The Time and Consumption Poverty of Employed Individuals in Ghana

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Abstract

This study presents the application to the case of Ghana of a methodology for a two-dimensional poverty measure that takes both necessary consumption as well as the required household production needed to achieve a minimum living standard into account. The official poverty lines in Ghana and other countries assume that all households and individuals have enough time to adequately attend to the needs of household members. However, some individuals may not have sufficient time and they thus experience "time deficits." If a household experiencing a time deficit cannot afford to cover it by buying market substitutes (e.g., hiring a care provider), that household will enjoy a standard of living below that supposedly reflected in the official poverty measures. We show results of our estimates of the Levy Institute Measure of Time and Consumption Poverty (LIMTCP) for working individuals in Ghana, as well as the results of an employment simulation for individuals in poor households.

Keywords: Measurement of poverty, household production

JEL Codes: I32, D24

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1 Introduction

Before the most recent crisis in Ghana, economic growth had surpassed that of many other sub-Saharan African nations. Sizable reductions in measured poverty had been accompanied by improvements in infrastructure. Since the foreign exchange crisis and the IMF-mandated reforms of the public sector, growth has slowed and the trend of increasing standards of living in Ghana has come to a halt. In this context, the analysis of poverty and the role of policy in alleviating it is as important as ever.

Standard measurements of poverty, such as the consumption poverty line used as the official measure of poverty in Ghana, implicitly assume that households that live at levels of consumption around the poverty line have sufficient time to carry out the tasks necessary for the reproduction of the household over time. It is not at all clear that this assumption is warranted, and there are many indications that it is false. There is certainly nothing that prevents households living around the poverty line (or at any other level of consumption expenditures for that matter) from suffering from time deficits: a lack of sufficient time among the household members to perform the necessary cooking cleaning, child and elder care, shopping and household management that every household must get done. Because this is the case it is not just possible but likely that households that are nominally equal to each other in terms of their consumption expenditures might be quite unequal in terms of the time that they have available. Thus, official poverty lines that assume that an important resource, namely time, is available but that do not account for it are internally inconