domestic work, there is no association between domestic work and marital status for men (Wodon and Ying 2010). Holding all other things constant, married men spend 9 minutes, 20 minutes, and 40 minutes less on routine housework in Ethiopia, Peru, and South Africa, respectively, compared to their counterparts who are single men (Ferrant and Thim 2019). Married women in urban cities in sub-Saharan Africa have been found to devote more time to domestic work than do daughters and mothers (Herrera and Torelli 2013).

2.2.3.4 Age

The studies considered here model age as a nonlinear relationship with housework. In Ethiopia, both rural and urban women's time spent on housework increases and then declines with age (Robles 2010). A similar pattern holds for urban and rural women and men in Sierra Leone (Wodon and Ying 2010). Among men in Ethiopia, however, the pattern is the reverse for urban men and there is no effect of age on rural men, nor for women and men in Ghana (Costa et al. 2009). Evidence from a combined data set in ten sub-Saharan countries by Herrera and Torelli (2013), however, shows that women aged 16–25 work 0.8 hours more a week than women aged 24–45. Women within the age ranges of 46–54 and above 55 spent 2.4 hours and 7.1 hours less per week, respectively, on domestic work than women in the 24–45 age category.

2.2.3.5 Housing structure

Arku and Arku (2013) explore the role of the housing structure in which couples reside and how it affects the type and amount of housework that men are willing and able to do. Using descriptive and explorative analysis, the study analyzed gender roles in three housing types:

self-contained, detached chamber and hall, and compound houses.¹⁷ The results indicated that 78 percent, 73 percent, and 55 percent of men who resided in self-contained, detached chamber and hall, and compound houses, respectively, performed household chores. This suggests that residents in self-contained houses with the greatest privacy reported the highest frequency of being involved with housework and the least occurrence was reported among those residing in compound houses.

2.2.3.6 Infrastructure

Access to and availability of utility services such as water and electricity have been found to reduce the burden of housework for both men and women (Arku 2010; Wodon and Ying 2010; Costa et al. 2009; Coloumbe and Wodon 2008; Charmes 2006; Lawson 2008, Fontana and Natali 2008). In the study by Costa et al. (2009), women's time allocation in Ghana was investigated as a trade-off between housework and market work given that households are provided with water and electricity infrastructure. The results from an OLS model show that community access to water significantly reduces the time women spend on domestic activities; as the distance to the water source increases, time spent on domestic work also increases but at a declining rate. This finding has been replicated in Sierra Leone by Wodon and Ying (2010). Another finding was that the time spent on wage-employment activities increases when households have access to electricity, but there is no effect on the probability of engaging in domestic work. A related study by Wodon and Ying (2010) used the Sierra Leone Integrated Household Survey to show that having access to electricity and water matters for the amount of time spent on domestic work. From the regression results, access to water and electricity reduces women's domestic work time by ten hours per week in both urban and rural households.

¹⁷ There is only one living room and one bedroom for the detached chamber and hall units. While self-contained houses are often separated from each other and sometimes enclosed with a wall, the detached chamber and hall units are not and offer less privacy compared to the self-contained houses. Compound houses consist of many chamber-and-hall-type homes attached on the same lot or compound. It is typical to have residents share the same amenities in the compound such as washrooms and sometimes a kitchen. In Ghana, compound homes are arguably the most common housing structure in rural and semiurban communities.

2.3 Conclusion

Like other regions across the world, empirical evidence on the inequality in the distribution of unpaid care work finds bias against women in sub-Saharan Africa. Although several theoretical models explain the distribution of unpaid work among men and women, three of them stand out in the literature—the time availability theory, the resource theories, and the gender ideology theory. These models, however, were designed with the Western nuclear family model as a reference point. This begs the question of whether the conclusions they draw can be extended to the African context. The huge informal and self-employment sectors, the participation of children in housework, the prevalence of the extended family, and the existence of polygamy represent unique features in sub-Saharan Africa that could have implications for the relevance of some of the theoretical models.

While theoretical perspectives relating to time availability and those on bargaining models have been confirmed by some empirical studies, aspects of gendered ideology and the “doing gender” perspectives seem to still dominate in most sub-Saharan African countries. The cultural living arrangements of the extended family setting in most African countries appear to provide some safety net in reducing women’s housework burden. The type of housing structure has been found to be important in determining the extent of male involvement in unpaid care work activities. Men who reside in more private housing structures tend to do more housework than their counterparts in other housing structures. Although having children in their early years increases women’s housework activities, the children become a source of relief from housework as they grow older and allow women to supply more time in market work. Again, easy access and availability to water and electricity, as well as other infrastructure like public transport and access to public schools, are also significant in reducing time spent on housework, especially by women and children.

Country-specific time-use surveys have provided the main data used in testing various theoretical perspectives established in the literature. In some instances, the objectives of the study require the researcher to collect primary data to address the research questions. While the analysis of unpaid care work’s distributional patterns has been explorative and descriptive, analysis of the prevailing unequal distribution’s determinants has been based on regressions. The multivariate linear models and the probability models have been the main regression models used by most studies, with some addressing issues of endogeneity and selectivity bias.

Analysis using panel regression models are, however, conspicuously missing, perhaps due to data constraints.

3 INTRAHOUSEHOLD DIVISIONS, TIME DEFICITS, AND CONSUMPTION POVERTY

Our discussion in the previous section has highlighted the existing inequalities in the gender division of household production in sub-Saharan Africa. We now turn to outlining our framework for incorporating the inequalities in an analysis of time and consumption poverty. Our empirical methodology for implementing the approach has been discussed comprehensively elsewhere and we therefore provide only a summary here (see Appendix B).¹⁸ We begin with the measurement of time deficits and intrahousehold disparities in the division of unpaid labor. Then we turn to an empirical analysis of the gendered differences in time deficits. We conclude the section by discussing the implications of labor's unequal division for consumption poverty.

3.1 Measurement of Time Deficits

Our approach to the measurement of time poverty follows the general approach for measuring income or consumption poverty. Central to such an exercise is the notion of thresholds or benchmarks that reflect some minimum acceptable standards. The thresholds are estimated as a statistic of the relevant characteristic of a reference group (e.g., average per capita food expenditures of households in the bottom quintile are taken as the starting point for deriving the food poverty line). One set of time thresholds pertains to the minimum time that each person needs for sleep, hygiene, etc. Most studies of time poverty consider these personal maintenance requirements as uniform across the working-age population (e.g., Vickery 1977; Harvey and Mukhopadhyay 2007). We adopt the same method, which, in effect, considers the working-age population as the reference group for constructing the threshold. The threshold value was computed as the sum of the averages of the actual time spent by members of the reference group on personal maintenance activities and an arbitrary constant.¹⁹

¹⁸ See Zacharias et al. (2019) for Ghana and Tanzania and Zacharias et al. (2020) for Ethiopia and Tanzania.

¹⁹ The arbitrary constant is the sum of nonsubstitutable household activities and minimum necessary leisure; see Appendix B, Table B-2 for details.

The other set of time thresholds pertain to household production. Since these activities are generally undertaken not just for the person performing the activity but for some or all others in the household, it is appropriate to specify the thresholds at the level of the household. Household characteristics, primarily size and composition, are crucial in determining the requirements. The reference group that we chose reflects the consideration that the thresholds must be relevant to low- and moderate-income households rather than high-income families that can purchase market substitutes or hire domestic help. We also wanted our thresholds to not be too low on account of the absence of individuals in the household that can assume household responsibilities (e.g., dual-earner families with small children). The two considerations led us to choose the group of households with consumption expenditures around the poverty line and at least one nonemployed adult as the reference group. We estimated a nonlinear regression model of time households spent on household production (the sum of the time spent by all members of the household) for the reference group (see Appendix B, Table B-3). The estimated parameters—in effect, an equivalence scale for household production requirements—were used to derive the threshold for each household included in the study sample.

In light of these considerations, the time balance equation for *working-age* person i in household j is:

$$X_{ij} = 168 - M - \alpha_{ij}R_j - D_{ij}^0(T_{ij} + L_{ij})$$

Our unit of time is a week and the total hours in a week are 168. The same amount of time, M , is assumed to be required for all to meet personal maintenance requirements. If the person is employed, the dummy variable D_{ij}^0 takes a value of 1; otherwise, it is zero. All employed persons are assumed to require some amount of time for commuting, T_{ij} , which is set equal to threshold (average) values that depend on a person's area of residence (e.g., rural versus urban) and weekly hours of employment, L_{ij} (part-time versus full-time). We report the threshold values of commuting used in the estimation in Appendix B, Table B-4.

A working-age person's required hours of household production depend on the threshold hours (R_j) that their household needs to reproduce itself at the poverty-level of income or consumption expenditures. It also depends on the share of the threshold hours that the person is

assumed to shoulder (α_{ij}). We assume that the share is equal to the person's observed share in the combined total amount of time that *all* persons in the household (except very young children) spent on household production. Therefore, the working-age person's observed share depends on the contributions to household production made by the persons that are not of working age. As we noted in the previous chapter, children's contribution to household production is higher in sub-Saharan Africa (and in many other parts of the developing world) compared to the rich countries. Explicitly enumerating the two groups of people in the household can make this dependence transparent.

Thus, we let i index the working-age persons in the household, $i = 1, 2, \dots, I^j$, and k index the persons that are not of working age, $k = 1, 2, \dots, K^j$. We also denote the weekly hours of household production as H . The working-age person's share of their household's total hours of household production can be expressed as:

$$\alpha_{ij} = \frac{H_{ij}}{\sum_{i=1}^{I^j} H_{ij}} \frac{\sum_{i=1}^{I^j} H_{ij}}{\sum_{i=1}^{I^j} H_{ij} + \sum_{k=1}^{K^j} H_{kj}}$$

The first fraction on the right-hand side (RHS) is the i^{th} working-age person's share of the total hours spent on household production by the household's working-age members. The second fraction on the RHS is the working-age persons' share in the total hours spent on household production by all (except the very young) members of their household. To simplify the notation, let us denote the first fraction as α_{ij}^w and the second fraction as α_j^w . By definition, $\alpha_j^w = 1 - \alpha_j^{nw}$, where α_j^{nw} is the share of the group of persons not of working age in the total hours spent on household production by all (except the very young) members of their household. Using these definitions and defining $Z_{ij} \equiv 168 - M - D_{ij}^0(T_{ij} + L_{ij})$, we can rewrite the equation for time balance as:

$$X_{ij} = Z_{ij} - [\alpha_{ij}^w(1 - \alpha_j^{nw})]R_j$$

3.2 Gender Disparity in the Incidence of Time Deficits

Evidence indicates that negative time balance values (i.e., time deficits) occur mostly among employed persons (Table 3-1).²⁰ Practically all time-poor men are employed. Similarly, in Ghana and Tanzania, virtually all time-poor women are employed. In Ethiopia and South Africa, we find that the nonemployed constitute a nontrivial proportion of time-poor women. These women, it appears, can fulfill their household production requirements only by forgoing the minimum required time for personal maintenance (sleep, nourishment, etc.).

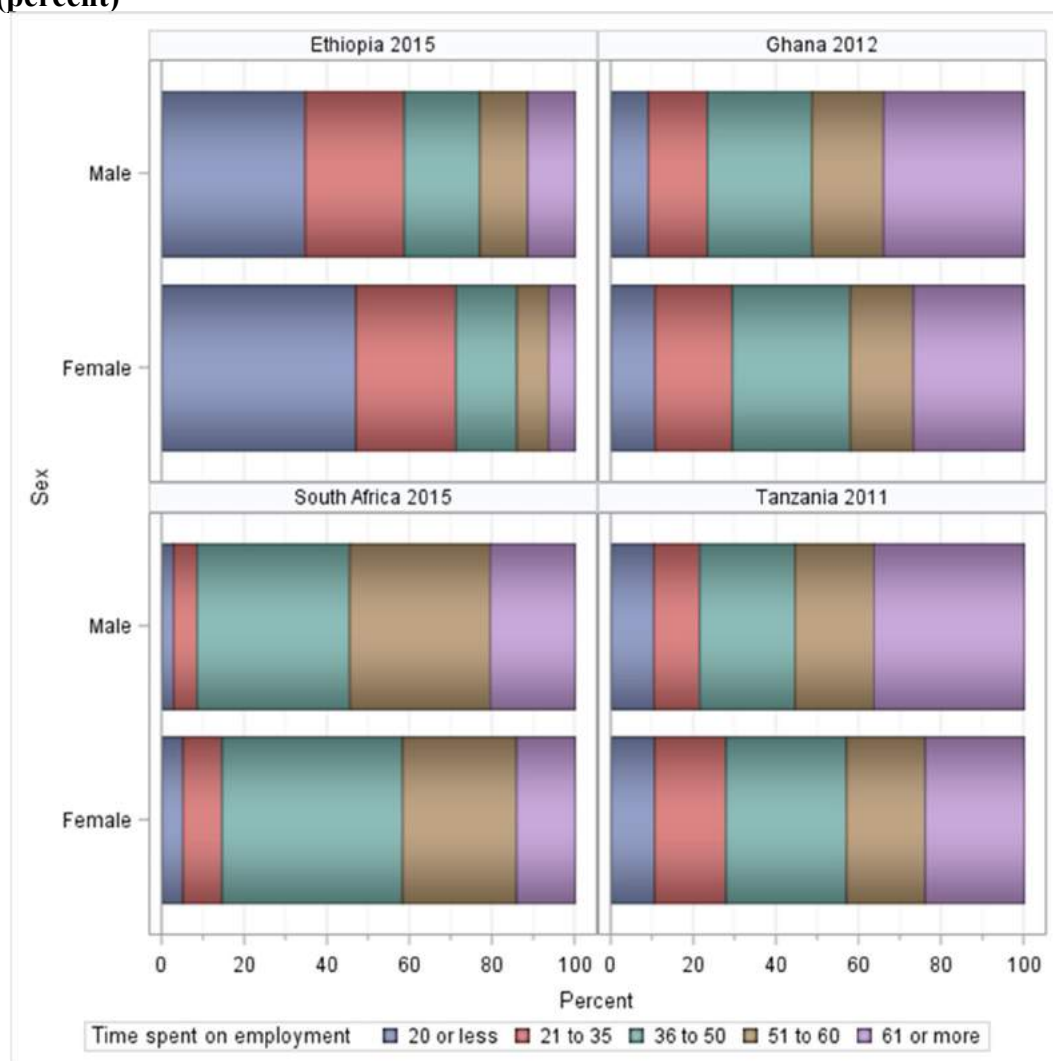
Table 3-1 Percent of Time-poor Persons that Are Employed, by Country, Year, and Sex (percent)

Country and Year	Male	Female
Ethiopia, 2014	99	91
Ghana, 2012	100	100
South Africa, 2014	99	93
Tanzania, 2011	100	99

Leaving aside the nonemployed, let us focus on the variations in the proximate factors determining the time balance among the employed. According to our equation for the time balance, differences in the time spent on employment (hours of employment plus commuting requirements, $L_{ij} + T_{ij}$) can be expected to play a central role in shaping the differences in the incidence of time poverty. The time spent on employment bears an inverse relationship to the individual's time balance. Other things remaining the same, the more time that the employed person spends on getting to and working **at their job, the lower their time balance and higher their propensity to become time-poor.** If women are, relative to men, more likely to spend less time on employment, they will tend to have more time available to meet their household production responsibilities than men, other things being equal. We compared the distribution of employed men and women across different lengths of the workweek to obtain an intuitive sense of the gender disparities along this dimension in our sample of countries (Figure 3-1).

²⁰ We define “employed” for the purposes of this report as engaged in income-generating activities, whether working for pay, self-employed, or doing unpaid work on the family farm or in a family enterprise. The countries show wide variation in their employment rate (expressed as a percentage of working-age persons). Tanzania ranks the highest with 87 percent and 81 percent, respectively, for men and women. South Africa ranks the lowest with only 52 percent and 40 percent, respectively, for men and women. In Ghana, working-age men and women have an employment rate, respectively, of 78 percent and 74 percent. The employment rate in Ethiopia for men is 83 percent while for women it is only 56 percent. We suspect that there is undercounting of employed women in the data that we use for Ethiopia (see Appendix B) because the estimates from the ILO indicate an employment rate of 74 percent in 2013 (data from ILOSTAT, <https://ilostat.ilo.org/data/>, accessed on July 18, 2020).

Figure 3-1 Distribution of Employed Persons by Time Spent on Employment, by Sex and Country (percent)



Note: Time spent on employment is the sum of weekly hours of employment (L_{ij}) and weekly commuting time requirements (T_{ij}).

We found that women tend to be more concentrated than men in what may be described as “part-time” jobs (less than 35 hours per week) in all five countries. The Ethiopian case looks striking because 71 percent of women and 59 percent of men are engaged in part-time employment. However, a larger percentage of men than women tend to be involved in overwork. In Tanzania (Ghana), for example, 36 (34) percent of men spent 61 hours or more per week on employment compared to 24 (15) percent of women. The South African data shows that 21 percent of men were overworked compared to 14 percent of women.

On the whole, it appears that there are systematic gender differences in the time spent on employment, with men having a longer workweek at the job than women (Table 3-2). The highest observed difference in the median value of workweek is eight hours (Ethiopia), while the smallest is four hours (Ghana and South Africa). Feminist economists have sought the explanation for the shorter time spent on employment in the disproportionate share of household responsibilities borne by women, occupational segregation, industrial composition of employment, and discrimination (see, e.g., Ruwanpura 2004). As we discussed before, lower hours of employment, other things being equal, tend to weaken women's propensity to incur time deficits.

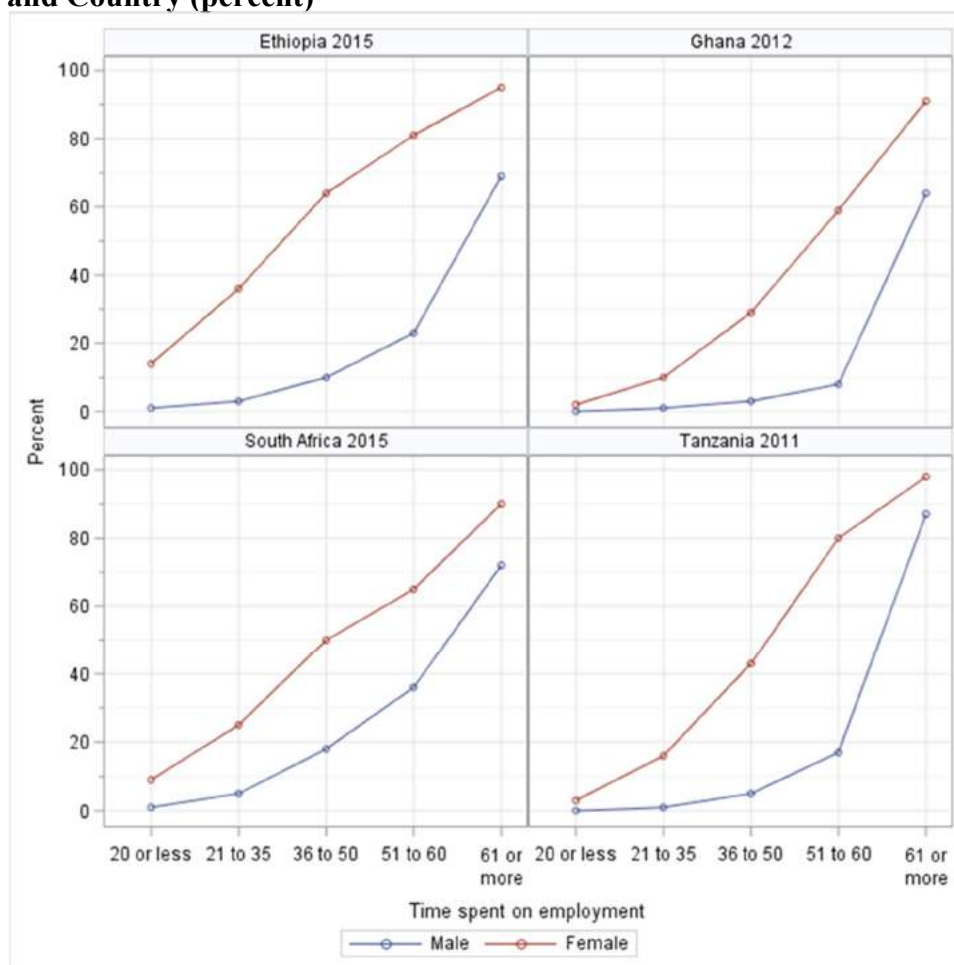
Table 3-2 Time Spent on Employment by Sex and Country (median weekly hours)

Country and Year	Male	Female
Ethiopia, 2014	31	23
Ghana, 2012	52	48
South Africa, 2014	52	48
Tanzania, 2011	51	44

Note: Time spent on employment is the sum of weekly hours of employment (L_{ij}) and weekly commuting time requirements (T_{ij}).

The systematic difference in the time spent on employment between men and women also points to the need to control for this factor while examining the gender disparity in time poverty. Our estimates, shown below in Figure 3-2, therefore present the time poverty rate for men and women that face similar demands in terms of the time spent on employment. The striking result is that even when men and women spend similar hours on employment, women are, in general, much more prone to time poverty than men in every country. The gender gap is quite remarkable. As we described above, relatively larger shares of men and women in Ethiopia engage in part-time work. In this group, women's time poverty rate is 14 times higher than men's (14 percent versus 1 percent). For the other instances shown in Figure 3-2, the most common length of a woman's workweek tends to be between 36 to 50 hours. We estimate that in this group, women in Ghana have a time poverty rate that is ten-times higher than men's time poverty rate. Tanzania is quite close in terms of the disparity (nine-times greater), while South Africa shows a much lower gap at three-times greater.

Figure 3-2 Rates of Time Poverty among Employed Men and Women, by Time Spent on Employment and Country (percent)



Note: Time spent on employment is the sum of weekly hours of employment (L_{ij}) and weekly commuting time requirements (T_{ij}).

Looking across all lengths of the workweek conveys a similar picture of glaring gender disparity (Table 3-3). However, the extent of the overall gap is smaller because men and women tend to have smaller differences in time poverty at the low and high values of the length of the workweek compared to the differences in the intermediate values (except in Ethiopia). Consequently, the time poverty rate of women is 4.6 times higher than men's in Ethiopia while the gap is smaller in other countries, ranging between 1.8 times in Ghana and 1.5 times in Tanzania.

Table 3-3 Rates of Time Poverty among Employed Men and Women by Country (percent)

Country and Year	Male	Female
Ethiopia, 2014	14	37
Ghana, 2012	24	44
South Africa, 2014	34	55
Tanzania, 2011	36	54

If differences in the time spent on employment do not seem to matter much for the rather large gender disparity in time poverty, what does? Turning back to our time balance equation, we observe that gender differences in three factors can shape this disparity: the size of the household's household production (R_j), the share the group of persons not of working age contribute to meeting the requirements (α_j^{nw}), and the working-age person's share in the total contribution made by the group of working-age persons in meeting the requirements (α_{ij}^w). As we would expect intuitively and suggested by the equation, working-age persons from households with a higher value of R_j will tend to have a lower time balance than working-age persons from households with a lower value of R_j , other things being equal. Similarly, there is an inverse relationship between the individual's time balance and their α_{ij}^w . On the other hand, working-age persons from households with a higher value of α_j^{nw} will tend to have a higher time balance than working-age persons from households with a lower value of α_j^{nw} .

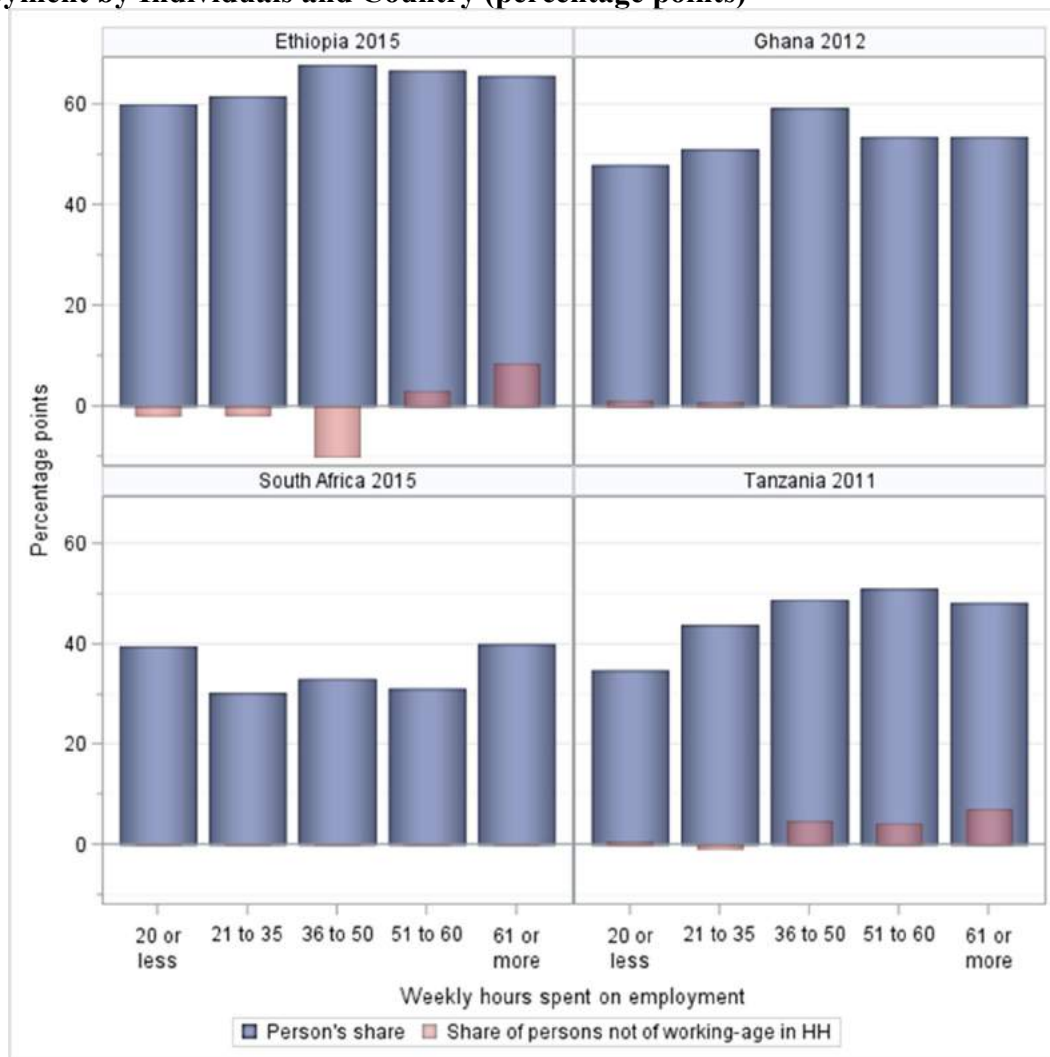
Gender differences in R_j and α_j^{nw} indicate differences between men and women in terms of household structure. The degree to which working-age men and women live together or form similar households will therefore have a direct bearing on gender gaps in the variables. For men and women that live under the same roof, the variables will have equal value; the magnitude of α_{ij}^w can and does differ along gender lines for those that live in the same household. Nevertheless, gender differences in household structure (e.g., the higher incidence of single motherhood versus single fatherhood) can also shape gender differences in α_{ij}^w .

We have already seen that the time poverty rate is higher for women. In light of our discussion of the equation, the first natural question to ask regards the roles of the two “share” variables— α_{ij}^w and α_j^{nw} —in shaping the gender disparity in time poverty. Admittedly, employed women will, in general, bear a higher share of household production responsibilities than employed men, i.e., α_{ij}^w will tend to be bigger for women than men. However, the impact

of this disparity on a working-age person's time balance will also be mediated by the contribution toward meeting household production requirements made by the group of persons that are not of working age (α_j^{nw}). The contribution made by persons that are not of working age (i.e., the young and old) to household maintenance is, on average, quite substantial in all the countries. We report estimates regarding the shares in Appendix C.

Our question now is not about the size of α_j^{nw} but whether gender difference along this dimension plays a substantial role in shaping the gender disparity in time poverty. Our estimates show that the answer to the question is no. Figure 3-3, below, shows the gap between employed women and employed men in the median value of α_{ij}^w : the share of the household production responsibilities borne by the employed working-age person in the total time spent on household production by all working-age persons in their respective households (the thicker bars in Figure 3-3). We have also shown the gender gap in the median value of α_j^{nw} : the group of persons that are not of working age's share in the total household production undertaken by all the members of their household (the thinner bars in Figure 3-3). The gender gap in α_{ij}^w is much larger than the gender gap in α_j^{nw} . That is, employed men and women differ substantially in terms of the contributions they make toward meeting household production requirements borne by working-age persons in their respective households. But they do not differ much in the respective contributions made by the younger and older family members. The gender difference along the latter dimension is so small that the bars depicting it are not even visible in several cases displayed in the figure.

Figure 3-3 Gender Gaps in the Median Values of α_{ij}^w and α_j^{nw} by Time Spent on Employment by Individuals and Country (percentage points)



Notes: (i) The estimates include only households with at least one employed person of working age. (ii) Time spent on employment is the sum of weekly hours of employment (L_{ij}) and weekly commuting time requirements (T_{ij}). (iii) “Person’s share” refers to the employed, working-age person’s share in the total household production performed by all working-age persons in their household. (iv) “Share of persons not of working age in H.H.” refers to the share of the group of persons not of working age in the total household production performed by all persons in their household. (v) The value shown in each bar was obtained by subtracting the males’ median value from the females’ median value.

In line with our expectation, the gap between employed men and women in how much they contribute toward their household’s household production requirements is fairly large, irrespective of the length of the workweek. The smallest gap shown here occurs for South Africa between men and women employed in the 21–35 hours bracket. That gap itself is 30 percentage points, derived from the median values of 50 percent and 20 percent, respectively, of

the shares of women and men. As we noted above, a workweek of 20 hours or less is the most frequently found workweek for women only in Ethiopia. In that group, women's share of household production is 63 percent compared to a minuscule contribution of only 3 percent by men, resulting in the gender gap of 61 percentage points shown in Figure 3-3. In the group of people that spent 36–50 hours on employment, the most common workweek length other countries, the biggest gap (59 percentage points, with women's share equal to 65 percent) is in Ghana. The lowest is for South Africa (33 percentage points, with women's share at 44 percent).

Let us now consider the two share variables without distinguishing workers in terms of the length of their workweek (Table 3-4). The typical working-age employed female shoulders nearly half or more of the household production responsibilities carried out by all working-age persons in her household; in contrast, her male counterpart's share is around 10 percent or less—a stark gender gap. Turning to the other share variable, in South Africa and Ghana the typical working-age employed female lives in a household in which persons that are not of working age do not contribute to meeting their home's household production responsibilities. The same holds for her male counterpart, too. But in Ethiopia and Tanzania the median values of the contributions are not trivial for either the employed male or employed female. However, the gender gap in this variable is quite small in Tanzania and nonexistent in Ethiopia. Consequently, among the two share variables, the gender disparity in α_{ij}^w appears to be the more decisive factor behind the higher level of time poverty among women.

Table 3-4 Median Values of Working-Age, Employed Person's Share (α_{ij}^w) and Share of the Group of Persons That Are Not of Working-Age (α_j^{nw}) (percentage) and the Gaps in Median Values (percentage points) by Country

	Person's share			Share of the group of persons that are not of working age		
	Male	Female	Gap	Male	Female	Gap
Ethiopia, 2014	1	64	63	14	14	0
Ghana, 2012	6	60	54	0	0	0
South Africa, 2014	11	46	35	0	0	0
Tanzania, 2011	10	56	46	19	23	4

Notes: (i) The estimates include only households with at least one employed person of working age. (ii) "Person's share" refers to the employed, working-age person's percentage share in the total household production performed by all working-age persons in their household. (iii) "Share of the group of persons that are not of working age" refers to the percentage share of the group of persons not of working age in the total household production performed by all persons in their household. (iv) The numbers shown in the "gap" columns are obtained by subtracting the males' median value from the females' median value and are denoted in percentage points.

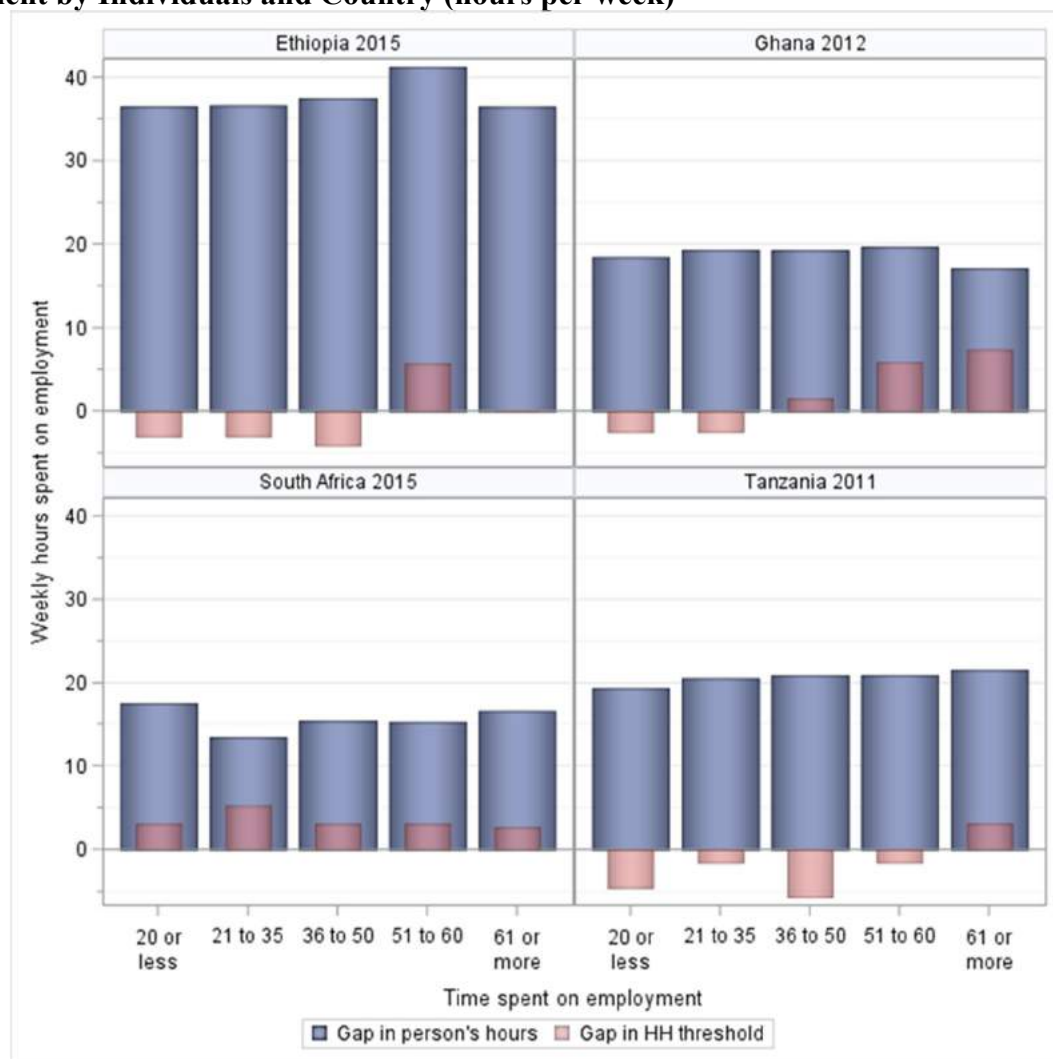
To confirm this intuition, we also need to assess the role played by the differences in R_j between men and women in the determination of time poverty. The reason is that the differences along this axis can amplify or dampen the impact of the gender disparity in α_{ij}^w on the gender gap in time poverty. For example, the observed higher time poverty among women can be due to the much higher R_j that they encounter as well as their relatively high level of α_{ij}^w . Since the two variables are measured in different units— R_j is measured in hours while α_{ij}^w is a percentage—we cannot compare them directly. However, the final result of the interpersonal differences in α_{ij}^w can be seen in the interpersonal differences in the hours of required household production the individuals face: $([\alpha_{ij}^w(1 - \alpha_j^{nw})]R_j)$. We can certainly compare the gender difference in R_j with the gender difference in the hours of required household production. The gender gap in the latter is an excellent proxy for the gender gap in α_{ij}^w since we already saw that the differences in α_j^{nw} between men and women are, on the whole, quite negligible. We can provide an intuitive idea about the relative impact of R_j vis-à-vis α_{ij}^w on the gender disparity in time poverty via this slightly indirect route.

Our estimates show that the differences between women and men in their own hours of required household production far outweigh the differences between them in the amount of household production required by their households, R_j (Figure 3-4). The difference is visible for every length of the workweek considered here. The smallest difference between the two bars

(shown for each period of the workweek) occurs for those who spend between 21 to 35 hours on employment in South Africa. The thicker bar indicates the number of hours by which the average female's required household production hours exceeds that of the average male (i.e., the difference between median values). It amounts to 13 hours. The thinner bar that shows the difference in R_j between the average female and average male is 5 hours. As we discussed above, the larger gap in the required hours of household production reflects women's higher share of household production responsibilities compared to men.²¹ We may surmise that while both factors can increase women's propensity to be time-poor relative to men, the gender difference in the share of household production is likely to play a more substantial role than the gender difference in R_j in shaping that higher propensity. Similar reasoning applies to the other estimates shown in Figure 3-4 to lead us to the same conclusion, albeit in a more forceful manner because in those cases the gender disparity in the hours of household production exceed the gender disparity in the amount of household production required by their households, R_j .

²¹ Looking back at Figure 3-3, we can observe that there is virtually no gender difference in the median values of α_j^{nw} and hence this factor possibly could contribute little to the gender gap in required hours for this group of workers (i.e., those who spent 21 to 35 hours on employment in South Africa).

Figure 3-4 Gender Gaps in the Person's Required Hours of Household Production and the Hours of Household Production Required by their Household (R_j), by Time Spent on Employment by Individuals and Country (hours per week)



Notes: (i) The sample for Ethiopia includes only households with a married head of working age, spouse of working age, and their children under 18 years of age. (ii) The estimates include only households with at least one employed person of working age. (iii) “Gap in person’s hours” displays the results of subtracting the employed, working-age males’ median value of own weekly hours of required household production from the employed, working-age females’ median value. (iv) “Gap in HH threshold” shows the results of the same operation performed with R_j .

The general conclusion can be seen more sharply by examining the estimates that do not differentiate workers by the length of their workweek (Table 3-5). Our estimates showed that the gap between the median values of R_j ranged between -4 hours and +3 hours per week (a negative value indicates women have a lower median value than men and vice versa for positive values). That is, the average male and average female live in households with roughly similar

requirements of household production; however, the gender gap in the individual contributions to meeting these requirements is enormous. The best-case scenario is for South Africa. Here the average male's contribution is approximately one-third of the average female's contribution (8 hours versus 23 hours per week). The extreme case of inequality is Ethiopia, with the average male contribution amounting to only 3 percent of the average female contribution (1 hour versus 39 hours per week). Ghana comes next, where the average male contribution is 14 percent of the average female contribution (3 hours versus 22 hours per week). In Tanzania, the better case, the average male contribution was equal to 21 percent of the female contributions (6 hours versus 26 hours). The gender disparities in the contributions mostly reflect the gap in men's and women's shares in the total household production performed by the working-age members of their households.

Table 3-5 Median Values of Working-Age, Employed Person's Required Hours of Household Production ($\alpha_{ij}^w (1 - \alpha_j^{nw}) R_j$) and Their Household's Required Hours of Household Production (R_j), by Country (weekly hours)

	Household production requirements (per household)			Required hours of household production (per person)		
	Male	Female	Gap	Male	Female	Gap
Ethiopia, 2014	86	85	-1	1	39	38
Ghana, 2012	52	54	2	3	22	19
South Africa, 2014	61	64	3	8	23	16
Tanzania, 2011	78	74	-4	6	26	21

Notes: (i) The estimates include only households with at least one employed person of working age. (ii) "Gap" displays the results of subtracting the employed, working-age males' median value from the employed, working-age females' median value.

To summarize, time deficits occur almost entirely among employed persons. Among them, women are substantially more prone to time deficits than men, even though women have a shorter workweek than men. In principle, with other things being equal, having a shorter workweek should go along with having fewer time constraints. Our preliminary perusal of the evidence strongly suggests that the counterintuitive result stems from women contributing to a much higher share of running the household and caring for its members than men even when they devote similar hours to employment. Apart from the time an individual spends on employment and their share of household responsibilities fulfilled by the group of working-age persons in their household, two characteristics of the households that they live in can affect their

vulnerability to time poverty. These characteristics are the time requirements that their household needs to reproduce itself as a unit and the contribution made by the members of their household that are not of working age (the younger and older members) toward meeting household responsibilities. However, we found that working-age employed men and women differ little in terms of these household characteristics, hence, they do not carry much force in accounting for the gender disparity in time poverty.

3.3 Time Deficits and Consumption Poverty

We have seen that the major factor behind the gender gap in time poverty is the gender gap in the sharing of household production responsibilities. It stands to reason, therefore, to inquire if the gender gap in sharing can be reduced to alleviate time poverty among women. Given that we are taking the household production threshold (R_j) and its division between the two groups in the household (those who are of working age and those who are not) as fixed in answering this question, reducing the share of one person in the working-age group would necessarily imply that share of others in the group has to increase. What is involved here is a redistribution of household production responsibilities within the household. We argue that redistribution can affect the household's consumption poverty.

Let us begin by restating the equation for the weekly time balance of working-age person i in household j :

$$X_{ij} = 168 - M - [\alpha_{ij}^w(1 - \alpha_j^{nw})]R_j - D_0(L_{ij} + T_{ij})$$

The redistribution that we are considering here is a redistribution of household production responsibilities among the household's working-age persons while all else remains constant. That is, we are contemplating the effects of a new set of values of α_{ij}^w for the I^j working-age persons in the household $i = 1, 2, \dots, I^j$. Let us denote the new shares as α_{ij}^{w*} and the associated time balances as X_{ij}^* . Redistribution will change the magnitude of the time balance and, depending on the extent and direction of the change, may result in a time-poor person becoming time-nonpoor or a time-nonpoor person experiencing time poverty.

The household's time deficit, X_j , is defined as the sum of the time deficits of the working-age individuals in the household. We can express the household time deficit associated with the members' new time balances as:

$$X_j^* = \sum_{i=1}^{I^j} \min(X_{ij}^*, 0)$$

We consider a household to be time-poor if $X_j^* < 0$, i.e., if there is at least one time-poor person in the household. We argue that the standard consumption poverty line is inadequate for time-poor households. Time-poor households would require expenditures (e.g., purchases of prepared meals, childcare services, etc.) to offset the time deficit they face in attaining the minimum level of household production that is needed to survive with poverty-level consumption expenditures. Therefore, it is necessary to augment the standard poverty line with the monetized value of the household's time deficit to account for the immiserating effect of time deficits. If we let P_j^O represent the official poverty line for household j , and p_j the hourly average replacement cost of household production for household j , we can represent the LIMTCP poverty line, P_j^{L*} , associated with the time deficit X_j^* as follows²²:

$$P_j^{L*} = P_j^O - p_j X_j^*$$

Redistribution of household production responsibilities alters individual time balances and can affect the number of time-poor persons in the household and the household's time deficit. In turn, the change in the household's time deficit modifies its LIMTCP poverty line. Assuming that the redistribution does not affect consumption expenditures, the difference in the time deficit can alter the household's consumption poverty status. The change in status may mean whether it is consumption-poor or how far the household's consumption expenditures lie from its LIMTCP poverty line. If the household is consumption-poor, we follow the standard practice and consider everyone in the household as consumption-poor. The usual method

²² The hourly replacement rates that we used in the study for monetizing time deficits can be found in Appendix B, Table B-5.

defines consumption poverty only at the household level. However, because we define time poverty at the household level *and* individual level, there can be time-nonpoor persons in a time-poor household.²³ Consequently, the joint distribution of deficits in time and consumption of individuals and their households need not coincide and requires separate examination.

3.4 Conclusion

Household production is an integral part of economic well-being. In this section, we presented an argument for incorporating household production in a measure of economic “ill-being” or deprivation. This entails specifying thresholds for household production. We employed the general procedure followed in the measurement of consumption or income poverty, with appropriate modifications, in our specification of time thresholds. Essentially, each individual is assumed to require the same amount of time for personal maintenance activities (e.g., sleep). Each individual also faces notional required hours of household production—determined by their household’s total household production requirements and their individual contribution to the total time that is actually spent by all household members in taking care of the home and its residents. Once we subtract from the total amount of time over a particular period (say 168 hours in a week) the time requirements for personal maintenance and time spent by individuals on employment, we get an estimate of the time that the individual can set aside for household production. If the amount that can be set aside falls short of the person’s time requirements for household production, we consider that person to be time-poor. We consider their family also as time-poor because the family’s household production requirements are not likely to be met when a member has a time deficit. Of course, other members of the same household may not be time-poor in the sense that we just described because the time they spend on employment need not fall short of the time requirements of household production that they face. Both magnitudes can be, and in many instances are, different for them than for the time-poor person.

Our empirical investigation showed that even when men and women engage in similar hours of employment, women are much more likely to be time-poor. Women’s time poverty rate is 4.6 times higher than men’s in Ethiopia, while the gap is smaller in other countries, ranging between 1.8 times in Ghana and 1.5 times in Tanzania. Further analysis suggests that

²³ Indeed, this is precisely the reason why we can study the issue of intrahousehold inequality in the division of household production in our framework as opposed to the earlier approaches (e.g., Vickery 1977; Harvey and Mukhopadhyay) that conceptualized time poverty solely at the household level.

the gender gap is driven largely by the unequal division of household production responsibilities. Women that spent as much time as men on employment face a much higher time requirement for household production than men do—an expression of the double workload employed women face almost everywhere in the world. A valid inference from the empirical finding is that a redistribution of household responsibilities may help reduce time deficits.

A logical implication of the recognition that a minimal standard of household production is required for the family to reproduce itself as a unit arises when that minimal standard cannot be met, i.e., when the household is time-poor. The standard poverty line no longer reflects the minimum requirements for time-poor households because it does not account for the expenditures that the time-poor household need to incur on market substitutes (e.g., buying takeaway meals) to survive. An estimate of the monetized value of the time deficit has to be added to the standard poverty line for time-poor households to ensure logical consistency. Consequently, a change in the time deficit will also alter the poverty line and affect the poverty status of the household. Redistribution of household production responsibilities can, therefore, lead to changes in the time and consumption poverty of individuals and families.

4 REDISTRIBUTION AS A STRATEGY FOR REDUCING TIME DEFICITS

We now turn to investigate how far a redistribution of household responsibilities among family members can serve to reduce time deficits. Redistribution among members based on their gender (e.g., between men and women), age (e.g., between children and adults), or relationship to each other (e.g., husband and wife) are all cases that share certain common features as a strategy to reduce time deficits. We develop a framework to assess the strategy in general and then apply it to gender-based redistribution. Confronting the method with the data, we can derive the maximum extent to which redistribution—either among all family members, between sexes, or between husbands and wives—can lower the incidence of time deficits.

4.1 Constraints on Redistribution

The scope of the redistribution of household production responsibilities in reducing time poverty depends on the **living arrangements of individuals**. Indeed, if the time-poor household consists only of **one working-age individual, no redistribution is possible**. For example, a family of an employed single mother and her young children is an important type of family that is quite **vulnerable to time poverty yet falls** outside the scope of redistribution. Households with two or more working-age persons can vary in terms of the characteristics relevant to time poverty and redistribution. **Family size and composition** may surely be a matter of individual choice at certain points in the lives of many individuals. However, in the short- to medium-term evaluations of economic well-being, they can generally be taken as fixed.

The effectiveness of the redistribution will depend on the **time that the family members have to redistribute**. For employed persons, the primary determinant of the amount of time available for household production **is the time they devote to generating income**. For wage workers, the hours of employment are generally not a matter of individual choice. They are set by the employer depending on their financial considerations, nature of the job, and, in a few instances, by collective bargaining agreements. For most own-account workers (e.g., street peddlers), the hours of employment are **determined by earnings**. That is, **people work as long as they can or need to so that they can earn “enough” to survive**. **The time available for household production has to be reckoned against the minimum requirements of household production, i.e., time thresholds**. Effectiveness of redistribution depends **on the latter, too**. For a family of a given size and composition, **the household production thresholds are shaped by social and physical infrastructure**. We have studied the effects of public investments in road infrastructure and early childhood education in Ghana and Tanzania elsewhere (Zacharias et al. 2019).

Scrutinizing households along the dimensions of the appropriate characteristics can offer a more informative route for arriving **at the necessary and sufficient conditions for effective redistribution than a merely (rather easy to derive) formal statement**. Specifically, such a route would shed light on potential conflicts between family members regarding redistribution and the efficacy of redistribution in alleviating an individual’s time deficits and improving a family’s economic well-being. It is also important to examine if the redistribution results in allaying only the **time deficit of the person without reducing the time deficit of the family**.

Time-poor households in which all working-age persons are time-poor represent a case where individual and collective interests may not coincide. In these households, redistribution is possible but ineffective in reducing the household's time deficit. Hence, redistribution cannot change the household's status of time or consumption poverty. A married (cohabitating) couple with young children where both spouses encounter time deficits while managing their jobs and household responsibilities fits this description. However, redistribution can make time deficits less unequal between the time-poor persons in this group of households, even potentially facilitating the transition out of time poverty for some individuals. Greater gender equality in the division of household responsibilities is desirable in this group, too, because gender equality is intrinsically important, irrespective of whether it affects the household's consumption poverty or time poverty status.

The discussion of the previous two cases makes it clear that to alleviate the household's time poverty, the household should have at least one time-nonpoor working-age person to whom household production responsibilities can be delegated. It is essential to consider whether such a person is of reasonably good physical and mental condition to take on additional responsibilities. (Appendix D discusses how we operationalized the notion of health limitations in the countries considered here.) If all time-nonpoor, working-age persons have health limitations that may prevent them from taking over more responsibilities, redistribution that is effective in reducing household time deficit is impossible. A prerequisite for the latter type of redistribution is, therefore, the presence of at least one "fallback person"—the able, time-nonpoor, working-age member that can take over the household responsibilities of a time-poor person.

The satisfaction of the fallback-person requirement does not guarantee effective redistribution. Redistribution will have no impact on the classification of the person as time-poor if their time poverty is entirely due to the length of the workweek. In terms of the notation introduced earlier, we are considering an employed person with a negative value for Z_{ij} . Recall that $Z_{ij} = 168 - M - D_{ij}^0(L_{ij} + T_{ij})$, where the minimum time required for personal maintenance (sleep, etc.) is denoted by M ; D_{ij}^0 is the dummy for being employed; and time spent on employment is indicated by $L_{ij} + T_{ij}$. The individuals that face purely job-induced time poverty can sustain the time that they spend on employment only by compromising on the minimum needs of personal maintenance. They cannot be made time-nonpoor via the

redistribution of household production responsibilities. Hence, their households will also remain time-poor because we consider a household with a time-poor person as a time-poor household.

However, the amount of the individual's time deficit may be reduced via redistribution if they did engage in household production because the time deficit, X_{ij} , is determined by the equation $X_{ij} = Z_{ij} - [\alpha_{ij}^w(1 - \alpha_j^{nw})]R_j$ where the last term is positive only if $\alpha_{ij}^w > 0$, i.e., if the person's share of the total time spent by all members of their household is positive. Of course, the necessary condition of a fallback person must be satisfied for this potential reduction of the time deficit to be realized. A "male- or female-breadwinner" family in which the employed partner works such long hours at the job that they forgo minimum personal maintenance would fall into this category. Redistributing some amount of household production responsibilities from the employed to the nonemployed partner cannot make the employed person time-nonpoor. But it can reduce their time deficit and thus make them less vulnerable to the time deficit's impoverishing effects.

Consider now the group of time-poor households that satisfy the prerequisites of the presence of a fallback person and the absence of a person with a purely job-induced time deficit. Can families in this group always reduce their time deficit and decrease the number of time-poor persons via some appropriate redistribution strategy? Unfortunately, even among this group of households, there would be those that would remain time-poor under *any* redistribution strategy. To identify such households we need to compare two magnitudes—the time available to fallback persons for household production and time deficits—both evaluated at the household level.

The first-mentioned magnitude can be readily constructed by adding up Z_{ij} over the F^j fallback persons in the household j , $i = 1, 2, \dots, F^j$. Let us denote the resulting sum as Z_j^f . The second magnitude is simply the household's time deficit (X_j) that we introduced earlier—the sum of the time deficits incurred by the working-age members of the household. The sufficient condition for the household to remain time-poor under any redistribution strategy is then $Z_j^f < \text{abs}(X_j)$, i.e., the time available to the fallback persons in the household for household production cannot offset the household's time deficit (X_j).

We can summarize the position in a slightly different way. A time-poor household can become time-nonpoor via redistribution only if it has at least one fallback person, no one with

job-induced time poverty, and the total time available for household production to the fallback persons exceeds the adjusted household time deficit (in absolute value). Our discussion has delineated five groups of time-poor households that cannot escape time poverty (i.e., reduce the number of time-poor persons to zero via redistribution) and one group that can. The characteristics relevant to their potential for becoming time-nonpoor via redistribution and the expected outcomes about household time deficit are summarized in Table 4-1. The lowest rate of household time poverty that can be attained via redistribution is equal to the combined share of the first five groups in the total number of households in the sample.

Table 4-1 Subgroups of Time-Poor Households and Potential Impact of Redistribution on Household Time Poverty

Group	Number of working-age persons	Characteristic	Presence of a fallback person	Job-induced time-poor person?	Possible reduction in:	
					Number of time-poor	Time deficit
1	One	One time-poor person	No	Maybe	None	None
2	Two or more	All are time-poor	No	Maybe	Maybe but not to zero	None
3	Two or more	All time-nonpoor members are sick/disabled	No	Maybe	Maybe but not to zero	None
4	Two or more	At least one time-poor person	Yes	Yes	Maybe but not to zero	Maybe but not to zero
5	Two or more	At least one time-poor person and time available for household production for fallback persons is less (in absolute value) than household time deficit	Yes	No	Maybe but not to zero	Maybe but not to zero
6	Two or more	At least one time-poor person and time available for household production for fallback persons is equal to or greater than (in absolute value) household time deficit	Yes	No	Can become zero	Can become zero

Notes: Time poverty is measured only for working-age adults. We have entered “Maybe” under the heading “Job-induced time poverty?” for the first three groups because the results regarding household time poverty do not depend on whether there is a person with job-induced time poverty in the household. Only Group 6 can reduce the number of time-poor persons to zero, i.e., become time-nonpoor.

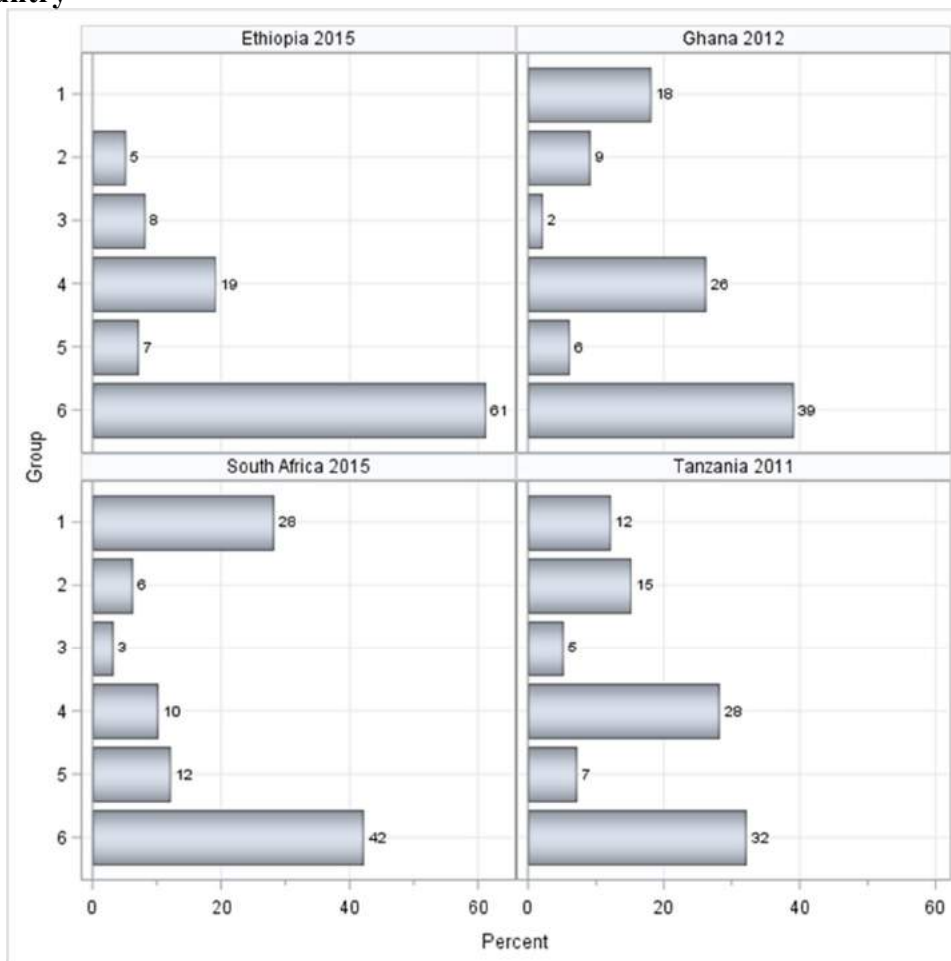
Discussion of the constraints on redistribution in reducing time poverty at the household level enables us to identify similar formal constraints at the individual level. To begin with, a time-poor person that is the only working-age person in their household cannot delegate their household production responsibilities to other working-age persons. Next, let us consider time-poor persons that live with other working-age adults. If all other working-age adults are sick or disabled, according to the assumption that we made earlier, household production responsibilities cannot be delegated to them and there is no scope for redistribution. On the other hand, if the time-poor person lives with at least one working-age person that is neither sick nor disabled, redistribution may reduce that person's time deficit and facilitate a transition out of time poverty. The only caveat is if the time-poor person has purely job-induced time poverty, $Z_{ij} < 0$; as we discussed earlier, such individuals cannot become time-nonpoor via redistribution, although, provided that they engage in some household production, their time deficits may be reduced via redistribution.

To confirm the validity of our conclusion, it is enough to consider the most stringent case, i.e., the household where time poverty is universal and all except one encounter job-induced time poverty. It is possible to eliminate the time poverty of the latter by relieving her of an amount of time equal to (or greater than) her time deficit and delegating it to the others in the household. Thus, the number of time-poor individuals remaining after successful redistribution is the sum of the number of time-poor individuals: (a) living without any other working-age individual in the household; (b) living only with sick or disabled working-age persons; and (c) encountering job-induced time poverty while living with able, working-age persons. The condition reflects the minimum requirements that the time-poor person must have someone to whom they can delegate their household production responsibilities and that their time deficit can be reduced to zero via such redistribution. Of course, there may be no reasonable rule of distribution that actually arrives at the minimum possible rate either at the household or individual level. We discuss the rules of distribution in the next chapter.

We now turn to an empirical assessment of the constraints on redistribution as a mechanism for reducing time deficits. In examining the estimates, it is important to note that Ethiopia is not comparable to other countries because, as discussed in Appendix B, we included only a specific type of family in our study, namely, the family headed by a married person that

lives with spouse and their children (perhaps along with other relatives and nonrelatives). As a result, there are no households with a single, working-age person in the Ethiopian sample.

Figure 4-1 Share of Each Group in the Total Number of Time-Poor Households (percent), by Country



Notes: See Table 4-1 for an explanation of the groups. The group of households that can become time-nonpoor via redistribution is Group 6. The sample for Ethiopia includes only households with a married head of working age, spouse of working age, and their children under 18 years of age. Therefore, there are no households in Group 1 for Ethiopia.

We have shown the respective shares of the groups we delineated above (Table 4-1) in the total number of time-poor households with at least one working-age employed person in Figure 4-1. The family composition of the chosen sample along with the relatively lower weekly amount of time spent on employment may help explain why as many as 61 percent of time-poor households are in Group 6 (i.e., the group of households amenable to redistribution) in Ethiopia. At the other extreme is Tanzania, where redistribution can be effective in reducing

the incidence of time poverty for only 32 percent of time-poor households. The scope for redistribution is higher in Ghana (39 percent) and South Africa (42 percent).

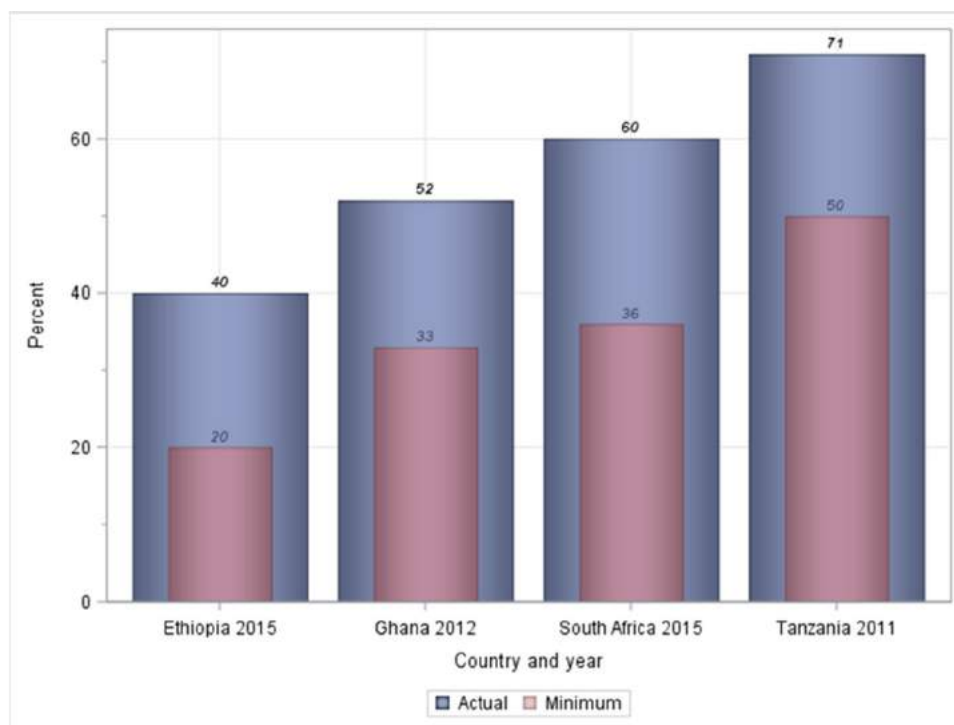
The sickness and disability barrier (Group 3) appears to be more of an impediment in escaping time poverty in Ethiopia than in other countries. The barrier indicates that the household members to whom the time-poor may delegate some of their household responsibilities may not be able to oblige because of health limitations. Our finding is consistent with the fact Ethiopia ranked the highest among the countries in our study in terms of the proportion of working-age adults that are either sick or disabled.²⁴

Time poverty that is purely job induced (resulting from the inordinately high weekly time spent on employment) is the main factor (Group 4) that restricts the scope for reducing the rate of time poverty via redistribution in Ethiopia, Ghana, and Tanzania. Roughly similar shares of time-poor households face this obstacle in the latter two countries (26 and 28 percent, respectively) while the share is somewhat lower in Ethiopia (19 percent). Comparatively, the presence of job-induced time poverty is less of an impediment in South Africa, where the proportion of time-poor households that include such time-poor persons is considerably lower at 10 percent.

In South Africa, the leading factor in restricting the scope of redistribution is the relative preponderance of households with a single, working-age person (Group 1). As many as 28 percent of all time-poor households in South Africa belong to this category where there are no other working-age adults with whom household production responsibilities can be shared, compared to 18 percent and 12 percent in Ghana and Tanzania, respectively. A considerable proportion of time-poor households in Tanzania (15 percent) consist of working-age adults who are all time-poor (Group 2). In other countries, however, their share is relatively smaller. Household time deficits can be redistributed among time-poor individuals in this group, even potentially allowing for some individuals to become time-nonpoor, thus resulting in a divergence between the time poverty status of the household and some of its members. Finally, the proportion of time-poor households in which the time available to fallback persons for household production falls short of the household time deficit (Group 5) is relatively small in all countries, ranging from 6 percent in Ghana to 12 percent in South Africa.

²⁴ As many as 17 percent of the working-age adults in Ethiopia were in the sick or disabled category. The percentages in South Africa and Tanzania were similar (12 percent and 10 percent, respectively). Ghana had the lowest proportion of sick or disabled persons in their working-age population (5 percent).

Figure 4-2 Actual and Minimum Possible Rate of Household Time Poverty by Country (percent)



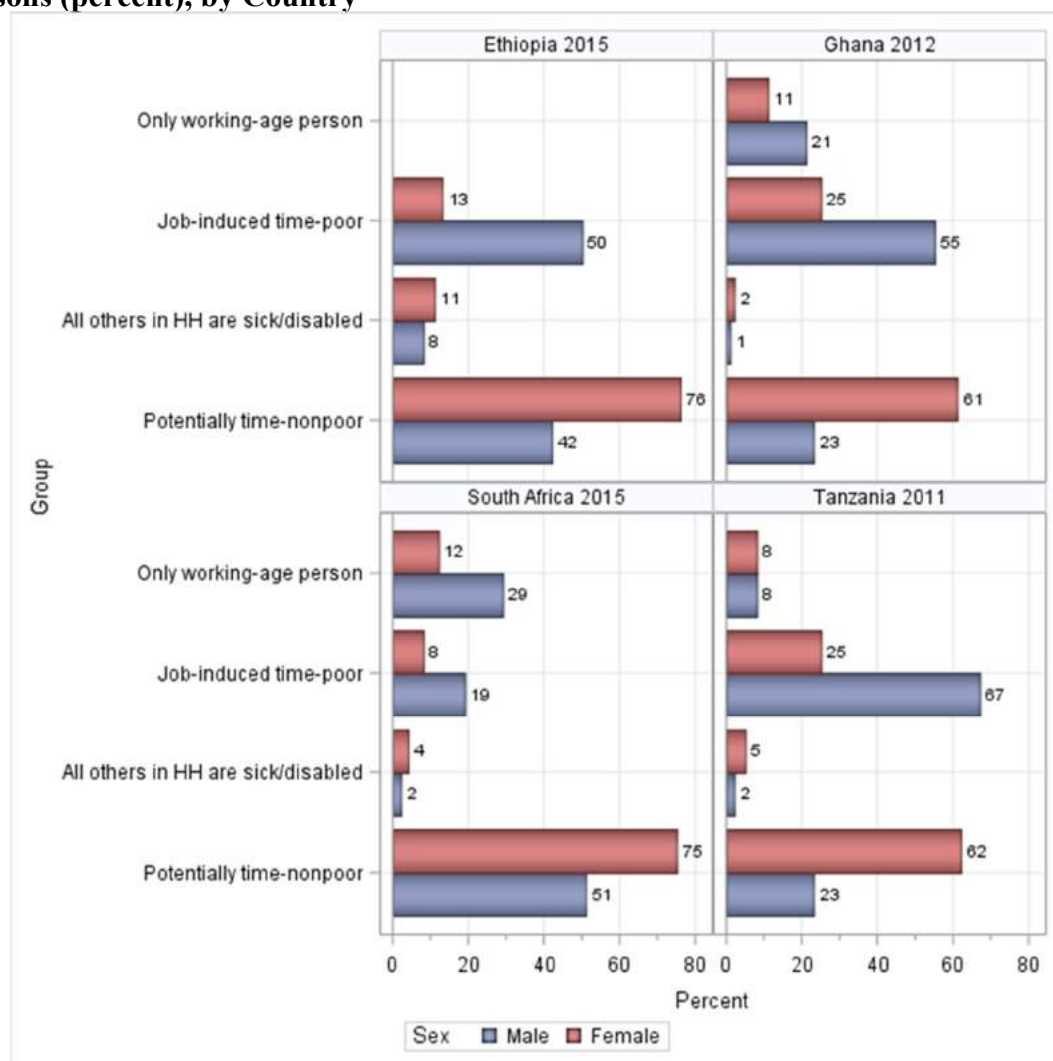
Notes: Household time poverty is estimated for households with at least one employed, working-age person. The sample for Ethiopia includes only households with a married head of working age, spouse of working age, and their children under 18 years of age.

As we noted before, the combined share of households belonging to Groups 1 through 5 in the total number of households in the sample constitutes the minimum possible rate of time poverty that we can hope to obtain via redistribution. In Figure 4-2 we provide a comparison between the minimum possible and actual rate for households with at least one employed, working-age person.²⁵ Evidently, if (and this is a big “if”) redistribution is completely successful, we can expect a remarkable reduction in the incidence of time poverty among households in all countries. However, it is notable that as many as half of all households in Tanzania and approximately one-third in Ghana and South Africa will continue to be time-poor after a successful redistribution. In the Ethiopian case, which is not comparable to other countries, the incidence of time poverty among households could fall to as low as 20 percent if redistribution were to be fruitful.

²⁵ In Ghana and Tanzania, almost all households with one or more working-age person report at least one of them as employed (95 percent and 98 percent, respectively). In South Africa, the percentage of households with at least one working-age employed person in the total number of households with one or more working-age persons is comparatively lower (73 percent). In Ethiopia, our sample included only households in which the husband or wife was employed.

Turning now to the evidence regarding the constraints on redistribution in alleviating individual time poverty, we note that the Ethiopian sample excludes households with only one working-age member. Consequently, the constraint of being the only working-age person in the household does not apply to Ethiopia. As for the constraint of job-induced time poverty, our estimates shown in Figure 4-3 indicate that men are much more prone to this type of time poverty than women in Ethiopia (50 percent versus 13 percent), a reflection of the comparatively smaller amount of time that the latter spent on employment. The opposite pattern holds for the constraint imposed when the persons to whom the time-poor person can delegate some of their household responsibilities happens to be sick or disabled. For time-poor Ethiopian women, this is almost as big a factor as overwork at the job in ruling out the possibility of becoming time-nonpoor via redistribution. Comparatively, being time-poor in a household with only sick or disabled members is much less frequent among the time-poor of the other countries considered here. We believe that the result is consistent with our finding of a higher proportion of time-poor households where all time-nonpoor members are sick or disabled in Ethiopia.

Figure 4-3 Share of Each Group in the Total Number of Working-Age, Employed, Time-Poor Persons (percent), by Country



Notes: The sample for Ethiopia includes only households with a married head of working age, spouse of working age, and their children under 18 years of age. Therefore, no estimates are shown for households with a single, working-age person in Ethiopia.

For time-poor men and women in Ghana and Tanzania, the main barrier to evading time poverty via redistribution is job-induced time poverty. About one-quarter of time-poor women fall into this category. The share of time-poor belonging to this group is even higher among men: 55 percent and 67 percent, respectively, in Ghana and Tanzania. As it turns out, in South Africa this is not the main barrier (only 19 percent of men and 8 percent of women can be found in this group). Instead, the main obstacle is being the only working-age member of the household so that the time-poor person cannot assign their household responsibilities to anyone else. Almost 29 percent of time-poor men and 12 percent of time-poor women belong to this

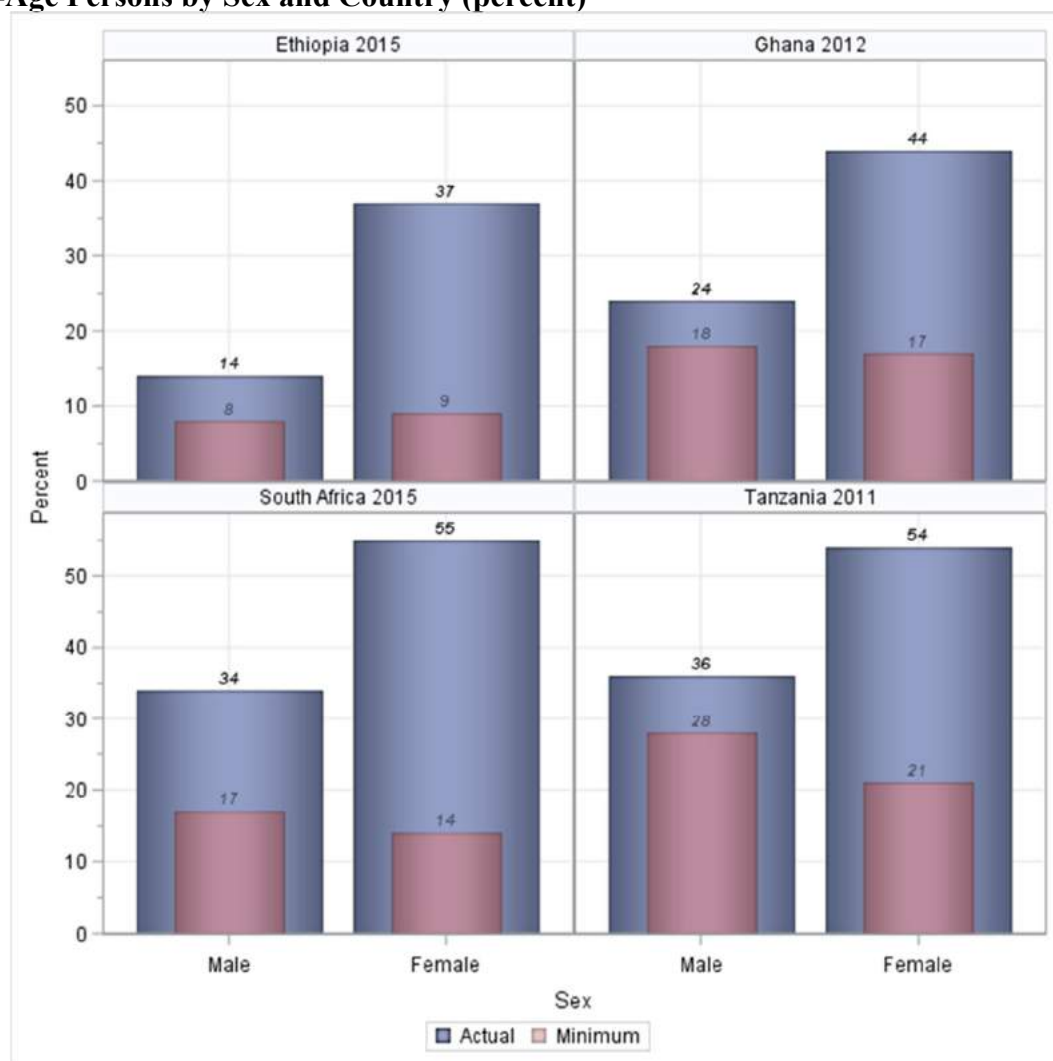
category. In comparison, 21 percent and 9 percent of men and 11 percent and 8 percent of women fall in this category in Ghana and Tanzania, respectively.²⁶

In Ethiopia and South Africa, if women could find their path out of time poverty via redistribution, the clear majority (about 75 percent) of the time-poor among them would vanish. The situation is less rosy in the other two countries (roughly 61 percent). In all countries, women are more likely to become time-nonpoor via redistribution than men. At the maximum, only 23 percent of time-poor men can expect to become time-nonpoor via redistribution in both Ghana and Tanzania while the share in Ethiopia and South Africa is, respectively, 42 percent and 51 percent.

The greater room for reduction in time poverty among women than men suggests that the potential minimum possible rate of time poverty for women would be further away from the actual rate of time poverty than for men. This intuition is confirmed by our estimates (Figure 4-4). As we have observed before, the incidence of time poverty is notably higher among women than men. If (again, a big “if”), however, redistribution can be carried out with the sole objective of eliminating the individual’s time deficit, we will find that as a result men would be more prone to time poverty than women in South Africa and Tanzania while the incidence would be roughly similar in Ethiopia and Ghana. For all practical purposes, we expect the post-redistribution rate of time poverty to be above the minimum possible rate because redistribution is unlikely to be completely successful.

²⁶ We referred to households with a lone working-age woman as an instance of households in which time poverty is not remediable via redistribution. Our estimates showed that among time-poor persons that were the only working-age person in their household, 59 percent, 52 percent, and 36 percent were women in, respectively, Tanzania, Ghana, and South Africa.

Figure 4-4 Actual and Minimum Possible Rate of Individual Time Poverty of Employed, Working-Age Persons by Sex and Country (percent)



Note: The sample for Ethiopia includes only households with a married head of working age, spouse of working age, and their children under 18 years of age.

4.2 Redistribution and Gender

We now take a closer look at the gendered nature of redistribution that may be deployed to alleviate time deficits within time-poor households. Since our focus is on the intrahousehold division between working-age individuals, we need to examine the subset of households with two or more working-age persons, with at least one member of each gender.²⁷ According to the

²⁷ Gender is a binary category in the surveys used in our study. Most of the time-poor households have at least one male and female working-age member. In Ethiopia, this is simply because we have chosen to study only such households. Among other countries, South Africa has the highest percentage of all-male or all-female time-poor households (17 percent). In Ghana and Tanzania, their percentage is much lower at 10 percent and 6 percent, respectively.

typology that we proposed earlier (see Table 4.1), we can distinguish between households based on whether it has a fallback person. We concluded in our discussion of the typology that no reduction in household time deficit was possible via redistribution in a household without a fallback person; all that redistribution can accomplish is to transfer time deficits across people in the household. The potential resolution of overt or covert gender conflicts about the division of household responsibilities cannot improve the collective outcome. As for the nature of the likely resolution, we cannot identify the direction of the redistribution (e.g., from women to men or vice versa) without knowing the actual pattern of time deficits among the members of the household. Among time-poor households with working-age men and women, the percentage of households with no fallback person was 13 percent, 13 percent, 10 percent, and 23 percent in Ethiopia, South Africa, Ghana, and Tanzania, respectively.

In contrast, households with one or more fallback person(s) present a different picture: the household time deficit can be reduced, though not necessarily eliminated in such households. Thus, the resolution of conflicts regarding their intrahousehold division can improve the collective outcome. We can also detect a priori the gender pattern of redistribution within the household by examining the gender of the fallback person and time-poor person, respectively.

The majority of the time-poor individuals in households with working-age persons of both sexes and fallback person(s) are women: 67 percent, 73 percent, 68 percent, and 64 percent, respectively, in Ethiopia, Ghana, South Africa, and Tanzania. On the other hand, the bulk of the fallback individuals are male: 66 percent, 63 percent, 61 percent, and 62 percent in Ethiopia, Ghana, South Africa, and Tanzania, respectively. Since the majority of time-poor individuals are female and the majority of fallback persons are male, the potential redistribution would mostly tend to be from women to men. The issue is how far a gender-based redistribution, either “female to only males” or “male to only females,” would be able to redress time deficits.

We can apply the same logic that we used to discuss redistribution in general to gender-based redistribution. On the one side of the ledger, we reckon the total time available to fallback persons of a given gender for household production. The other side of the ledger consists of the total time deficits of time-poor persons of the opposite gender, adjusted to include only the required hours of household production in the time deficit incurred by the job-induced time-

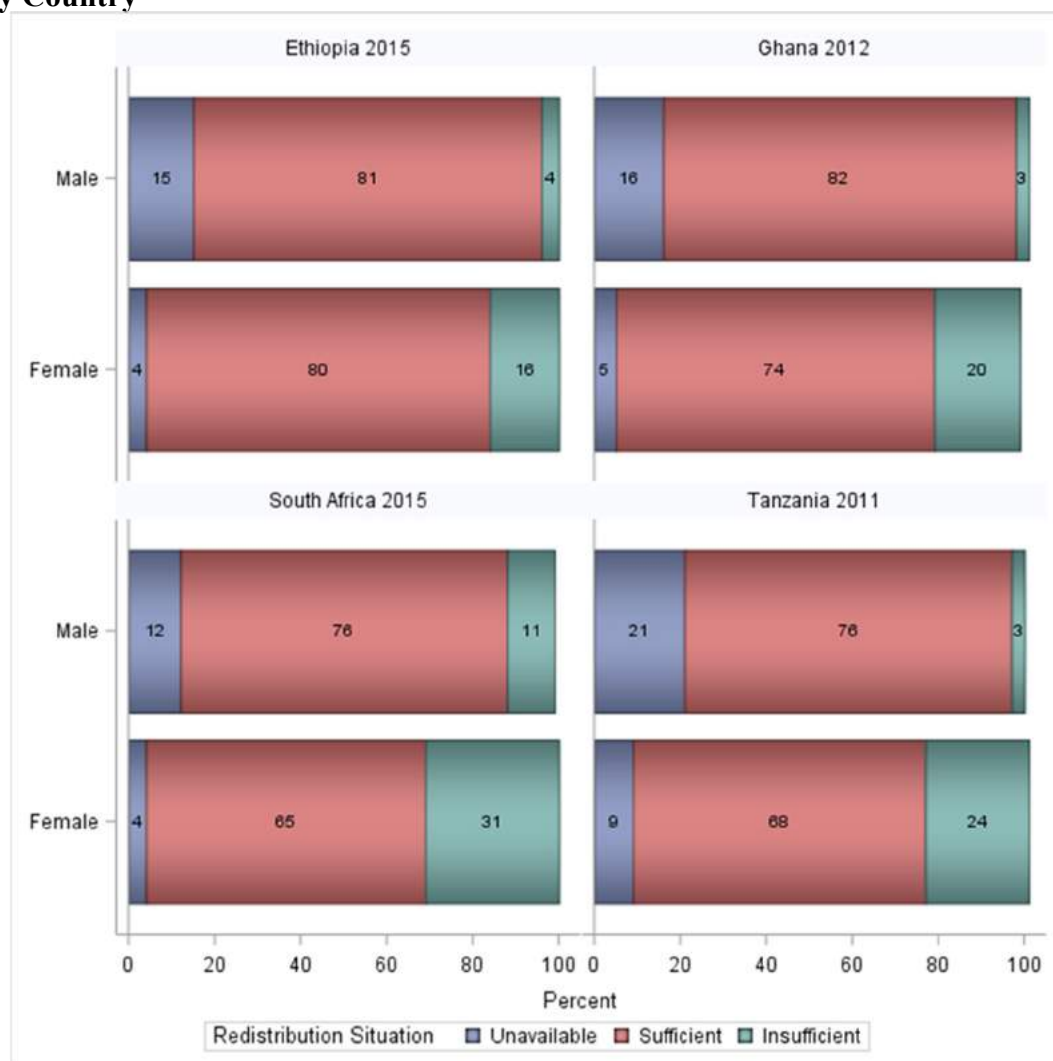
poor. The adjustment is made to account for the portion of the time deficit that is intractable to redistribution. As we discussed before, the time deficit of those in job-induced time poverty has two potential components: the extent to which the hours at the job exceed the amount of time left in a week after deducting the time requirements for personal maintenance (Z_{ij}) and the person's required hours of household production. Only the latter magnitude is amenable to change via intrahousehold redistribution because we are assuming that the time spent on employment remains unchanged. Therefore, when we construct the total deficit for the household that can be reduced via redistribution, we should exclude the amount Z_{ij} for the members in job-induced time poverty.

The effectiveness of redistribution can be judged by comparing the two sides of the ledger—the total time available to fallback persons of a given gender for household production and the adjusted total time deficits of time-poor persons of the opposite gender. If the two sides match or the value on the first side mentioned exceeds that on the other side (in absolute value), gender-based redistribution will be effective, that is, redistribution can reduce the individual *and* household time deficits to zero.

The time-poor men and women can fall into three groups with respect to the condition that we just stated. In the first group, we have either time-poor men or women that do not have fallback persons of the opposite gender in their household. Consider, for example, a family headed by a single female that is time-poor. Her son and daughter are of working age and live with her. Suppose that the fallback person happens to be the daughter because the son is time-poor. Gender-based redistribution cannot eliminate the mother's time deficits because there is no one of the opposite sex to whom some of her household responsibilities can be delegated. We label this group of families as “Unavailable” to indicate that there is no fallback person of the desired characteristic in the household for the time-poor person. The second group consists of time-poor men and women that happen to meet the condition. This group can be described as “Sufficient,” indicating that fallback persons with the desired characteristic and sufficient time are available. Finally, there are likely to be some time-poor men and women with members of the opposite sex in the household not having enough available time to take over their household responsibilities to the extent required to eliminate their time deficits. Accordingly, we label this group as “Insufficient.”

Our estimates show that a gender-based redistribution can go a long way toward redressing time deficits; however, redistribution between household members of the same gender is also required to alleviate time deficits in a substantial number of families (see Figure 4-5). Approximately two-thirds of households with time-poor women in South Africa and Tanzania are in the “Sufficient” category, i.e., there are men in the household with enough time to relieve women’s time deficits. In Ghana and Ethiopia the share is still higher at 74 percent and 80 percent, respectively. For households with time-poor men, the prospects are better in Ghana, South Africa, and Tanzania. Roughly three-quarters of households with time-poor men in South Africa and Tanzania have women as fallback persons with sufficient time to offset the men’s time deficits. The percentage of households in the “Sufficient” category for males is still higher (a little over 80 percent) in Ethiopia and Ghana. Compared to the percentage of households in the same category for females in each country, Ethiopia shows little difference, while in Ghana the prospects appear to be better for men than for women.

Figure 4-5 Potential for Gender-Based Redistribution (percent of households in each group), by Country



Notes: The estimates are for the subsample of time-poor households with working-age males and females and at least one fallback person. Each segment of each bar shows the percentage of households belonging to that category in the total number of households (e.g., 65 percent of households with time-poor females in South Africa are estimated to have male fallback persons with sufficient time to offset the female’s time deficits). For an explanation of the categories representing the potential for redistribution, see section 4.2.

The main inhibiting force against gender-based redistribution for time-poor men appears to be the unavailability of female fallback persons in their households. We noted that fallback persons in the households that we are considering are predominantly male—a reflection of men’s lower rate of time poverty. We believe that this is behind the higher value that we estimate for men than women in the category “Unavailable.” In contrast, available time for household production among male fallback persons falling short of women’s time deficits is the main factor restraining the effectiveness of gender-based redistribution in households with time-

poor women. As we reported before, the employment rate and weekly hours spent on employment are higher among men. Both factors would tend to reduce the men's average time available for household production. On the other hand, the average time deficits of time-poor women are notably higher than those of time-poor men. After excluding the purely job-induced time deficit, the average weekly time deficit was 12 hours versus 23 hours for men and women, respectively, in Ethiopia, 7 hours versus 18 hours in Ghana, 13 hours versus 20 hours in South Africa, and 9 hours versus 19 hours in Tanzania. This set of circumstances explains why we find more women than men in the category "Insufficient."

Disputes on intrahousehold division and how they might be resolved depends not just on the gender identity of the persons but also on their relationship with each other. Admittedly, the conflict and cooperation regarding household responsibilities between wives and husbands has been the most salient in social science research on intrahousehold division. From our perspective here, the redistribution between wives and husbands constitutes a subset of the gender-based redistribution that we discussed above. Empirically, too, married-couple families in which a husband and wife are of working age are the most prevalent type of family among the type of households that we consider here.²⁸ Further, wives constitute the largest segment of the time-poor population when people are classified by their relationship to their household head.²⁹ Naturally, given the nature of our sample for Ethiopia, we find that the percentage of wives in the total number of time-poor persons is highest there—59 percent. The next highest is in Ghana, followed by Tanzania and South Africa (53 percent, 40 percent, and 38 percent, respectively). In contrast, the percentage of husbands in the time-poor population is 24 percent, 21 percent, 23 percent, and 18 percent, respectively, in Ethiopia, Ghana, Tanzania, and South Africa. How effective is redistribution between wives and husbands in redressing time deficits?

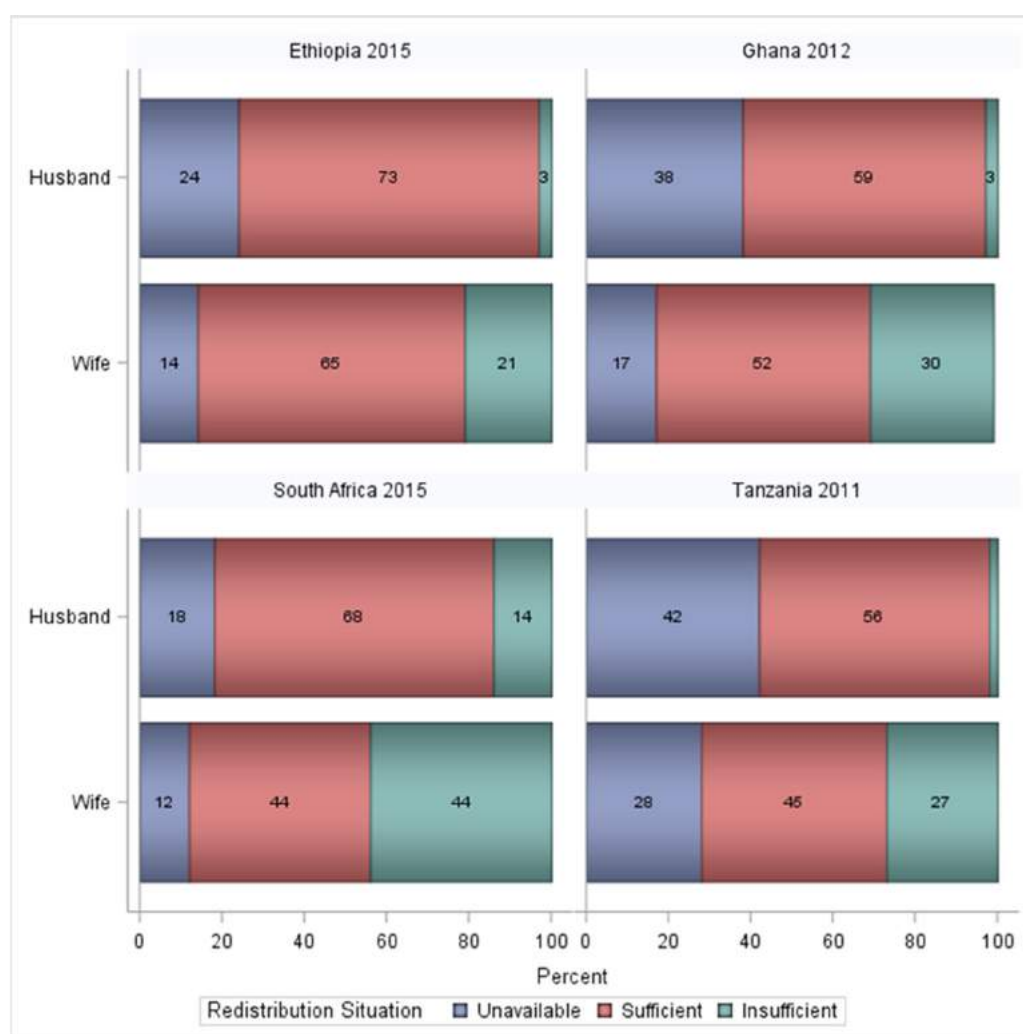
In line with our earlier discussion, for effective redistribution we need a fallback spouse with sufficient time available to assume some of the household tasks undertaken by a time-poor

²⁸ All time-poor households with at least one working-age individual of both sexes and at least one fallback person consist of working-age, married-couple families in Ethiopia because of our sample choice. In other countries, the prevalence of working-age, married-couple families is as follows: 83 percent in Ghana and Tanzania and 69 percent in South Africa.

²⁹ This will not include all wives in the sample because we cannot unambiguously identify wives of people other than the head of the household. A similar limitation applies to the identification of husbands; we can clearly identify them only when they are heads of households. The inability to accurately identify subfamilies in most of the region's household surveys is a serious data limitation in studying a variety of issues, e.g., the dynamics of family formation.

spouse so that her or his time deficit is reduced. We can group the married-couple families in the same way we did in the instance of the gender-based redistribution above. A time-poor husband (wife) cannot be the fallback person for a time-poor wife (husband). This married-couple family belongs to the “Unavailable” group. A family with a fallback husband (wife) with sufficient time available to offset his wife’s (her husband’s) time deficit can be put in the “Sufficient” group. Finally, the “Insufficient” group includes families where the fallback spouse does not have the time available to offset the other spouse’s time deficit.

Figure 4-6 Potential for Spousal Redistribution (percent of families in each group), by Country



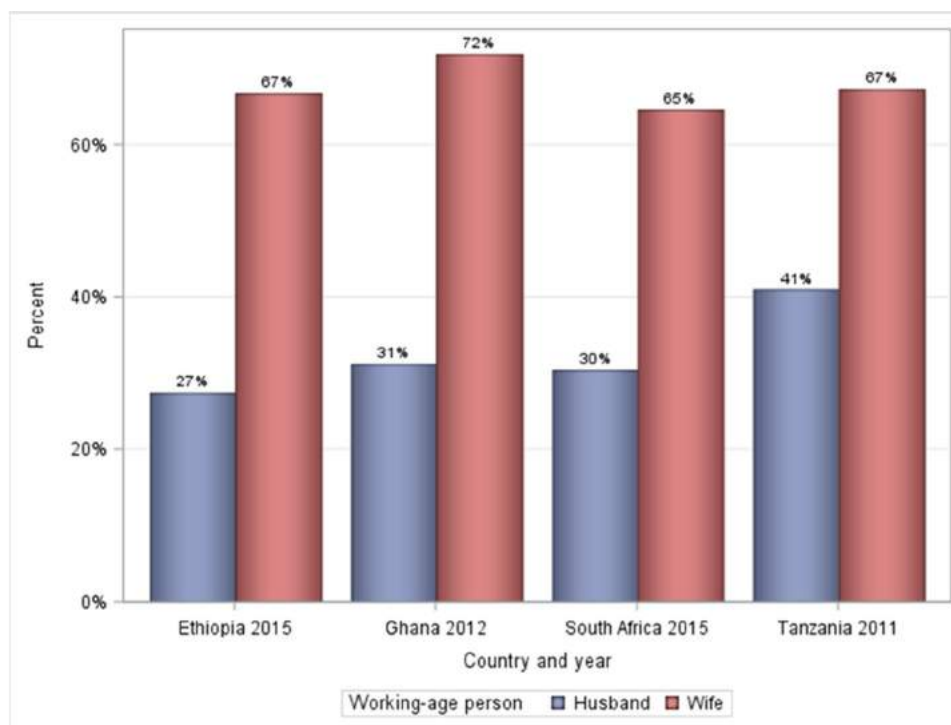
Notes: The estimates are for the subsample of time-poor families with a working-age wife and husband and at least one fallback person. Each segment of each bar shows the percentage of families belonging to that category in the total number of families (e.g., 45 percent of families with time-poor wives in Tanzania are estimated to have husbands with sufficient time to offset their wives’ time deficits). For an explanation of the categories representing the potential for redistribution, see section 4.2.

We found that in Ethiopia redistribution between husbands and wives is likely to be quite successful in reducing individual and household time deficits (Figure 4-6). Approximately 73 percent of married-couple families can eliminate the husband's time deficit via redistribution. In comparison, about 65 percent of them would be able to do so for the wife by redistributing household responsibilities from her to him. Time deficits are far less amenable to spousal redistribution in other countries, especially for wives. Only about half of married-couple families can free the wife of her time deficit via redistribution in Ghana; the proportion is a little lower in South Africa and Tanzania. Of the two impediments—the inability of the husband to act as a fallback person or having a husband with insufficient time—the latter turns out to be the dominant factor in Ghana and South Africa. In Tanzania, both impediments act with roughly equal strength.

The higher the person's likelihood of being employed and of spending long hours at the job, the higher the probability of the person having less time available for household production. We know that the likelihood of being employed and having a long workweek is greater for husbands than wives. Similarly, we also noted the higher time deficits, on average, of women than men. The disparity also prevails, unsurprisingly, between wives and husbands. Both of these factors explain why having a spouse with insufficient time is much more of an impediment for wives than for husbands.

We also find that husbands encounter the impediment of having a spouse that is unable to act as a fallback person more often than wives (as can be seen by comparing the size of the segment labeled “Unavailable”). What prevents the working-age spouse from being a fallback in a time-poor household? Our data shows that, by far, the main barrier to a spouse acting as a fallback person is time poverty; sickness or disability is much less frequently an obstacle. As we would expect in light of the gender disparity in time poverty that was already discussed, wives face a substantially higher incidence of time poverty than husbands in time-poor families (Figure 4-7).

Figure 4-7 Time Poverty Rate of Husbands and Wives in Time-Poor Families (percent), by Country



Notes: The estimates are for the subsample of time-poor families with a working-age wife and husband and at least one fallback person. We define a family as time-poor if one or more members are time-poor.

4.3 Conclusion

Redistribution of household production responsibilities in time-poor households between males and females does have the potential for improving individual and household well-being via reducing time deficits. The primary constraint on the effectiveness of gender-based redistribution is that the person of the opposite gender in the household may not be able to take over responsibilities due to their time constraints, i.e., they may be time-poor or cannot assume others' tasks without becoming time-poor. Indeed, there is no guarantee that time-poor women are likely to benefit more from purely gender-based redistribution than time-poor men.

We estimate that even after a successful redistribution along gender lines in time-poor households, a substantial minority of women and men would still be time-poor. Ethiopia presents an exception in that women fare the same as their male counterparts because only as many as 19 percent of time-poor households will continue to have either time-poor women or

time-poor men.³⁰ In Ghana and South Africa, the outcomes for women would be worse than for men because a higher percentage of households will be left with time-poor women than time-poor men. The percentages are 25 percent versus 15 percent in Ghana and 35 percent versus 31 percent in South Africa. It turns out that in Tanzania the shares are almost identical (33 percent and 34 percent of time-poor households will continue to have time-poor women and men, respectively).

Redistribution between wives and husbands, a narrower form of gender-based redistribution, fares notably worse for time-poor wives than time-poor husbands because the additional restrictions on intragroup redistribution seem to be more stringent for women. Our estimates indicate that successful spousal redistribution in Ethiopia, Ghana, South Africa, and Tanzania will leave as many as 35 percent, 47 percent, 56 percent, and 55 percent, respectively, of time-poor married-couple families with time-poor wives. In contrast, the same principle of redistribution will lead to 27 percent, 21 percent, 44 percent, and 46 percent of time-poor married-couple families with time-poor husbands in Ethiopia, Ghana, South Africa, and Tanzania, respectively.³¹

Redistribution within the household will be considerably more potent in reducing time deficits if it is extended to all fallback persons and not restricted to spouses or members of the opposite sex. In principle, delegating some additional household tasks to working-age children of the head of the household or members of the extended family irrespective of gender, if they are available as fallback persons, can help relieve time deficits further. The composition of time-poor families in our case indicates that working-age children make up a substantial segment of fallback persons.³² Of course, extending the scope of redistribution to enhance cooperation in household production could simultaneously generate new conflicts among family members. Thus, the alleviation of time deficits for men and women via full-scale redistribution

³⁰ The estimates for each gender are obtained as the sum of the numbers in the “Unavailable” and “Insufficient” categories in Figure 4-5.

³¹ We calculated the estimates for husbands and wives by summing the numbers in the “Unavailable” and “Insufficient” categories in Figure 4-6.

³² In Ethiopia, 23 percent and 13 percent of fallback persons in time-poor, working-age, married couple families are, respectively, working-age sons and daughters. The corresponding estimates are 23 percent and 17 percent in Ghana, 20 percent and 15 percent in South Africa, and 24 percent and 13 percent in Tanzania. The share of extended family members in the total pool of fallback persons ranges between 8 percent in Ethiopia to 17 percent in Tanzania. Redressing the time deficits of husbands and wives via spousal redistribution alone excludes a large proportion of fallback persons and thus contributes substantially to leaving a sizeable proportion of families with time-poor wives or husbands even after successful spousal redistribution.

can potentially trigger disputes between people of the opposite gender and between people of the same gender.

5 EFFECTS OF REDISTRIBUTION ON TIME DEFICITS AND CONSUMPTION POVERTY

We saw in the previous section that although there are constraints, **intrahousehold redistribution can substantially reduce time deficits**. Within the constraints that we identified, the extent of the reduction would depend on the principle that we use in distributing household responsibilities among the members. Simple **egalitarianism that involves an equal division is one such principle**. **But there are other contenders**, too, and we discuss them in the next section. We also briefly outline the methods used for implementing the principles in our data, with the detailed explanation of some aspects provided in Appendix E. Next, we provide an assessment of the different principles in terms of how **far they improve the position of women and how much such improvements are congruent with the betterment of the economic well-being** of their families. In the subsequent section, we compare and contrast the joint distribution of time and consumption poverty among families and individuals that would result from each principle.

5.1 Distribution Rules for Household Production

Alternative values of α_{ij}^w indicate how household production requirements, net of the portion met by household members that are not of working age or are physically unable to take on more work, are shared between working-age persons in the household. One possibility is an equal sharing rule, a form **of “naïve egalitarianism.”** As before, denoting the number of working-age persons in household j as I^j , we can express the rule as:

$$\alpha_{ij}^E = \frac{1}{I^j}$$

Another **possibility is to share according to the time that is available after setting aside the time for personal maintenance requirements and income generation, Z_{ij} . As we pointed out in the previous section, some people** may have such exceptionally long hours at the job that

after meeting the minimum personal maintenance requirements they are left with no time whatsoever to devote to household production requirements. We described them as being in purely job-induced time poverty, as their Z_{ij} values are negative. Because we are assuming that the time spent on employment remains constant, the logical approach would be to set the value of Z_{ij} to zero for those in job-induced time poverty in figuring out the time available to the household as a whole and individuals shares:

$$\alpha_{ij}^A = \frac{\max(0, Z_{ij})}{\sum_{i=1}^{I^j} \max(0, Z_{ij})}$$

A third possibility is based on the idea of opportunity costs along marginalist lines. The sharing rule depends on the **relative actual (potential) wage**.³³ For example, if there are only two working-age adults, say husband and wife, and if the husband's wage is twice as much as the wife, the wife's share would be two-thirds and the husband's share would be one-third. Thus:

$$\alpha_{ij}^M = \left(\frac{1}{I^j - 1} \right) \left(1 - \frac{w_{ij}}{\sum_{i=1}^{I^j} w_{ij}} \right)$$

We simulate each of these principles of redistribution and recalculate individual and household time and consumption poverty using the LIMTCP framework described above and elsewhere. We can now analyze the results of the exercise.

5.2 Reducing Gender Gaps in Household Production

In the analysis of the results below, we limit our attention to time-poor, working-age persons in households with two or more working-age persons, with at least one member of each gender and at least one working-age employed person, i.e., the sample for the simulations of the principles of redistribution discussed in the previous section. We include households with and without fallback persons. Indeed, whether a person is a fallback person depends to a large extent

³³ We use the actual or shadow wage for the employed and potential wage for the nonemployed. See Appendix E for details.

on the regime or principle by which intrahousehold division of household production responsibilities takes place.

5.2.1 *Sharing of Household Responsibilities: Relieving Time Deficits versus Moving toward Greater Gender Equality?*

The direct impact of redistribution is transmitted via the changes in the working-age individuals' shares of household production (α_{ij}^w). As we discussed earlier (see section 3.2), gender disparity in the shares between employed men and women is the principal factor behind the higher time poverty of employed women. Our focus is on time-poor persons and their households; that is, we examine how far redistribution by alternative principles would go toward alleviating time deficits. We therefore begin with a description of the changes in the shares. We report here results for time-poor men and women in married-couple households because they are the focus of most research and represent the overwhelming majority of time-poor individuals in all four countries. Detailed tables and figures for all working-age individuals differentiated by a variety of key demographic variables will be made available in an online appendix.

The actual situation described under the heading “Baseline” shows the gender inequality in the median value of the share that exists in all countries (Table 5-1). In each country, the disparity is impervious to the poverty line, i.e., the gender gap is quite large for persons in both the consumption-poor and nonpoor groups. Given the actual situation, we expect that there will be significant progress in gender equality by this measure under the equal shares scenario. That is, we should observe a large downward revision in women's shares and a relatively smaller upward revision in men's shares. In general, our findings lend support to our expectations. The exceptions are consumption-poor men in Ethiopia and consumption-nonpoor men in South Africa, where the equal shares scenarios result in a *fall* in the typical male share. We do not expect the typical male and female shares to necessarily attain parity in the equal shares scenario because households differ in the sex composition of their working-age members. For example, a household with more working-age males than working-age females will show a lower share for males than females and vice versa. Such demographic factors appear to be comparatively stronger in Ethiopia than in other countries.

Table 5-1 Share of Working-Age, Time-Poor Persons in Household Production (α_{ij}^w) by Country, Sex, and Consumption Poverty Status, Actual and Simulated Median Values (percent)

Country and year	Sex	Baseline poverty status	Baseline	Redistribution scenario		
				Equal	TA	OC
Ethiopia 2015	Men	Poor	27	25	8	23
		Nonpoor	23	33	4	24
	Women	Poor	73	33	33	38
		Nonpoor	73	42	36	43
Ghana 2012	Men	Poor	8	25	0	20
		Nonpoor	8	33	0	21
	Women	Poor	53	25	17	27
		Nonpoor	63	33	20	34
South Africa 2015	Men	Poor	23	33	6	24
		Nonpoor	43	33	18	28
	Women	Poor	60	33	21	32
		Nonpoor	68	39	35	38
Tanzania 2011	Men	Poor	10	20	1	18
		Nonpoor	9	25	0	19
	Women	Poor	39	22	19	21
		Nonpoor	49	29	26	29

Notes: The median values reported in the table are for persons that were time-poor in the baseline. All those persons need not be time-poor in the redistribution scenarios. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

If people did actually divide household responsibilities according to available time, men and women that spend a similar amount of time on employment should have roughly similar rates of time poverty. The reality, as we described before, is that women who spend as much time as men on employment have higher rates of time poverty. Therefore, we expect the shares of time-poor women to decline under the time available scenario. We have also seen that men are much more prone to job-induced time poverty ($Z_{ij} < 0$) than women. Redistribution on the basis of available time would certainly relieve them of their required hours of household production and reduce their share to zero. The presence of nonemployed wives can also serve to lower the shares of time-poor husbands via redistribution.

An additional factor that can lower the shares of both time-poor men and women under this principle of redistribution is the presence of working-age adults that are time-nonpoor because they are nonemployed or, even when employed, carry a light share of household work. As we noted in our survey of the literature (section 2.2.3.2) and in our discussion of the scope of redistribution (section 4.3, note 30), families in sub-Saharan Africa often do not conform to the theoretical ideal of the nuclear family that is generally postulated in the Western analyses of intrahousehold divisions. The head of the household's working-age children and members of the extended family are present in a substantial number of time-poor households and are often time-nonpoor. In the time available scenario, household responsibilities are reallocated to them from time-poor persons.

The factors identified above operate with varying force across time-poor families and in different national contexts. We find that the overall result is a reduction in the shares of time-poor women *and* men. As a result, the gender gap in shares, measured either as the percentage point difference between the male and female shares or as the ratio of the two shares, is worse in the time available scenario than equal shares scenario. The comparison of the gender gap between the actual or baseline situation and time available scenario does not yield a straightforward result. It seems to depend on how we measure the gap. If we measure it by the ratio of the shares, the gap resulting from the time available scenario of redistribution is actually worse for women than the baseline; the opposite holds if the gap is measured in terms of percentage point difference. Arguably, since the female and male shares are much lower in the time available scenario compared to the baseline, the percentage point difference is a better gauge of disparity in this context.³⁴

Turning to the final candidate for the principle of redistribution—opportunity cost—we expect the principle, in general, to lower the gender gap relative to the baseline. The reason is that the inequality in the gender division of household production is far more than that

³⁴ To illustrate the point, let us take the Tanzanian nonpoor group. In the baseline, the male share is 19 percent of the female share and the difference between the female and male share is 39 percentage points. Redistribution on the basis of time availability yields a value of zero for the ratio and the percentage point difference is 26. A comparison of the percentage point difference provides us with a concrete picture of how many more hours are required of women compared to men before and after the redistribution once we recall that the shares in question are shares of weekly hours of time requirements that remain unchanged across the scenarios and are approximately the same for men and women in each group. The ratio measure does not yield similar information in this case.

“warranted” by gender inequality in wages alone. Therefore, bringing the intrahousehold division in line with the wage disparity will represent an improvement in gender equality.

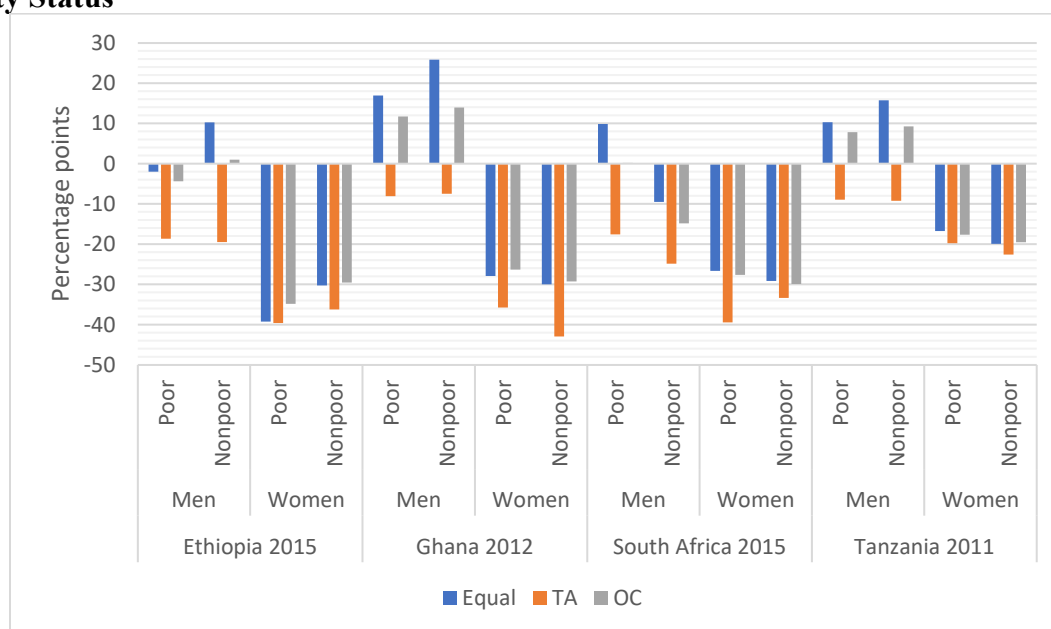
Consider the case of South Africa. We estimate that the average nonpoor woman’s share of household production was 1.59 times that of the average nonpoor man. This is the lowest value of the ratio, i.e., the lowest level of gender disparity in household production among the cases shown in the table. If this was the result of following the opportunity cost principle of distributing household production using our formula (section 5.1), we can readily calculate that the average female’s wage would be only 63 percent of the average male’s wage. In contrast, we estimate that the average female wage worker earns as much as 86 percent of what the average male wage worker earns per hour.³⁵ With this relative wage, the implied ratio of the female-to-male share in household production would be 1.16, much lower than the actually observed value of 1.59. A similar conclusion can also be drawn for other countries, leading us to expect that opportunity cost-based redistribution would translate into greater gender equality in household production. The current situation in all four countries is not the Pareto optimum predicted by the neoclassical theory of household production: if people truly were specializing according to their relative shadow wage, we would see little or no shift in the shares of household production.

Our estimates shown under the heading “OC” in Table 5-1 confirm our expectation. Men’s share generally increases (with the exception of poor men in Ethiopia and nonpoor men in South Africa) and women’s share falls, thus bringing greater equality in the division of household responsibilities. It is indeed a peculiar coincidence that women’s shares are almost identical under such differing principles of distribution as equal shares and opportunity costs. For men, the increase in their share under the opportunity cost scenario is generally much smaller than under the equal shares scenario. Putting these two findings together leads to the conclusion that the opportunity cost principle is less effective than the equal shares principle in enhancing gender equality because of the underlying gender wage inequality that is reflected in the former. Specifically, we know that wage inequality is likely to be higher between men and women in nonpoor than poor households. People on the higher rungs of the wage distribution in

³⁵ We estimated the relative hourly wage from the ILO’s Labour Market Dynamics database for 2015. The calculation was based on the median earnings for females and males between the ages of 15 and 60 and employed as wage and salary workers. We found that the hourly wage was approximately 18 rands and 16 rands for men and women, respectively.

every country are disproportionately nonpoor men. The implication is that gender inequality in the shares will be higher among the nonpoor than the poor when the shares are determined according to opportunity cost. Overall, this expression of the structural aspect of gender inequality in earnings contributed to making the reduction in gender inequality in shares lower under the opportunity cost division than under the equal shares division.

Figure 5-1 Change in the Share of Household Production of Working-Age, Time-Poor Persons under Alternative Principles of Division (percentage points), by Country, Sex, and Poverty Status

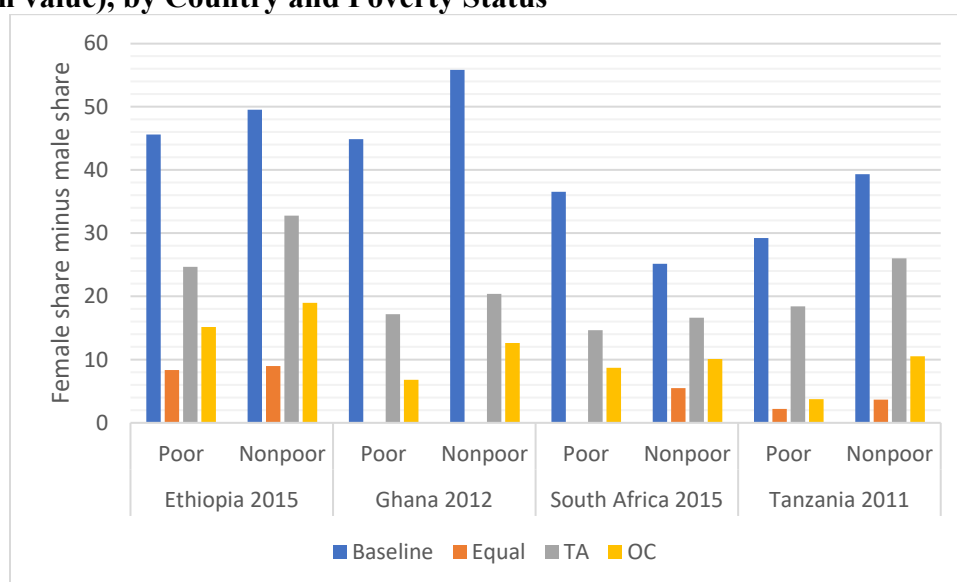


Notes: Each bar represents the value obtained by subtracting the median value calculated under a redistribution scenario from the median value prevailing in the baseline (reported in Table 5-1). The estimates reported in the figure are for persons that were time-poor in the baseline. All those persons need not be time-poor in the redistribution scenarios. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

Of the three principles considered here, distribution according to available time results in the largest reductions in time-poor women’s share of household production responsibilities (Figure 5-1). The reductions stemming from the equal shares and opportunity cost principles are, for the most part, substantively the same for women. Distribution according to available time seems to be the most favorable principle for time-poor men, too. Division according to

equal shares and opportunity cost generally leads to an increase in men's share of household production, in contrast to the decline that is observed when the division is according to available time. Given the apparent differences in the circumstances that shape the time constraints of men and women, it is curious that the same normative principle is the most advantageous to both as an arrangement for dividing household responsibilities.

Figure 5-2 Gender Gap in the Share of Household Production of Working-Age, Time-Poor Persons under Alternative Principles of Division (percentage point difference in the median value), by Country and Poverty Status



Notes: Each bar represents the value obtained by subtracting the median value of the male share of household production from the median value of the female share of household production (reported in Table 5-1). A missing bar for a particular group in the “Equal” series indicates that the difference in the median values is zero (i.e., there is perfect equality). The estimates reported in the figure are for persons that were time-poor in the baseline. All those persons need not be time-poor in the redistribution scenarios. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

However, reducing the individual's time constraints may not be the only purpose of the social relations shaping the distribution of household production among family members. Equality—both perceived and actual—between members also matters, especially for those who are in the disadvantaged position. Gender disparity, measured as the percentage point difference in shares (a proxy for the difference in the hours) or the ratio of shares, is reduced by all three

principles of distribution (Figure 5-2).³⁶ Yet, division according to available time fares worse than division according to equal shares or opportunity cost. The most effective principle in reducing time deficits performs worst in promoting gender equality. Time-poor individuals attempting to rearrange their household production to reduce time constraints and enhance gender equality may, therefore, face a conflict between the attainment of the two goals if they attempt to follow the principles discussed here in some form. Since women themselves may have both goals in seeking redistribution of household production, the potential conflict may not be between the male and female members alone. The tension between reducing time constraints and attaining equality in household production may become a source of internal mental strife for women themselves. This would be especially accentuated in the struggle for livelihood under conditions where women and men have little say over the conditions of employment or social provisioning of services that help reduce their time requirements for household production and travel to work.

5.2.2 Congruence and Conflict in the Reduction of Time Deficits

The changes in the share of household production that we discussed in the previous section will, in turn, result in changes in the individuals' time balances. For those who are time-poor, the reduction in the share will lead to a decline in their time deficit. We had earlier identified instances where the fall in an individual's time deficit need not be accompanied by a fall in their household's time deficits (see section 4.1). Our task in this section is to examine this issue closely in light of the three principles of redistribution. We focus on time-poor men and women in married-couple households that are able to reduce their individual time deficits via redistribution.

The individual's time deficit declines in the simulation of distributive principles as a result of a decline in their share of household production. Under our assumption that the time requirements (thresholds) for household production remain constant, an individual's share cannot decline without an increase in the combined share of other working-age members (neither sick nor disabled) of the household. When a person is assigned additional

³⁶ We have chosen to show the gap in median values here rather than the ratio of median values. The reasons behind the choice were already discussed above (note 32).

responsibilities, their share of household production increases. In turn, this generates a fall in their time balance (X_{ij}).

We define a person i in household j as having a lower time deficit as a result of redistribution when $\min(0, X_{ij}^a) < \min(0, X_{ij}^s)$, where X_{ij}^a is the actual or baseline time balance and X_{ij}^s is the simulated time balance, i.e., the time balance remaining after household production responsibilities have been distributed according to one of the principles discussed before. Our question is about the change in the time deficits of other persons that live under the same roof as the person experiencing a lower time deficit. That is, we wish to compare $\sum \min(0, X_{mj}^a)$ and $\sum \min(0, X_{mj}^s)$ where the aggregation is done over working-age persons other than the person experiencing the time deficit ($m \neq i$).

When an individual's time deficit falls in a household as a result of redistribution, the time deficits of others added up together can remain unchanged or even decline. A redistributive outcome of this type generates congruence between the well-being of the individual experiencing the reduction in their time deficit and the well-being of their family members because no other member is left with a higher time deficit as compared to the baseline scenario. The incidence of congruence can be measured as the proportion of such households in the total number of households in which someone's time deficit fell as a result of redistribution. We can describe the situation where others' time deficits remain unchanged as *weak congruence*: $\min(0, X_{ij}^a) < \min(0, X_{ij}^s)$ and $\sum \min(0, X_{mj}^a) = \sum \min(0, X_{mj}^s)$. Likewise, where others' time deficits decline, we define it as *strong congruence*: $\min(0, X_{ij}^a) < \min(0, X_{ij}^s)$ and $\sum \min(0, X_{mj}^a) < \sum \min(0, X_{mj}^s)$.

There can also be a redistributive outcome that is incongruent. That is, the reduction in the individual's time deficit is accompanied by an increase in other members' time deficits added up together. The incompatibility resulting from redistribution between the improvement for the individual and that of her family may provide fertile soil for intrahousehold conflicts to breed. Hence, we describe this type of redistributive outcome as *conflictual*: $\min(0, X_{ij}^a) < \min(0, X_{ij}^s)$ and $\sum \min(0, X_{mj}^a) > \sum \min(0, X_{mj}^s)$. The incidence of conflictual redistributive outcomes can be measured in a manner analogous to that of congruence by making the appropriate modification to the numerator. A key issue is to examine whether and to what extent the incidence of the redistributive outcomes depends on the gender of the individual whose time

deficit is reduced via redistribution. We should also pay attention to whether the answers to these questions differ depending on the principle of redistribution.

**Table 5-2 Distribution of Cases by Redistributive Effect on Family (percent)
Accompanying Declines in Individual Time Deficit, by Country and Sex**

	Equal			TA			OC		
	SC	WC	C	SC	WC	C	SC	WC	C
Ethiopia 2015									
Men	24	64	12	26	63	11	23	61	16
Women	11	58	31	15	68	18	12	64	24
Ghana 2012									
Men	21	53	26	33	45	23	18	46	37
Women	13	40	47	22	55	24	13	45	42
South Africa 2015									
Men	19	43	38	25	50	25	16	38	46
Women	10	34	56	18	47	36	10	43	47
Tanzania 2011									
Men	39	31	30	43	33	25	34	33	33
Women	21	28	51	35	35	29	21	28	51

Notes: The numbers that are shown for each sex under each distributive principle within each country add up to 100. The estimates shown are for persons in married-couple households that experienced a reduction in their time deficits as a result of redistribution. If the reduction was accompanied by a reduction in the time deficits of other family members, we describe it as strong congruence (SC); an absence of change is weak congruence (WC); and an increase is conflictual (C). “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

We calculated the incidence measures described above for time-poor men and women in married-couple households that experienced a decline in their time deficits as a result of redistribution. The percentage distribution of outcomes by the type of redistributive effect under the three alternative principles of distribution is shown in Table 5-2. We report the outcomes for men and women in each country separately. We found that the majority of redistributive outcomes were congruent irrespective of whether it was men or women that experienced a deficit reduction. However, the incidence of conflictual outcomes was lower for men than women.

We would expect to see weak congruence when the time-poor person is in a household in which the other working-age persons do not have time deficits. In other words, in households

with sufficient fallback persons, we can reduce or even eliminate the time-poor persons' time deficits without increasing the time deficits of others in the household (though their time balances would, of course, be reduced). Strongly congruent outcomes require that at least one other person in the household has time deficits to reduce. In order for that reduction to happen with redistribution, there must also be fallback persons in the household. Conflictual outcomes imply either that there are no fallback persons or that the time balances of the fallback persons are insufficient to prevent others in the household from having a greater time deficit when there is a reduction in another person's time deficit. Depending on the principle of distribution applied and the time balances of the persons in the household, a given household might be in one or the other category. However, households with only one time-poor person can never have a strongly congruent outcome. In fact, almost all (93 percent to 100 percent across countries and distributive principles) of the cases of weak congruence occur in households with just one time-poor person. Conversely, for households with just one time-poor person whose time deficits are reduced, weak congruence results in the majority of cases for men (86 percent to 92 percent for all principles of division in Ethiopia, Ghana, and Tanzania, while in South Africa the portions are lower, 61 percent to 78 percent). The same is true for women whose time deficits are reduced, but in smaller shares in each case (61 percent to 85 percent for all principles of division in Ethiopia, Ghana, and Tanzania, while in South Africa the portions are again lower, 45 percent to 62 percent).

Distribution by available time produced the largest incidence of strong congruence across countries and sex. This makes intuitive sense, especially compared to the equal shares distribution. Strong congruence requires at least two individuals with time deficits and another household member with a positive time balance (a fallback person). In that type of household, distribution by available time will assign larger shares of required household production to the fallback persons and reduce the shares of those with time deficits. Equal shares will more often result in one of the two time-poor individuals increasing their share of household production and so increasing their time deficits.

When considering the differential incidence of congruent and conflictual outcomes of the time deficit reductions by sex, a clear pattern emerges: when women's time deficits are lowered, the outcome is much more likely to be conflictual. One explanation is the fact that among those whose time deficits were reduced, women were more likely to come from

households in which they were the only time-poor person. These were also the most numerous households among those with reduced time deficits in Ethiopia, Ghana, and South Africa, where between 60 percent and 75 percent of persons with reduced time deficits were the sole time-poor individual in their households. In Tanzania, this share was around 41 percent across principles of distribution. Even among these households, however, reductions in women's time deficits were more likely to result in conflict than congruence.

Table 5-3 Median Time Deficits of Other Working-Age Household Members, by Sex of Person with Reduced Time Deficits, Country, Outcome, and Principle of Distribution

	Equal		TA		OC	
	Male	Female	Male	Female	Male	Female
Ethiopia 2015						
SC	-27	-18	-27	-17	-28	-19
C	0	0	0	0	0	0
Ghana 2012						
SC	-22	-21	-26	-20	-25	-22
C	-11	-2	-10	0	-15	-4
South Africa 2015						
SC	-16	-18	-16	-17	-19	-19
C	0	0	0	0	0	0
Tanzania 2011						
SC	-30	-29	-39	-29	-29	-29
C	-24	-11	-18	-4	-24	-11

Notes: The median values reported in the table are for persons in households that contained time-poor persons in the baseline whose time deficits were reduced in the indicated distribution scenario. "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons). "SC" refers to strong congruence, or the cases in which the total time deficits of other persons in the household were reduced; "C" refers to conflict, or the cases in which the total time deficits of other persons in the household were increased.

The source of the difference lies in the time deficits of others in the household and the differences by the gender of the time-poor person. Table 5-3 compares the median time deficits of others in the household in the baseline when men and women have reduced time deficits and by outcome. A striking result is that the median time deficits of others are lower (often zero) in the cases where the outcome is conflictual than when there is strong congruence.³⁷ This reflects the fact that the redistribution of required household production time is likelier to reduce the

³⁷ Median time deficits and indeed most persons' time deficits are zero in cases of weak congruence, as explained above.

time deficits of those with larger deficits and increase the time deficits of those with low or no time deficits. In addition, the time deficits of others are higher in those cases in which men's time deficits are reduced in the strongly congruent outcomes, and in the cases of Ghana and Tanzania for the conflictual outcome as well. The majority of other persons that have time deficits in households in which men are time-poor are women and vice versa. Because women tend to have higher time deficits than men, it is much less likely that the outcome of redistributing required household production time will be strong congruence when women's time deficits are reduced.

Table 5-4 Number of Time-Poor (millions) and Share of Time-Poor with Reduced Time Deficits (percent), by Sex, Country, and Principle of Distribution

	All time-poor		Equal			TA			OC		
	Male	Female	Male	Female	All	Male	Female	All	Male	Female	All
Ethiopia 2015	4.1	7.4	52	95	80	71	95	87	57	94	81
Ghana 2012	1.3	2.7	28	80	63	51	84	73	33	77	62
South Africa 2015	2.9	3.9	56	82	71	72	88	81	58	80	71
Tanzania 2011	3.5	5.3	33	87	66	76	85	81	38	84	66

Notes: The values reported in the table are for persons that were time-poor in the baseline. "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

We conclude this section by examining the overall rate of reductions in time deficits by sex and principle of redistribution, reported in Table 5-4. In each country in our study there are many more time-poor women than men. Women make up between 58 percent (in South Africa) and 67 (in Ghana) percent of time-poor persons. A striking result of our simulations, however, is that each distribution principle reduces the time deficits of most women in each country. The same is not true for men: only distribution by available time reduces time deficits for the majority of men in all four countries, though in Ethiopia and South Africa all distribution principles do. Because women are the great majority of the time-poor and the great majority of women have reductions in time deficits with each of the distribution principles, all three principles of distribution reduce the time deficits of the majority of time-poor persons in each country.

Of the three principles, distribution by available time is the most successful in terms of reducing men's time deficits. In all four countries, the greatest share of time-poor men has reductions due to this distribution. Distribution by opportunity cost reduces the time deficits of slightly larger portions of time-poor men than the equal shares distribution, but both are clearly inferior to distribution by available time. Such a ranking is not possible for women, however. The differences between the distribution principles in terms of this outcome measure are much smaller for women than men. And although in the cases of Ghana and South Africa the available time distribution clearly produces the largest share of time deficit reductions, the same cannot be said for Ethiopia and Tanzania, where the shares of women with reduced time deficits under the equal shares distribution are equal to or greater than the shares in the available time distribution. In the latter two cases, the distribution by opportunity cost produced shares that were not very much lower than the other two principles.

5.3 Redistribution, Time Poverty, and Consumption Poverty

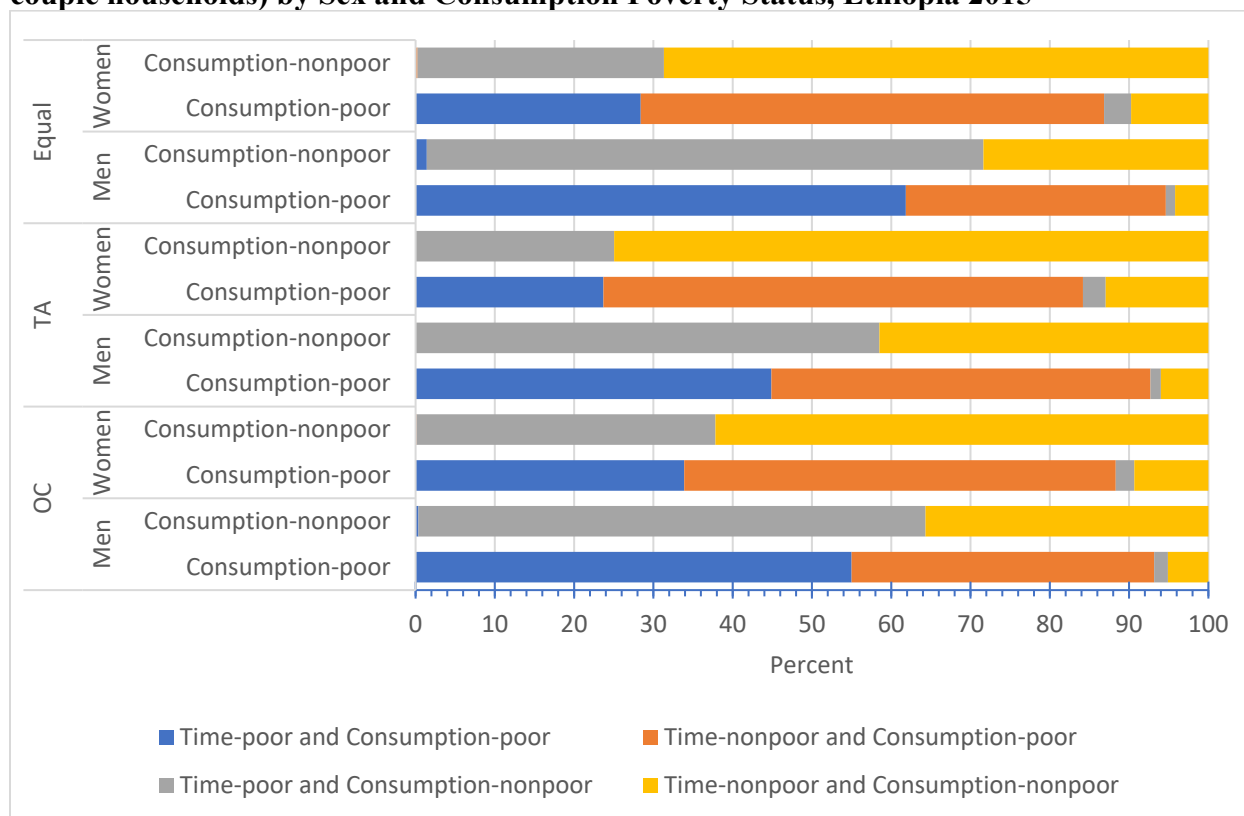
We now discuss the implications of the deficit reductions in terms of time and consumption poverty. As shown in Table 5-4, a substantial share of the time-poor—in fact, a clear majority of time-poor women—can reduce their time deficits if redistribution of household production responsibilities were to take place under any of the three principles of distribution. For some time-poor persons, the reduction can be large enough to eliminate their deficit entirely. Redistribution would thus enable a transition out of time poverty for those individuals. If all time-poor individuals in the household were to escape time poverty via redistribution, the household's time deficit would fall to zero and it would also become time-nonpoor. A further potential effect is on consumption poverty, as was discussed in section 3.3. The reduction in the household's time deficit translates into a decline in its LIMTCP or time-adjusted consumption poverty line. If the decline is large enough, the household and its members would no longer be classified as consumption-poor. Reduction in time deficits can also enable a transition from consumption poverty. On the other hand, conflictual redistributive outcomes (as described in the previous section) can, in some cases, lead to an increase in household time deficits. If the increase is large enough, a consumption-nonpoor household may end up as a consumption-poor household after redistribution.

We will examine below for each country how these effects vary by the gender of the time-poor person and the distribution principle. Next, we turn to examining changes in “hidden poverty,” that is the extent to which the reduction in time deficits via redistribution narrows the gap between official poverty and time-adjusted poverty both in terms of incidence and depth. This is followed by an assessment of the dent made by redistribution on the vulnerability to the “double-bind” of being both time- and consumption-poor. As has been done so far, our evaluation will highlight the differences (or the lack thereof) between men and women across alternative mechanisms of redistribution.

5.3.1 Poverty Transitions

We now turn to the consideration of the impact of the simulations on time-poor individuals’ time and consumption poverty status. We have seen above that time deficits are reduced in many of the scenarios for time-poor women and men and for time-poor households as well. This should produce reductions in time-adjusted consumption poverty overall, but not everyone in the simulations will have had decreases in time deficits and not every poor household will have escaped consumption poverty. Indeed, some marginal households might have slipped into consumption poverty as a result of some of the scenarios. In the discussion below we again confine ourselves to discussing time-poor men and women in married-couple households, who are the majority of persons in the simulations and are also very much representative of the results.

Figure 5-3 Time and Consumption Poverty Status of Time-Poor Individuals (in married-couple households) by Sex and Consumption Poverty Status, Ethiopia 2015



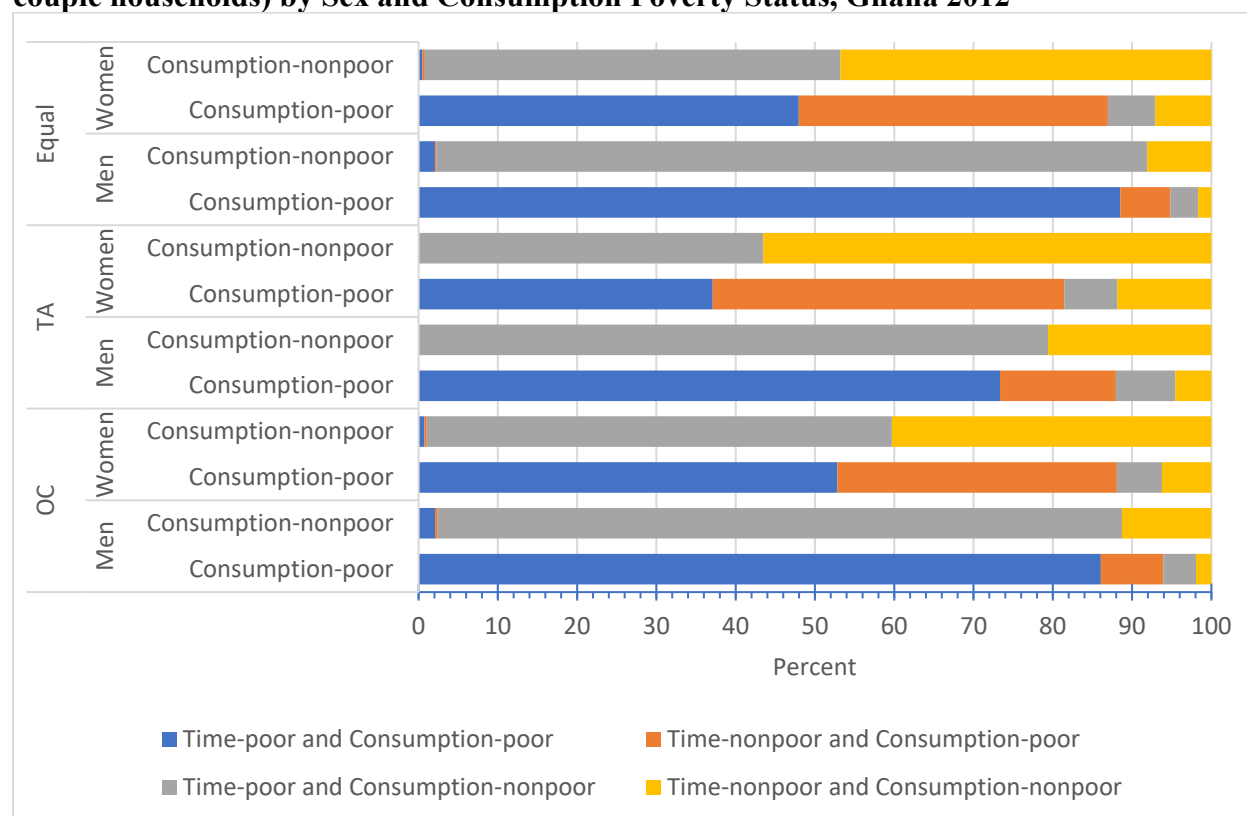
Notes: Each bar is divided into different combinations of time and consumption poverty in the indicated redistribution scenario. The estimates reported in the figure are for persons that were time-poor in the baseline. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

In the case of Ethiopia (see Figure 5-3), we see that for the most part, large majorities of women leave time poverty in each simulated redistribution. There is no more than 2 percentage points difference between the shares of women that remain time-poor in poor and nonpoor households. In the case of distribution by available time, three-quarters of time-poor women escape time poverty. The results are not quite as good for the equal shares scenario, with only 68 percent of women escaping time poverty, while just 61 percent do so in the case of distribution by opportunity cost. In terms of consumption poverty, most women remained poor in all three scenarios. Distribution by available time produced the best results, with 16 percent of women leaving poverty. Distribution by equal shares was again second best with 13 percent and the opportunity cost scenario was worst with just 12 percent.

Time-poor men mostly remain time-poor across principles of distribution. Across simulations, significantly more men from poor households than nonpoor households left time poverty. Only in the available time case did most time-poor men from poor households (54 percent) escape time poverty, though only 41 percent from nonpoor households did so. The share of time-poor men that escaped time poverty was smaller in the distribution by opportunity cost and smallest of all in the equal shares distribution, in which just 28 percent of men in nonpoor households left time poverty. The rate at which time-poor men escaped consumption poverty was also lower than that of women, with only 7 percent transitioning out of poverty in the distribution by available time and by opportunity cost and only 5 percent leaving poverty in the equal shares scenario. In the latter simulation, 1 percent of time-poor men in nonpoor households fell into consumption poverty as a result of the redistribution.

Overall, the time available scenario has the most promising results, with more people escaping time poverty and more consumption-poor people leaving that condition behind as well. Though men do a little better in the opportunity cost than the available time redistribution—presumably because labor market conditions favor men over women in Ethiopia—so many more women than men are time-poor that, overall, the time available scenario is best.

Figure 5-4 Time and Consumption Poverty Status of Time-Poor Individuals (in married couple households) by Sex and Consumption Poverty Status, Ghana 2012



Notes: Each bar is divided into different combinations of time and consumption poverty in the indicated redistribution scenario. The estimates reported in the figure are for persons that were time-poor in the baseline. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

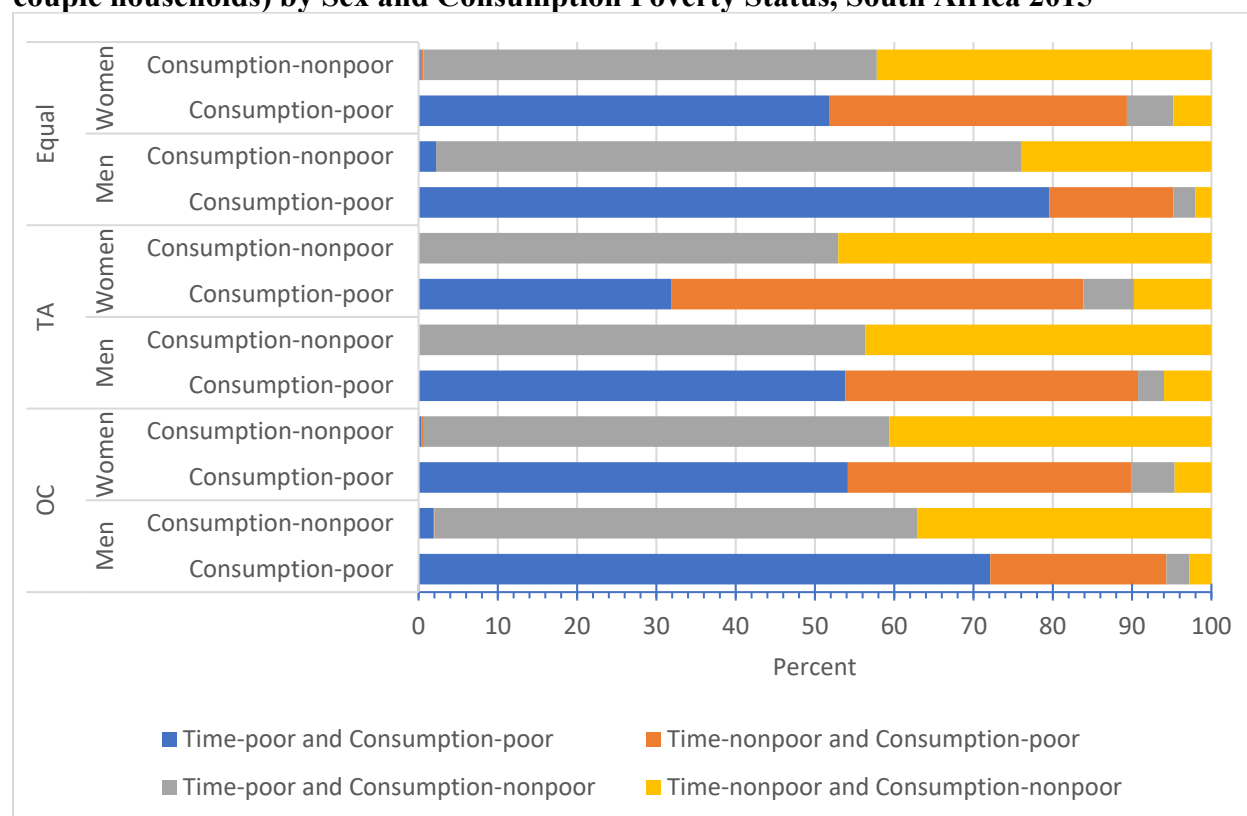
In the simulations for Ghana (see Figure 5-4) we again see large differences in the transition out of time poverty between men and women. There were much smaller differences in terms of the transition out of consumption poverty and very small differences between persons in poor and nonpoor households. Time-poor women were much likelier than men to escape time poverty in all the simulations. As in the case of Ethiopia, the greatest number of women leave time poverty in the available time scenario. In fact, most women do so (56 percent). Only 47 percent leave time poverty in the equal shares distribution and 41 percent in the opportunity cost scenario. Just 19 percent of women were able to leave consumption poverty in the available time redistribution, but again, even fewer women (12 percent) were able to do so in equal shares and opportunity cost scenarios. In both of the latter two scenarios, 1 percent of nonpoor women

became poor as a result of the redistribution of household production time increasing time deficits in the household. So, in terms of reducing both the time and consumption poverty incidence for time-poor women, distribution by available time is the best case.

For men we again see smaller reductions in both time and consumption poverty than women across the board. Relatively few men escape time poverty in any of the scenarios we simulated, but the greatest number (20 percent) did so as a result of the distribution by available time. In the distribution by opportunity cost and equal shares, just 11 percent and 8 percent of men escape time poverty, respectively. The chances of escaping consumption poverty are even slimmer for men in Ghana. Only 12 percent of time-poor men in poor households saw their households escape time poverty in the time available simulation, while just 5 percent did so in the other scenarios. In both of the latter two simulations, 2 percent of nonpoor men had their households fall into consumption poverty as a result of the redistribution of household production time.

The impact of the simulations for South Africa on time and consumption poverty are presented in Figure 5-5. The results are broadly consistent with those we already have seen for Ethiopia and Ghana. For the most part, time-poor men and women remain time-poor and the consumption-poor remain so as well. Women are more likely to leave time poverty and consumption poverty in the simulations and their best outcomes come under the distribution by available time. One interesting contrast here is that in the time available scenario there was a large difference in the rate of transition out of time poverty between women in poor and nonpoor households: 62 percent of women from poor households escaped time poverty, while just 47 percent of nonpoor women did. The latter share is similar to the results for both poor and nonpoor women under the equal shares and opportunity cost scenarios (42 percent and 41 percent leaving time poverty, respectively). The largest share of time- and consumption-poor women's households (16 percent) left consumption poverty in the distribution by available time as well. Just 9 percent or 10 percent of such households left poverty in the other scenarios, while in each 1 percent fell into poverty.

Figure 5-5 Time and Consumption Poverty Status of Time-Poor Individuals (in married-couple households) by Sex and Consumption Poverty Status, South Africa 2015

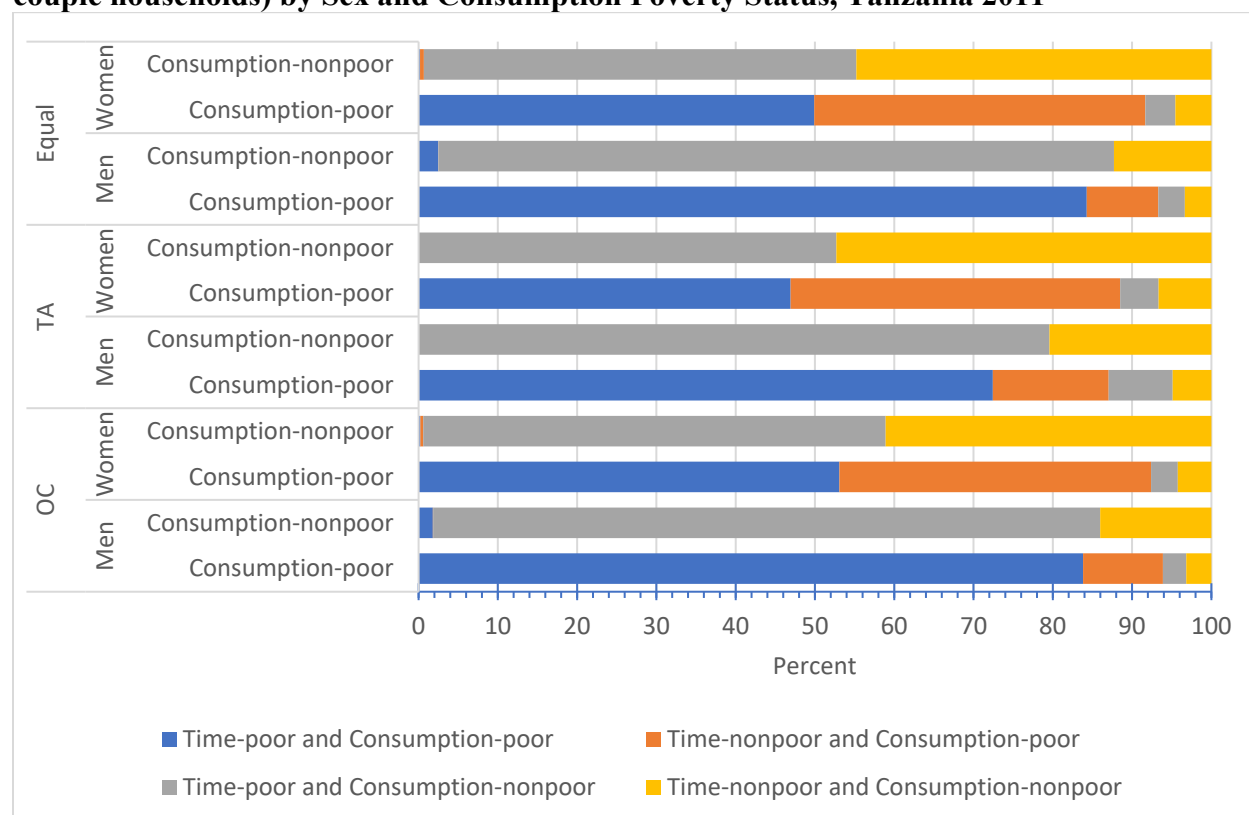


Notes: Each bar is divided into different combinations of time and consumption poverty in the indicated redistribution scenario. The estimates reported in the figure are for persons that were time-poor in the baseline. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

For men the story is similar, except that the rates of transition out of both time and consumption poverty were lower for men in all cases, as in the other countries. It was only in the available time scenario that rates of transition out of time poverty were similar for men from poor and nonpoor households: about 43 percent became time-nonpoor. Poor men were less likely to climb out of time poverty in the other two scenarios, by 6 percentage points in the equal shares and 12 percentage points in the opportunity cost distribution. It was in the former that the fewest men escaped time poverty though, with only 18 percent of men from poor households becoming time-nonpoor. Fewer than 10 percent of poor men were in households that left consumption poverty under any of the distribution principles. The time available

scenario was slightly better (9 percent) than the others (5 percent and 6 percent). For South Africa then, as for Ethiopia and Ghana, the time available scenario was best overall.

Figure 5-6 Time and Consumption Poverty Status of Time-Poor Individuals (in married-couple households) by Sex and Consumption Poverty Status, Tanzania 2011



Notes: Each bar is divided into different combinations of time and consumption poverty in the indicated redistribution scenario. The estimates reported in the figure are for persons that were time-poor in the baseline. “Equal” refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; “TA” is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and “OC” represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

Finally, turning to the simulations for Tanzania (Figure 5-6), we find the smallest deviations across scenarios and again little deviation between poor and nonpoor households in terms of time poverty reduction. Women had larger reductions in time poverty than men, but not always larger rates of transition out of consumption poverty, unlike we have seen in the other countries in the study. The time available scenario produced the largest reduction in time poverty for women (48 percent) though the other two scenarios were almost as effective (42 percent and 46 percent for the opportunity cost and equal shares distributions, respectively).

Reductions in consumption poverty were larger in the time available scenario as well, at 12 percent, compared to 8 percent for the other two principles of distribution. Time poverty reductions for men were deepest in the time available scenario at 20 percent, while only 12 percent and 14 percent of men rose out of time poverty in the equal shares and opportunity cost simulations. Men's transition out of consumption poverty was not very different from women's, within 2 percentage points in all three scenarios. Again, the time available scenario produced the largest reductions in the consumption poverty rate for time-poor men.

Table 5-5 Median Reduction in Time Deficits of Those Time-Poor Individuals with Reduced Time Deficits, by Sex, Country, and Principle of Distribution (weekly hours)

	Equal		TA		OC	
	Male	Female	Male	Female	Male	Female
Ethiopia 2015	9	15	11	16	9	14
Ghana 2012	6	12	7	14	6	11
South Africa 2015	9	17	10	16	10	14
Tanzania 2011	8	12	6	13	8	11

Notes: The values reported in the table are for persons that were time-poor in the baseline and had reduced time deficits in the distribution principle indicated. "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

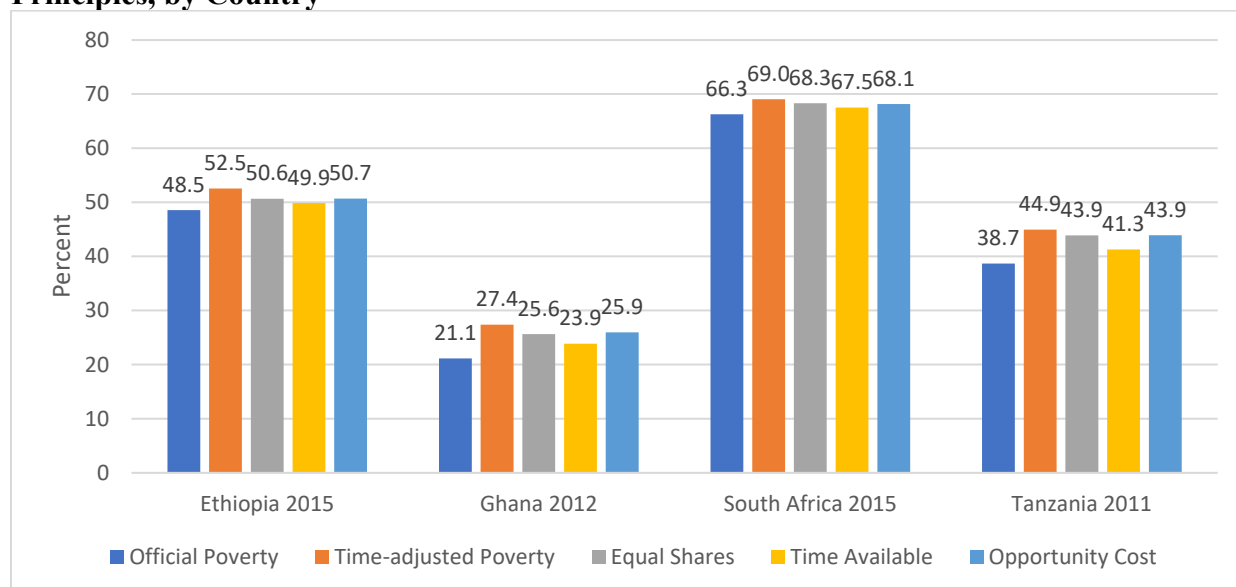
Overall then, the redistribution of household production hours predictably has a larger impact on rates of time poverty than of consumption poverty. As we saw, women were more likely to have lowered time deficits and so we expect to see the observed sex differences in reductions of time poverty rates. It is less obvious why it should be that the greatest reductions in time and consumption poverty should be in the case where household production hours are distributed according to the time available. In the last section we saw that reductions in women's time deficits were more likely to be accompanied by increases in others' time deficits than reductions in men's time deficits. However, we also saw that the time deficits of others in the household tended to be significantly larger for men than for women who had reduced time deficits in the various scenarios. This implies that the reductions in time deficits were likely to be smaller for men than for women. And indeed, when we examine the median time deficit reductions among time-poor men and women (see Table 5-5) whose time deficits were reduced

under each principle of distribution, we see that women's time deficits are reduced substantially more than men's in each country across simulations. It is also generally the case that time deficit reductions for both men and women are deeper in the time available scenario than in the others. Thus, the heterogeneous nature of households in which men and women see reduced time deficits helps to explain the difference in results between men and women.

5.3.2 Impact on the Incidence and Depth of Hidden Poverty

Looking at the comparative consumption poverty rates for each of the four countries in the study in Figure 5-7, the individuals for whom we report statistics are those that are time-poor in the baseline scenario from households with two or more working-age persons, with at least one member of each gender and at least one working-age, employed adult. The figure's leftmost bar is the official poverty rate, while the bar next to it is the time-adjusted poverty rate in the baseline scenario. For each scenario, the difference between the official poverty rate and the time-adjusted rate shown is the rate of hidden poverty. For time-poor individuals we can see that in each country and each scenario the poverty rate is lower than the baseline, which also implies that the hidden poverty rate is lower than in the baseline case. It also seems apparent that in each country the consumption poverty reduction among time-poor individuals is greatest in the time available scenario, as already documented above. The equal shares and opportunity cost scenarios also reduce poverty, but by about the same amount and not as much as the time available scenario. The difference between the time available scenario and the others varies across the different countries in the study, as well. The gap between them in terms of poverty reduction is smallest in the Ethiopian simulations and appears to be the largest in absolute terms in the South African case. It is in the Ghanaian simulations, however, that the highest relative reductions in poverty are predicted to happen.

Figure 5-7 Official and Time-Adjusted Poverty Rates for the Baseline and for Distribution Principles, by Country



Notes: Authors' calculations based on LIMTCP file for Ethiopia (2015), Ghana (2012), South Africa (2015), and Tanzania (2011). The bars refer to the share of households in our sample below the consumption poverty threshold for each country. "Official Poverty" refers to the official poverty threshold used in that country; "Time-adjusted Poverty" refers to the official poverty line adjusted for the monetized value of household time deficits in the baseline; "Equal Shares" refers to the time-adjusted poverty line in the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "Time Available" refers to the time-adjusted poverty line in the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "Opportunity Cost" refers to the time-adjusted poverty line under distribution according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

The actual hidden poverty rates are presented in Table 5-6. The baseline hidden poverty rate among time-poor individuals was lowest in the South African case (2.8 percent) and greatest in Tanzania (7.5 percent). The time available scenario produced the greatest reduction in hidden poverty among time-poor individuals, with reductions in the rate ranging from 1.6 percentage points in South Africa to 3.7 percentage points in Tanzania. The equal shares and opportunity cost scenarios produced nearly identical rates of hidden poverty, with the latter reducing hidden poverty just less than the former in the Ghanaian and South African simulations.

Table 5-6 Hidden Poverty Rates in the Baseline and for Principles of Distribution (percent), by Country

	Baseline	Equal	TA	OC
Ethiopia 2015	4.0	2.1	1.3	2.1
Ghana 2012	6.3	4.5	2.7	4.8
South Africa 2015	2.8	2.0	1.2	1.9
Tanzania 2011	6.3	5.2	2.6	5.3

Notes: Authors' calculations based on LIMTCP file for Ethiopia (2015), Ghana (2012), South Africa (2015), and Tanzania (2011). "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

If we look at the consumption poverty gaps for poor households in the baseline and redistribution scenarios (see Table 5-7) we notice that in each redistribution scenario the mean gap has increased from the baseline. This suggests that all of the redistribution scenarios were more effective for those closer to the poverty threshold. Indeed, in the time available scenario—which produced the largest reductions in time and consumption poverty, as well as hidden poverty—poverty gaps are larger than in the other scenarios, though the difference is not large (0.7 percent to 3.5 percent of the baseline poverty gap). In the Ghanaian time available scenario, which saw one of the greater reductions in hidden poverty (3.6 percentage points lower than baseline), the increase in the poverty gap is greatest (a nearly 10 percent increase over the baseline).

Table 5-7 Mean Consumption Poverty Gaps for Poor Households by Country and Redistribution Scenario (in national currencies)

	Baseline	Equal	TA	OC
Ethiopia 2015	9,228	9,511	9,578	9,489
Ghana 2012	2,668	2,851	2,931	2,837
South Africa 2015	3,171	3,295	3,361	3,285
Tanzania 2011	59,618	62,789	64,072	62,441

Notes: Authors' calculations based on LIMTCP file for Ethiopia (2015), Ghana (2012), South Africa (2015), and Tanzania (2011). "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

5.3.3 *Impacts on the Incidence of the Double-Bind of Time and Consumption Poverty*

Finally, let us turn to the overall impact of the redistribution scenarios on the incidence of the double-bind of both time and consumption poverty. We will first look at the individual level, where time poverty is defined as having a negative time balance or time deficit. We will then turn to the household level, where time poverty is defined as any household member having a time deficit. Consumption poverty is defined at the household level as consumption expenditures falling below the time-adjusted poverty line for the household. For specific households, this time-adjusted threshold varies as the household total time deficit changes.

Table 5-8 shows the percentage of working-age men and women in our sample that are both time- and consumption-poor in each country and scenario. For measures including consumption poverty, cross-country comparisons are not valid, since each country uses its own unique definition of consumption poverty. We can, however, note that for each country in the baseline the rate of the double-bind is higher for women than for men. All three principles of redistribution reverse the gender disparity: the postredistribution incidence among women is lower or equal to the incidence among men. This is mainly a reflection of the larger reduction in women's time deficits brought about by redistribution, as we discussed before.

In the equal shares scenario the incidence of the double-bind is uniformly greater for men and lower for women than in the baseline, so that in each country simulation the incidence of the double-bind is higher for men than for women. Only in the South African simulation was the increase in the number of men in the double-bind larger than the decrease in the number of women, driving the overall incidence in the equal shares scenario higher than in the baseline (9.3 percent versus 8.3 percent). In the other three countries there were substantial reductions in the overall incidence of the double-bind (between 16 percent and 37 percent).

The time available scenario also reduced the incidence of the double-bind for women and in some cases for men as well. In Ghana and Tanzania, the incidence for men is slightly higher, while in Ethiopia and South Africa it is 0.7 percentage points and 1.4 percentage points lower, respectively. The reductions under distribution by time available are the largest of all three simulations for women in all four countries: between 3.8 percentage points and 5.7 percentage points. Men's rates are higher than those of women in all cases except for Ghana where they are equalized. The overall incidence of the double-bind was substantially reduced (between 30 percent and 56 percent) in all four countries.

Finally, the opportunity cost scenario produced more modest decreases in the incidence of the double-bind for women while increasing that of men compared to the baseline. For Ethiopian men, the increase is negligible. In Ghana, the incidence of the double-bind remains higher for women than for men, though by only 0.3 percentage points. The overall incidence of the double-bind is lower in the opportunity cost scenario in all cases but that of Tanzania, where it is slightly higher.

The time available redistribution produces the best reductions in the overall incidence of the double-bind and reduces the incidence among both men and women. The equal shares and opportunity cost distributions produce the most dramatic reversals in gender gaps in the incidence of the double-bind because in both scenarios the incidence among men generally increases. These results flow directly from what we saw above when we compared the changes in shares of household production and time deficits by sex across redistribution principles. All three principles produced substantial reductions in the shares of household production, time deficits, and time poverty for women in all four countries, and the distribution by available time produced the greatest improvements. For men, however, the time available scenario was the only one that uniformly reduced their median share of household production time, while the other two redistribution principles produced increases. The time available scenario accordingly reduced the time deficits of more men in each country than in the other two scenarios. Thus, while all three redistribution principles substantially reduced women's incidence of the double-bind, only the time available scenario reduced or left men's incidence unchanged. While all scenarios inverted the gender gaps in the incidence of the double-bind (except in Ghana where only the equal shares scenario did so), the time available scenario minimized the resulting gender gaps while also minimizing the overall incidence of the double-bind.

Table 5-8 Percentage of Individuals in Both Time and Consumption Poverty in the Baseline and Redistribution Scenarios, by Sex and Country

	Baseline		Equal		TA		OC	
	Male	Female	Male	Female	Male	Female	Male	Female
Ethiopia 2015	2.8	5.6	3.5	1.7	2.1	1.5	2.9	2.1
Ghana 2012	3.0	7.0	4.5	4.1	3.2	3.2	4.2	4.5
South Africa 2015	6.9	9.6	11.2	7.4	5.5	3.9	10.0	7.4
Tanzania 2011	5.3	8.8	6.3	4.9	5.2	4.7	6.3	5.2

Notes: Authors' calculations based on LIMTCP file for Ethiopia (2015), Ghana (2012), South Africa (2015), and Tanzania (2011). "Equal" refers to the scenario in which the total time required for household production (net of the contributions made by non-working-age members of the household) is divided equally among the working-age members of the household; "TA" is the scenario of division according to the time available to the individual after setting aside, from the total time in a week (168 hours), the time requirements of personal maintenance and actual time spent on employment; and "OC" represents division according to the actual or imputed hourly wage of the working-age person (all employed and nonemployed persons).

5.4 Conclusion

We approached the assessment of the effectiveness of the three redistribution principles simulated here from a number of different angles. The impact of redistributing household production responsibilities varies in important and interesting ways by choice of distribution principle and by sex. There are variations by country as well, but there are more similarities than differences. There certainly appears to be an important trade-off between reducing women's share of required household production and reducing the gender gap in that share. The contrasting results in the time available scenario between measures of gender equity and household welfare highlight this tension. For the most part, the rankings of the three scenarios are consistent across measures, at least in terms of the best choice. Across measures and countries, the time available scenario seems to consistently produce strong results. The equal shares scenario appears to be the worst in almost all cases. This is not surprising, given the fact that we are not simulating responses in terms of engagement with income-generating activities. These activities tend to be unequally distributed as well, so distributing shares of household production responsibilities equally among household members will tend to produce time deficits or increase those of the individuals who are engaged in long hours of income-generating activities.

Turning to the differential impacts on time-poor individuals by sex, we saw that the greatest improvement in the gender gap in shares of household production occurred in the equal shares scenario, although the time available scenario produced the greatest reductions in shares for both time-poor men and women. The opportunity cost scenario was in each case an

intermediate result, with larger share reductions for women than in the time available scenario, but smaller than in the equal share scenario, while the gender gap was reduced more than in the time available scenario but not nearly as much as in the equal shares scenario. Similarly, in terms of the time balances of time-poor individuals, the time available simulation was the standout in terms of increasing women's time balances. Across countries and categories of households, the time available scenario produced significantly better results than either the equal shares or the opportunity cost scenario. And only in the time available simulations presented above were outcomes improved for everyone, men and women alike. These results imply that if we wish to simply reduce gender gaps in shares of household production hours, we also need to reduce gender gaps in shares of income-generating activities. In other words, we would need to eliminate the gender division of labor that is a feature of so many societies and apply the equal shares distribution across household production and income generation activities.

Using the congruence of an individual's time deficit reduction with the reduction of the time deficits of others in the household as a measure of welfare improvement illuminates a clear advantage for the available time scenario. In all four countries and across groups defined by the individuals that had reduced time deficits in the simulation, the available time scenario had the lowest incidence of conflictual outcomes and the highest incidence of strong congruence. Strong congruence was less likely when women's time deficits compared to men's because women were more likely to be the only time-poor person in the household and because the time deficits of others tend to be lower in households with time-poor women: the unequal burden of household production time falling on women works against the incidence of strong congruence when their time deficits are reduced.

All three principles of distribution reduced time deficits for the large majority of time-poor persons overall. However, the reductions were greater for women than for men, and the larger number of time-poor women drives this overall result. For time-poor women, there was little difference in the incidence of time deficit reductions across scenarios in Ethiopia (about 95 percent) and Tanzania (about 85 percent), but in Ghana and South Africa, the time available scenario produced higher rates than redistribution by equal shares or opportunity cost. For men, on the other hand, the time available scenario was clearly the best in terms of reducing time deficits, with time deficit reductions rates that were at least 14 percentage points greater than the

other principles, and only this distribution principle reduced the time deficits of a majority of time-poor men.

The transitions in an individual's time and consumption poverty status to a great extent followed the patterns in shares of household production and time balances. The time available scenario produced the highest levels of transition out of time and consumption poverty for both men and women. The opportunity cost scenario produced somewhat better results for men than the equal shares scenario, though the same was not true for women. The time available scenario also produced the greatest reductions in hidden poverty among individuals that were time-poor in the baseline scenario. The time available scenario also outperformed the other scenarios in terms of reduction of the double-bind of time and consumption poverty at both the individual and household levels. Thus, other than the reduction of gender gaps in household production time, in which the distribution by equal shares produces the best results, the distribution by available time provides the best outcomes across measures and countries.

6 CONCLUSION

The experiences of rich countries suggest that it will take a long time to substantially reduce gender disparity in home production. To reduce gender disparity in developing countries may require overtaking and surpassing the developed-country record. What will it take to accomplish this sort of reduction in gender disparity? The general consensus in the literature on the developed-country experience of facilitating such a reduction has several recommendations. The first is to encourage higher levels of full-time employment among women to provide households additional resources. Secondly, increased provisioning of publicly funded childcare is needed to reduce the time required for household production. Third, governments should provide for relatively short paid maternal leave periods and more paid paternity leave to encourage gender equity in childcare work in early childhood. Finally, a real shift will require more egalitarian gender attitudes (Sullivan, Gershuny, and Robinson 2018).

Our results point to the constraints that gender roles (which are admittedly hard to quantify) have on redistribution. Patriarchy has long been understood by feminists and Marxists

as entwined with other forms of hierarchy, such as race and class.³⁸ Hierarchy is a complex web of material relations and ideological constructs. Gender hierarchy includes women's current and historical disadvantages vis-à-vis men in a variety of domains. It also includes the written and unwritten laws, attitudes, and perceptions regarding women's inferiority.³⁹ Gender identity norms, as postulated in recent literature, refer mainly to attitudes and perceptions (including self-perception). To reduce gender inequality to a mere question of attitudes and perceptions will be to narrow the scope of gender ideology and gender hierarchy. Indeed, a great deal of scholarship outside of mainstream economics has focused on uncovering the social relations between men and women that shape gender ideology (e.g., Boserup's [1970] explanation of how what are seen as women's and men's tasks in agriculture vary depending on land tenure, technology, etc., mainly concerning India, and Deere's [1982] study of agrarian households in Cajamarca, Peru).

The two theories of intrahousehold allocation of household production work we have attempted to apply as a principle of distribution in our simulations—the available time and opportunity cost principles—have both failed in one important and common way. The mechanics these theories describe do not appear to be in actual operation. If either of these theories were an adequate description of the intrahousehold allocation of household production time as practiced, our simulation would have had minimal effects on changing peoples' shares of household production. The fact that attempting to apply them has produced profound shifts within households is in and of itself a damning indictment of these ideas and suggestive that gender norms are dominant in determining the intrahousehold allocation of household production time among family members.

The results of our simulations indicate that there is a tension between gender equity and the reduction of the unequal burden of household production responsibility shouldered by women, at least in the context of the countries in our study. While distributing shares of household production responsibilities among working-age household members according to the

³⁸ In one of the earliest analyses of intersectionality of class and gender, Frederick Engels ([1884] 1972, 135,144) argued that proletarian women tend to enter marriage on a less unequal footing than women from propertied families. For a careful discussion of the different meanings of intersectionality, see Collins (2015).

³⁹ Let us consider legislation regarding universal suffrage, perhaps the most salient political right in a capitalist democracy. In the “developed” countries the relevant legislation was passed mostly in the twentieth century, e.g., women in Britain, the birthplace of industrial capitalism, won the right to vote only as late as 1928. In the cradle of merchant-colonial capitalism, Portugal, unfettered suffrage for women became a reality only in 1976.

naïve equality principle (or equal shares) reduces gender gaps in the share of household production time, it is less effective at reducing time deficits and time poverty among women, who bear the majority of these deprivations. Reducing the incidence of women's time poverty is more effectively done by distributing shares of household production by the time available to individuals. As it happens, this is also the scenario that most benefits men in terms of their shares of household production, time deficits, and rates of time poverty. This principle also produced the best results at the household level in terms of reductions in time and consumption poverty. These promising results from our simulations do require us to consider the plausibility of the scenarios we simulate given the binding constraints households face, including the gender norms already mentioned and the structures of livelihood generation in the countries we study.

Of course, one limitation of our study is that we have not modeled the simultaneous reallocation of time devoted to income-generating activities, especially paid employment. It remains an open question to what extent time-poor persons in the countries we studied have opportunities to reallocate the time they devote to such activities. Limits on the acquisition of the skills required for well-compensated employment, on employment opportunities at whatever level of skill, and on access to land for growing subsistence crops or market production for people in rural areas unable to access paid employment are important bounds on the choice sets they have. These limits also operate in much more constricting ways for women than for men in most contexts.

Assuming the desire to redistribute household production hours were present, the labor market conditions in these countries (and several others, of course) are in many ways inimical to the households' need around the provision of care for children and the elderly and around household production in general. The length of the workweek in paid employment is very long in many cases, leaving many in time poverty just from engaging in paid employment, let alone contributing to required household production activities. Also, the typical work hours for paid employment frequently conflict with specific caring activities and living arrangements. The very young, the very old, and those with severe physical impairments need to be cared for and fed throughout the day. School-age children's school hours might not fit well within the schedules of working adults in the household. All of these factors make the reallocation of household production difficult, even if the desire to do so were there.

These constraints do provide clear guidance for policies that could help to facilitate both household well-being in general and the more equitable distribution of household production responsibilities. Such policies fall into two broad categories: labor market reforms and social provisioning. Reforming labor markets could begin with limits on work hours. Long hours of work are a major contributor to the time poverty of the employed. Gender pay equity is an important area for policy to improve the benefits of paid employment for women and reduce gender inequality in livelihood generation. Providing flexibility in terms of work hours would also be a substantial improvement for families with time constraints due to care responsibilities. However, labor market reforms alone cannot provide for all of the temporal needs of households, especially those with young children.

Social provisioning is a necessary complement to making labor market reforms more effective at reducing time deficits directly and indirectly, for instance through the provision of childcare and early childhood education. While in our earlier work (Zacharias et al. 2019) we found these interventions to have a relatively small impact on required household production time, they also contribute to better livelihoods in the future. Improvements in physical infrastructure or expansions in public transportation systems can also be helpful in places where inadequate roads or public transportation make getting to and from work very time consuming. Some social provisioning can be and, of course, in many instances is, locally organized, such as community kitchens. These efforts could be supported by government policy.

Our findings highlight the fact that it may be challenging to produce gender equality in terms of the share of responsibility for household production or in terms of the incidence and depth of time poverty in the countries we study. Several factors stand in the way, only some of which can be directly addressed by policy interventions. Gender norms stand in the way of redistribution within households, as well as constraining women's options outside of the household. The structure of the labor markets in many countries is gender biased, inadequate for the material provisioning of many families' livelihoods, and insensitive to the temporal needs of diverse families. Given the labor market structure, social provisioning levels are inadequate to allow for many people to choose to engage in labor markets without putting themselves into time poverty or seriously depriving their households of needed household production work. The lack of adequate physical infrastructure intensifies these problems by making every activity outside of the household, whether income-generating or for the procurement of life's

necessities, more costly in terms of time. What we have shown is that if some of these obstacles can be removed or attenuated, gender equality in terms of household production work is attainable for many, if not all, households.

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APPENDIX A. MATRIX OF DATA, KEY VARIABLES, AND ECONOMETRIC METHODS OF SELECTED STUDIES

AUTHOR, YEAR, AND COUNTRY	DATA	KEY VARIABLES	METHODS	ECONOMETRIC REASON
Getahun (2018) Ethiopia	Household survey data of 502 married women from 6 communities (4 urban, 2 rural)	Dependent variable: women's housework time (minutes per day) Independent variables: time availability (women's employment status); bargaining power (years of schooling); traditional gender perception (gender ideology)	Multivariate hierarchical linear regression model	<ul style="list-style-type: none"> Linear models are more robust to measurement errors More zeros in Tobit regression models tend to produce statistically insignificant results Housework is typically a woman's task and its unlikely to have zero hours of work
Costa et al. (2009) Ghana	GLSS 4; focus was on the time use of a sample of 3,799 households in the 190 rural communities surveyed	Dependent variables: hours worked on total work; hours worked on domestic work; hours spent on fetching water; hours spent on market activities Independent variables: individual characteristics (age, education); household characteristics (number of boy and girl children, men, women, elderly); household assets (land, home, and enterprise goods); community infrastructure (electricity, water, distance to water source)	<ul style="list-style-type: none"> OLS regression models but corrected for selectivity bias Heckman selectivity bias 	<ul style="list-style-type: none"> There may be some selectivity in the process of deciding whether or not to fetch water as well as whether or not to work in the labor market Instruments used: distance from the nearest market and the presence of community water infrastructure
Robles (2010) Ethiopia	Labour force survey (2005), 51,946 households	Dependent variables: total work time (hours per week); time poverty (a lower threshold equal to 1.5 times the median number of total individuals' working hours distribution and a higher threshold equal to 2 times the median) Independent variables: education; age; marital status; number of adults and children	<ul style="list-style-type: none"> Determinants of market and household work time: separate Tobit models for men and women Determinants of labor allocation: multinomial logit estimations (5 employment sectors; reference category is inactive and unemployed workers) 	Tobit specifications are preferred over OLS because where data is censored, OLS yields inconsistent parameter estimates

Simister (2013) Cameroon, Chad, Egypt, Kenya, Nigeria, India, and the United Kingdom	Nationally representative WAS (work, attitudes, and spending) surveys for all countries aside UK; the British Household Panel Study (BHPS) for the UK	Dependent variable: fraction of domestic work done by women Independent variables: wife's earnings (as fraction of total couple income); gender-based violence (dummy for being beaten by husband); number of visits to the bar/club	<ul style="list-style-type: none"> Two-stage least squares regression model OLS regression, used in the appendix 	<ul style="list-style-type: none"> Concerns of endogeneity in women earnings. At least one of the explanatory variables (wife's earnings) is often claimed to be dependent on other variables in the regression. Wife's education and age were used to predict her earnings.
Wodon and Ying (2010) Sierra Leon	The 2003–04 Sierra Leone Integrated Household Survey	Dependent variable: individual total domestic work time per week Independent variables: household per capita consumption; access to water and electricity; employment status; gender; type of the household; education level; marital status; household location, size, and composition	<ul style="list-style-type: none"> OLS Regression models Separate OLS results for urban men, urban women, rural men, and rural women 	
Lawson (2008) Lesotho	Lesotho HBS (2002/03)	Dependent variable: time poverty dummy Independent variables: infrastructure (water, electricity, transport, schools); income quintiles; gender; marital status; education; household size; number of children; locality	Probit models for time poverty for: <ul style="list-style-type: none"> (1) all adults (2) males (3) females (4) male-headed households (5) female-headed households 	
Arora (2015) Mozambique	Time-use primary household survey in two rural communities	Dependent variable: time poverty (dummy) Independent variables: age; sex; education; ability to speak Portuguese; household ownership; presence of children; household size	<ul style="list-style-type: none"> Probit regressions. Separate probit regressions for pooled, women, and men 	

Herrera and Torelli (2013) 10 sub-Saharan African countries	Samples from 1-2-3 surveys conducted in seven WAEMU capitals; Madagascar, DR Congo, and Cameroon ⁴⁰	Dependent variables: time spent on domestic (market) activities by men and women. Independent variables: age; education level; employment status; number of children and adults in the household; number of spouses; access to electricity and water	Tobit and Heckman models	<ul style="list-style-type: none"> • Tobit: dependent values are left censored⁴¹ • Heckman: accounts for possible selection bias as individuals with zero or nonzero values may present some particular characteristics (their nonparticipation may not be random)
Ndlovu et al. (2018) South Africa	Primary data set collected in rural South Africa in 2011; information from 340 rural households on adults' leisure, home production, and market-related time allocations, not readily available in secondary data sets	Dependent variable: time allocated to leisure, domestic production, and market work Independent variables: increase in household income due to male and female pensions	Regression discontinuity analysis	<ul style="list-style-type: none"> • The causal effect of an income transfer depends on the difference between when the individual lived in a pension household and when s/he didn't; however, it is impossible to observe both at the same time • RD analysis allows for recovering average causal effect for an unobserved potential outcome
Arku and Arku (2013) Ghana	Primary data set collected from six communities (total of 78 households with 155 respondents)	Main variables: three main housing types (self-contained, detached chamber and hall, and compound houses); gender roles in households Other variables: age and education	<ul style="list-style-type: none"> • No regressions • Explorative and descriptive analysis 	
Arku (2010) Ghana	Self-collected data: 340 married men and women from three rural communities	Main variables: time spent in collecting water, market work, leisure, and education before and after a water project. Barriers to access: water fees; time; distance; power outage. Respondent's own well-being indicators	<ul style="list-style-type: none"> • No regression analysis • Interpretivism methodology theory • Analysis was mainly descriptive 	

⁴⁰ The data combined samples from 1-2-3 surveys conducted in seven West African Economic and Monetary Union (WAEMU) capitals: Antananarivo, Madagascar; Kinshasa, Democratic Republic of Congo; Douala and Yaoundé, Cameroon. A description of these surveys can be found in De Vreyer and Roubaud (2013).

⁴¹ Up to about 52 percent of individuals declare zero market working hours, 44 percent declare zero domestic working hours, and 22 percent declare zero total working hours.

Mitik and Decaluwé (2009) South Africa	South African social accounting matrix (SAM); the authors integrated the household production activities by gender into the SAM.	Allocation of time for market work, household work, and leisure for adult men and women. Socio-economic: race; education; gender; children (boys and girls)	Used a dynamic computable general equilibrium model that integrates both market and nonmarket activities. However instead of using regressions, analysis was largely exploratory and descriptive	
Fontana and Natali (2008) Tanzania	Time-use survey and the Integrated Labour Force Survey	Main variables: time burden associated with water collection, fetching of fuel, food preparation, and home maintenance. Socioeconomic variables: sex; location; income; age; number of children; other characteristics	Explorative and descriptive analysis: <ul style="list-style-type: none"> • patterns of time use in home maintenance, food preparation, water, and fuel collection • subgroup analysis using eight subgroups for men and women (rural poor, rural nonpoor, urban poor, urban nonpoor) 	

APPENDIX B. SOURCES AND METHODS FOR THE LIMTCP

We provide a brief overview of the methodology used in constructing the estimates of the Levy Institute Measure of Time and Consumption Poverty (LIMTCP) for Ethiopia, Ghana, South Africa, and Tanzania.

As stated in the main text, the weekly time balance for *working-age* person i in household j , X_{ij} , is calculated as:

$$X_{ij} = 168 - M - \alpha_{ij}R_j - D_{ij}^0(T_{ij} + L_{ij}),$$

where 168 is the number of hours in a week, M (assumed to be equal for all) represents the personal maintenance requirements, R_j the time requirements of household production for household j , α_{ij} the observed share of the person in the combined total amount of time that *all* persons in the household (except the very young children) spent on household production, D_{ij}^0 the dummy variable that takes a value of 1 if the person is employed (otherwise, it is zero), T_{ij} the time required for commuting, and L_{ij} the actual or usual weekly hours of employment.

We estimate X_{ij} for working-age persons; working age is defined as 15–70 years old in Ghana and Tanzania and 15–64 years old in South Africa and Ethiopia. The estimation is carried out in a synthetic data file that is created by statistically matching the individuals in the time-use survey and household budget survey for each country (see Rios-Avila [2016] for Ghana and Tanzania and Rios-Avila [2020] for Ethiopia and South Africa). The surveys used in the study are shown in Table B-1.

Table B-1 Surveys Used in Constructing the Levy Institute Measure of Time and Consumption Poverty

Country	Relevant survey subject	Survey and sample	Sample size
Ethiopia	Consumption expenditures and employment	Ethiopia Socioeconomic Survey (ESS), wave three, 2015/16: subsample of married-couple households (household with a married head and spouse, 18–64 years of age, living in the same household, and at least one spouse is employed) with children (persons under 15 years)	11,124 persons in 1,873 households. There were 7,356 individuals age 10 years or older.
	Time use	Ethiopia Time Use Survey (ETUS), 2013: subsample of married-couple households (household with a married head and spouse, 18–64 years of age, living in the same household, and at least one spouse is employed) with children (persons under 15 years)	51,103 persons in 9,524 households. There were 28,673 individuals age 10 years or older
Ghana	Consumption expenditures and employment	Ghana Living Standards Survey (GLSS), 2012–13	72,373 persons in 16,772 households. There were 52,771 individuals age 10 years or older.
	Time use	Ghana Time Use Survey (GTUS), 2009	9,297 persons age 10 or older in 4,193 households.
South Africa	Consumption expenditures	Living Conditions Survey, 2014/15	83,263 persons in 18,968 households. There were 63,741 individuals age 10 years or older.
	Time use	South Africa Time Use Survey, 2010	14,294 persons age 10 or older in 8,337 households. Two selected individuals (not all) in a household completed the time diaries.
Tanzania	Consumption expenditures and employment	Tanzania Household Budget Survey (THBS), 2011/12	46,593 persons in 10,186 households. There were 39,265 individuals age 5 years or older.
	Time use	Integrated Labour Force Survey, Time Use Module (Tanzania Time Use Survey or TTUS), 2006	10,553 persons age 5 years or older in 3,140 households.

We estimated the personal maintenance thresholds (M) as the sum of minimum necessary leisure (assumed to be equal to ten hours per week), nonsubstitutable household activities (assumed to be equal to seven hours per week), and the weekly average for the reference group (all working-age individuals) of the time spent on personal care. Personal care was defined as sleeping, eating and drinking,⁴² and caring for personal hygiene. Weekly average

⁴² We found that the time spent on eating and drinking in Ghana was unusually short (only 4.4 hours per week or 38 minutes per day), perhaps due to the specific manner in which information on eating and drinking was collected.

hours spent on personal care were estimated from the time-use surveys for the years shown in the column headings. The resulting estimates are shown in Table B-2.

Table B-2 Personal Maintenance Thresholds (weekly hours)

	Ethiopia 2013	Ghana 2009	South Africa 2010	Tanzania 2006
Personal maintenance	95	93	98	98
Minimum necessary leisure	10	10	10	10
Nonsubstitutable household activities	7	7	7	7
Personal care	78	76	81	81
Sleep	61	61	64	62
Eating and drinking	13	11	10	11
Hygiene	4	4	7	8

The thresholds represent, as noted in the previous section, the average amount of household production that is required to subsist at the poverty level of consumption expenditures. Our reference group for estimating the thresholds consists of households with at least one nonemployed adult and consumption around the poverty line. Unfortunately, our preferred source of data for estimating the thresholds, the time-use survey, did not contain sufficient information regarding households' consumption expenditures or poverty status. Therefore, we had to estimate the thresholds from the matched data file because it contains information on consumption expenditures, poverty status, and (imputed) time allocation. We defined households with consumption expenditures not less than 75 percent and not more than 150 percent of their poverty line as subsisting at a poverty level. We then selected households with at least one nonemployed adult (a person 18 years or older) from this group to constitute our reference group.

A nonlinear regression model of the time spent by households on household production was specified for the reference group and estimated separately for rural and urban areas (see Zacharias et al. [2019: Appendix B] for details). Specifically, the estimated equation is:

$$H^j = a_0(A_{18-59}^j + a_1C_{0-6}^j + a_2C_{7-17}^j + a_3E_{60p}^j)^b + e_j,$$

To avoid understating the thresholds, we assumed that the threshold value for eating and drinking was equal to the actual average time in Tanzania.

where j is an index for households, H the weekly hours of household production by the household, A the number of adults 18–59 years of age, C_{0-6} the number of younger children (under 7 years of age), C_{7-17} older (7–18 years of age) children in the household, E the number of older (60 years or older) adults in the household, and e is an error term. The parameter a_0 indicates the required hours for a household with only a single adult in the 18–59 year age range. Our assumption is that the presence of additional members would change the household production requirements according to the age group that they belong to. Accordingly, the parameters a_1 , a_2 , and a_3 indicate the required hours per person in the respective category that have to be added to the hours required in a household with a person between the ages of 18 and 59 years. We also allow for the possibility that the requirements can vary with respect to the size (i.e., the number of persons) of the household. The size effect is captured by the parameter b , which when smaller than one would indicate economies of scale and when greater than one indicates diseconomies of scale. We have shown the estimates of the model in Table B-3. We used the parameter estimates shown in the table to calculate the thresholds (R_j) for each household in the synthetic data file for each country.⁴³

Table B-3 Estimates of Models of Thresholds of Household Production (weekly hours)
A. Ethiopia and Ghana

	Ethiopia		Ghana	
	Rural	Urban	Rural	Urban
Adult 18–59 years of age	19.35***	18.42***	10.69***	10.71***
Number of children 0–6 years of age	[4.781]	[4.143]	[1.505]	[1.880]
	0.123	1.048***	0.372***	0.883**
	[0.114]	[0.351]	[0.141]	[0.353]
Number of children 7–17 years of age	0.620***	0.865**	1.086***	2.299***
Number of persons over 60 years of age	[0.136]	[0.369]	[0.167]	[0.637]
	1.404***	1.819*	1.179***	1.585***
	[0.301]	[0.951]	[0.180]	[0.420]
Household size effect	1.089***	0.810***	1.067***	0.877***
	[0.143]	[0.129]	[0.0781]	[0.102]
Number of observations	855	303	853	596

⁴³ For example, consider a family of a 20-year old mother and 3-year old child in rural Ethiopia. Our estimates suggest that the requirements for the family is $19.35(1 + 0.123 * 1)^{1.089} \approx 22$ hours per week.

B. South Africa and Tanzania

	South Africa		Tanzania	
	Rural	Urban	Rural	Urban
Adult 18–59 years of age	22.88***	22.72***	14.44***	28.28***
	[0.942]	[0.793]	[2.405]	[3.484]
Number of children 0–6 years of age	0.282***	0.240***	0.329***	0.296**
	[0.066]	[0.051]	[0.127]	[0.149]
Number of children 7–17 years of age	0.698***	0.540***	0.638***	0.821***
	[0.058]	[0.048]	[0.228]	[0.158]
Number of persons over 60 years of age	1.042***	1.014***	1.351***	1.005***
	[0.075]	[0.066]	[0.224]	[0.248]
Household size effect	0.897***	0.899***	1.063***	0.766***
	[0.023]	[0.021]	[0.113]	[0.0716]
Number of observations	1588	2430	275	643

Notes: * significant at 10 percent level; ** significant at 5 percent level; *** significant at 1 percent level
The numbers in [] indicate standard errors.

After we estimated the threshold hours of household production, we used the synthetic data file to calculate each individual's share of their household's actual household production (α_{ij}). We assumed that an individual's share in the threshold hours would be equal to the share of that individual in their household's observed total hours of household production.

For weekly hours of employment (L_{ij}) we used the actual values reported in the budget surveys, except in the case of South Africa where no such information was available. Hence, we used the values that we obtained from the time-use survey via statistical matching. The threshold values for commuting (T_{ij}) were estimated from each country's time-use survey. They are the average values of the time spent on commuting by working-age persons, differentiated by the length of the workweek (full-time versus part-time) and area of residence (Table B-4).

**Table B-4 Threshold Hours of Commuting by Hours of Employment and Location
(weekly hours of employed persons)**

	Full-time	Part-time
Ethiopia 2013		
Urban	3.3	2.1
Rural	3.1	2.7
Ghana 2009		
Urban	7.0	3.2
Rural	8.4	5.7
South Africa 2010		
Urban formal	7.0	5.3
Urban informal	8.2	5.8
Tribal areas	7.7	3.2
Rural formal	4.8	3.8
Tanzania 2006		
Dar es-Salam	8.4	3.9
Other urban	7.7	5.8
Rural	9.5	7.5

The information discussed above is sufficient to estimate the time balance X_{ij} , of each working-age individual in the synthetic file. As discussed in the text, for households with time deficits, the official poverty line needs to be augmented with the monetized value of household time deficits:

$$P_j^L = P_j^O - p_j X_j,$$

where $X_j = \sum_{i=1}^{I^j} \min(X_{ij}, 0)$ is the time deficit of household j (i.e., the sum of the time balances (topped off at zero) of the I^j working-age persons), p_j the hourly replacement costs of time deficits, P_j^O the official poverty line, and P_j^L the adjusted (LIMTCP) poverty line.

The official poverty lines are constructed by the national statistical agencies of the respective countries using the cost-of-basic-needs approach (see, e.g., Statistics South Africa [2017] for an exposition). A minimum amount of food expenditures required for survival is first identified (food poverty line). Next, an estimate is chosen as the share of food expenditure in total consumption expenditures. Dividing the minimum amount of food expenditures by the chosen budget share of food yields the poverty line. In several countries, the poverty line is differentiated across the areas of the country to account for regional differences in the cost of

living. Ethiopia, Ghana, and Tanzania follow this practice, but South Africa does not (see Zacharias et al. [2017] for a brief description of the official poverty lines in Ghana and Tanzania and Zacharias et al. [forthcoming] for Ethiopia and South Africa).

To account for time deficits we had to modify the official poverty lines (P_j^0) that are published by the governments. We required an estimate of the replacement cost of time deficits to perform the modification. Since the time deficits reflect deficits in household production, we assumed, as is done in most studies that attempt to value household production in monetary terms, that the hourly value of the time deficit (p_j) is equal to the average hourly wage of domestic workers. The details regarding constructing the occupational category of domestic workers and deriving their hourly wages are discussed elsewhere (Zacharias et al. [2018, 30–32] for Ghana and Tanzania; Zacharias et al. [forthcoming] for Ethiopia and South Africa). Domestic workers' wages were differentiated by location to account for potential differences in cost across geographical regions (Table B-5).

Table B-5 Hourly Wages of Domestic Workers by Country and Area (nominal amount in national currency)

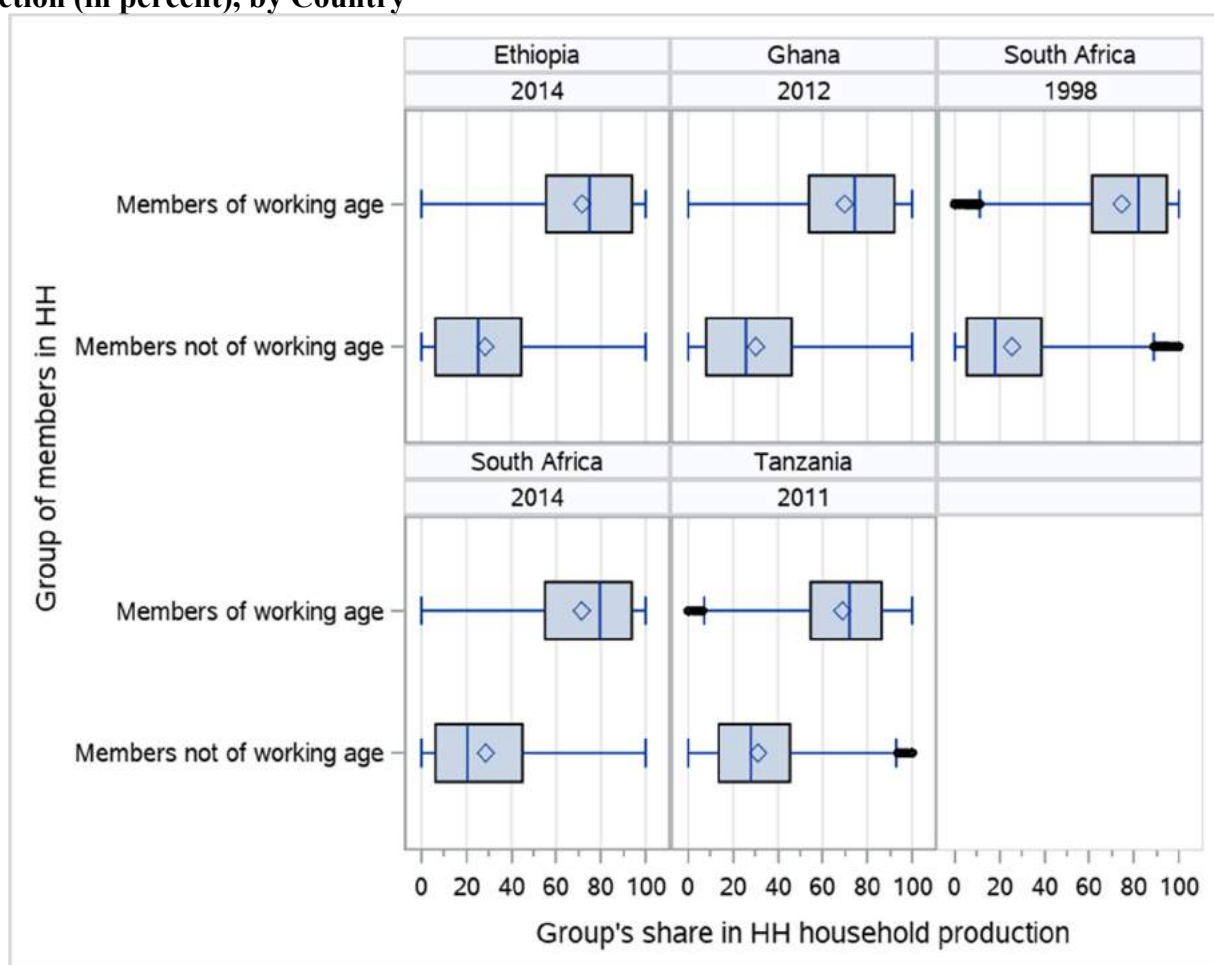
Ethiopia 2015 (birr)	
Rural	2.5
Small town	2.4
Medium and large town	2.7
Ghana 2012–13 (cedi)	
Rural	1.04
Urban	1.14
South Africa 2015 (rand)	
Rural	12.1
Urban	15.7
Tanzania 2011–12 (shillings)	
Rural	183
Other urban	210
Dar es salaam	424

We multiplied the household time deficit with the hourly wage reported above to obtain the monetized value of the time deficit. The final step was to add the monetized value to the official poverty line to obtain the LIMTCP poverty line.

APPENDIX C. CONTRIBUTION TO HOUSEHOLD PRODUCTION BY MEMBERS THAT ARE NOT OF WORKING AGE

A working-age individual's time balance depends on how much of the household production requirements of the household are borne by the young and old persons in the household, i.e., persons that are not of working age. Our definition of working age varies slightly across countries: it is 15–70 years of age in Ghana and Tanzania and 15–64 years of age in South Africa and Ethiopia. The estimates of the contributions made by the two groups—members of working age and members not of working age—to their household's total household production are presented below in the box plots.

Figure C-1 Shares of Each Group within the Household in the Total Hours of Household Production (in percent), by Country



Note: The estimates shown are for households with at least one individual from each age group.

To be sure, the effect of the contributions made by the persons outside the working-age group (denoted α_j^{nw} in the main text) on time deficits depends on how large such contributions are and their variation among households. As we would expect, the bulk of household production is done by people that are of working age. Yet the share of the members that are not of working age is hardly trivial. The median value ranges from 20 percent (South Africa, 1998) to as much as 30 percent (Tanzania). It is also noteworthy that the size of the share of the members that are not of working age is considerable, as indicated by the size of the box for each country. The question of whether there are substantial gender differences in α_j^{nw} is examined in the main text (see Figure 3-3).

APPENDIX D. HEALTH LIMITATIONS

The responses to survey questions regarding the health status of individuals were utilized to assess whether the working-age individual could assume additional responsibilities of household production. We attempted to construct a measure that could have reasonable comparability across countries. However, the definitions could not be uniform across countries due to the differences in the questions regarding the health status and coding of the responses. The definitions are summarized in the table below. Details regarding each country are provided in the text following the table.

Table D-1 Health Status Definitions, by Country

Country and year	Definition of sick or disabled: person reporting one or more of the circumstances listed below
Ethiopia 2015	<ul style="list-style-type: none"> • Disability with respect to vision, hearing, mobility, cognition, self-care, or interpersonal communication • Ill or injured during the past 4 weeks and visited a health practitioner/ facility for follow-up appointment for earlier chronic illness/accident or new injury/new or acute illness • Ill with malaria or tuberculosis during the past 4 weeks but has not sought treatment • Pregnancy or gave birth in the last month
Ghana 2012	<ul style="list-style-type: none"> • Disability that prevents full participation in life activities • Sickness/disability as the reason for not looking for work in the past 12 months • Stopping work or education in the past 12 months due to illness or injury • Pregnancy
South Africa 1998	<ul style="list-style-type: none"> • Disability (physical or mental) limiting daily activities • Illness or disability as the reason for not being employed or as the reason for being absent from job during the previous week • Illness or disability as the reason for not attending school in the current year • Pregnancy
South Africa 2015	<ul style="list-style-type: none"> • Disability with respect to vision, hearing, mobility, cognition, self-care, or interpersonal communication • Illness, injury, or disability as the reason for not attending school in the current year • Poor health or disability as the reason for not try to find work or try to start a business in the last four weeks • Suffered an injury requiring medical care in the last month • Under treatment for chronic illness such as tuberculosis, AIDS, etc. • Pregnancy
Tanzania 2011	<ul style="list-style-type: none"> • Disability with respect to vision, hearing, mobility, cognition, self-care, or interpersonal communication • Sickness/disability as the reason for not looking for work in the past 4 weeks • Currently sick or injured and was sick or injured during the last 4 weeks from an accident or chronic illness such as tuberculosis, diabetes, cardiac issues, cancer, etc. • Pregnancy

Ethiopia

- People who answered “some difficulty,” “lot of difficulty,” or “cannot perform” to at least one of the five questions regarding disability, i.e., difficulty seeing, even if he/she is wearing glasses; difficulty hearing, even if he/she is wearing a hearing aid; difficulty walking or climbing steps; difficulty remembering or concentrating; difficulty with self-care, such as washing all over or dressing, feeding, toileting, etc.; and, difficulty communicating, for example understanding or being understood.
- People who listed sickness or disability as the reason for not attending school.
- People who reported that they had an illness or injury during the previous four weeks, consulted a health practitioner or traditional healer or visited a health facility and listed the reason for consultation as “follow up appointment for earlier or chronic illness,” “follow up appointment for earlier accident,” “new or acute illness,” or “new injury.”
- People who reported that they had an illness or injury during the previous four weeks and listed their illness as tuberculosis or malaria.
- People who consulted a health practitioner or traditional healer or visited a health facility during the previous four weeks and listed the reason for consultation as “prenatal checkup” or “giving birth.”

Ghana

- People who answered “yes” to the question: “Have any serious disability that limits full participation in life activities (such as mobility, work, social life, etc.)?”
- People who gave sickness or disability as the reason for not looking for work in the past 12 months.
- People who answered “stopped work or school completely” in response to the question: “Think about your most serious illness/injury, how did this/these affect your work/schooling?”
- Women who answered that they are currently pregnant.

South Africa 2015

- People who answered “some difficulty,” “lot of difficulty,” or “unable to do” to at least one of the five questions regarding disability seeing, hearing, walking, remembering or concentrating, self-care, and communicating.
- People listing “illness,” “injury,” “disability,” or “pregnancy” as the reason for not attending school or other educational institution.
- People listing “health reasons,” “pregnancy,” or “disabled or unable to work” as the reason for not try to find work or try to start a business in the last four weeks.
- People under medication for the following chronic conditions: tuberculosis, cardiac problems, cancer, HIV, or AIDS.
- People that had suffered an injury requiring medical care during last month.

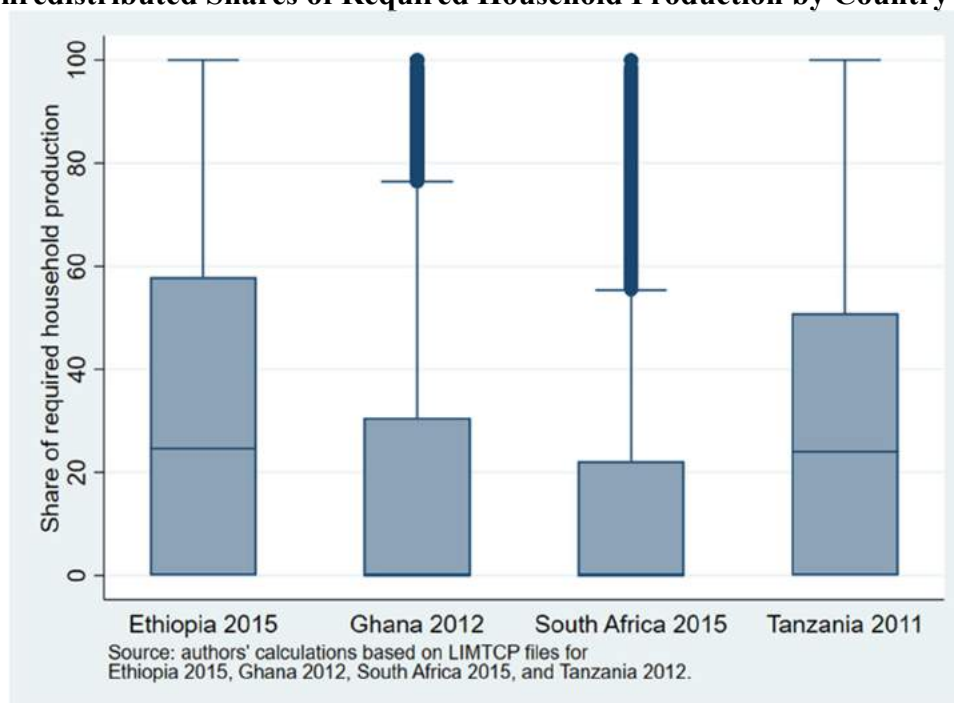
Tanzania

- People who answered “some difficulty,” “lot of difficulty,” or “cannot perform” to at least one of the five questions regarding disability, i.e., difficulty seeing, even if he/she is wearing glasses; difficulty hearing, even if he/she is wearing a hearing aid; difficulty walking or climbing steps; difficulty remembering or concentrating; difficulty with self-care (such as washing all over or dressing, feeding, toileting, etc.); and difficulty communicating (for example understanding or being understood).
- People who identified themselves as sick or injured at the time of the interview and had an accident or listed chronic illness such as tuberculosis, diabetes, cardiac issues, cancer etc. as the source of sickness or injury that they faced in the previous four weeks.
- Women who gave pregnancy as the reason for not attending school.

APPENDIX E. SIMULATION OF PRINCIPLES OF DISTRIBUTION OF HOUSEHOLD RESPONSIBILITIES

In all cases, we restricted the sample for redistribution by excluding those that were not working age and those who had a physical condition that would not allow for additional time spent on household production (see Appendix D for details). We report results throughout by restricting the sample to households with at least one employed, working-age adult and at least one male and one female working-age adult. The shares of required household production were held constant at the level in the baseline LIMTCP estimates for each country for all those that were not included in the redistribution scenarios. We add up the shares of the required household production hours of these individuals in each household. Figure E-1 shows the distribution of the shares of required household production hours that are not being redistributed in the simulations. In all four countries, the median share is below one-quarter of the required household production time. In both Ghana and South Africa the median shares are zero. The bulk of the required hours of household production time are being redistributed in each country's simulations.

Figure E-1 Unredistributed Shares of Required Household Production by Country



Similarly, large shares of working-age adults in households with one or more employed persons and at least one male and female working-age adult are a part of the simulated redistribution of required household production time. In Ghana and South Africa, more than half of such individuals are a part of the simulations, which helps to account for the fact that the median shares of unredistributed time in those two countries are zero.

Table E-1 Shares of the Working-Age Individuals in the Redistribution Simulations, by Country

	Share in simulation
Ethiopia 2015	40.7
Ghana 2012	55.0
South Africa 2015	62.6
Tanzania 2011	48.4

E.1 Equal Shares Scenario

The procedure for the equal shares scenario is relatively simple. Recall that the shares of those in the redistribution simulation in this scenario are simply:

$$\alpha_{ij}^E = \frac{1}{I_j} (1 - \alpha_j^{nw'})$$

Thus, we just need to count how many people are in the redistribution simulation in each household and then assign them the appropriate fraction (1 for households with one person in the simulation, ½ for households with two people in the simulation, and so on) and apply that fraction to the redistributable share of required household production time. Table E-2 breaks down the distribution of households by the number of individuals in the simulation for each country in the study. In a plurality of households there are two individuals in the redistribution simulation and in between 16 percent and 31 percent of households there are zero or one individuals.

Table E-2 Number of Individuals in the Redistribution Simulation per Household, by Country

Number	Ethiopia 2015	Ghana 2012	South Africa 2015	Tanzania 2011
0	5.59	1.24	3.07	4.59
1	11.1	29.95	25.07	20.09
2	48.86	35.88	35.21	40.09
3	17.92	15.64	18.67	16.34
4	9.7	8.92	10.12	9.11
5	3.74	4.59	4.43	5.29
6	2.37	2.28	1.99	2.34
7	0.51	0.77	0.79	0.98
8	0.12	0.37	0.31	0.4
9	0.11	0.24	0.2	0.31
10+	0	0.12	0.16	0.45

E.2 Time Available Scenario

The time available scenario is based on the principle that household members should split up the required household production time based on the time each one has available. The time available (Z_{ij}) is defined as the time left over after the minimum personal maintenance and time spent on income generation (including commuting time) have been subtracted from the total weekly hours. To calculate the shares for each individual based on this principle, we first calculate the time available for each individual, then add up the total among the household for those individuals that have positive time available. We then divide each individual's time available by the total and apply that fraction to the redistributable share of household production time. For those individuals that have negative time available we set their shares to zero in this simulation.

$$\alpha_{ij}^A = \frac{Z_{ij}}{\sum_{i=1}^I Z_{ij}} (1 - \alpha_j^{nw'}), \quad \text{if } Z_{ij} > 0,$$

$$\alpha_{ij}^A = 0, \quad \text{if } Z_{ij} \leq 0.$$

The exception to this rule is when there are no working-age household members that have positive time available. In that case, we use the one minus their share of the sum of negative time available across individuals if there is more than one such individual; if there is

just one we assign the entire redistributable share to them. As we can see in Table E-3, the share of individuals for whom negative time balances were a reality is substantial in each country in the simulation, ranging from 2 percent to 9.3 percent.

Table E-3 Individuals in the Simulation With and Without Time Available, by Country

	No time available	Time available
Ethiopia 2015	957,444	46,008,013
Ghana 2012	1,279,191	19,405,114
South Africa 2015	711,879	28,005,555
Tanzania 2011	3,418,632	33,406,373

E.3 Opportunity Cost Scenario

For the opportunity cost scenario, we imputed wages for all of those not currently working for pay. In order to do this, we used a two-stage Heckman selection model (Heckman 1979), also known as the Heckit procedure, which we will outline below. Once done, we used the imputed wages of those that are not currently working for pay and the actual wages of those that are to divide up the redistributable share of required household production:

$$\alpha_{ij}^M = \left(\frac{1}{I_j - 1} \right) \left(1 - \frac{w_{ij}}{\sum_{i=1}^I w_{ij}} \right) (1 - \alpha_j^{nw'})$$

Because we wish the share of required household production to be inversely proportional to the individual's share of the sum of wages, we subtract their share of this sum from one. To ensure that the resulting shares sum up to unity, we divide by the number of individuals in the simulation minus one. We then apply this share to the redistributable share of required household production as in previous steps.

In order to impute wages for those not currently employed for wages, we first impute the likeliest industry and occupation for each individual using a multinomial probit procedure. Industry and occupation are regressed on age, age squared, sex, rural/urban status, education, and geographic region on all those employed for wages. The likelihood for each industry and occupation is then predicted for everyone, using the results of the multinomial probit. Then each

individual not currently working for wages is assigned the industry and occupation corresponding to the largest predicted likelihoods for that individual.

Then we move on to the first stage of the Heckit procedure, a probit estimation of a dummy variable for being employed in wage work (*paid*):

$$P(\textit{paid} = 1|X) = F(X\beta)$$

where F is the cumulative density function of a normal distribution. The vector of explanatory variables, X , comprises the number of children under the age of 5 years and the number of children aged 6 to 17 years in the household, the individual's education, and the individual's spouse's age, education, and labor force status. The regression is run on the universe of all eligible adults separately by age (divided into four categories: less than 25 years old; 25 to 34 years old; 35 to 54 years old; and 55 years old and over) and sex. The Mills ratio, λ , is calculated for all individuals using the results of the first stage regression:

$$\hat{\lambda} = \frac{f(X\hat{\beta})}{F(X\hat{\beta})}$$

where f and F are, respectively, the probability and cumulative density function of a normal distribution, and $\hat{\beta}$ is the vector of estimated coefficients from the probit model.

The second stage is an ordinary least squares (OLS) estimate of the log of hourly wage:

$$\ln w = \gamma_2 Z^w + \theta_2 \hat{\lambda} + \mu.$$

This regression is run only on those that are actually employed for pay. The vector of explanatory variables, Z^w , includes the individual's education, age, industry, occupation, geographic region, rural/urban location, spouse's labor force status, and, finally, λ , the Mills ratio calculated in the first stage. Inclusion of the Mills ratio corrects for the selection bias induced by limiting the regression to those in paid employment. The imputed log of wage is predicted for those not working for wages from the results of the regression, with industry and occupation replaced by the industries and occupations assigned in the previous step.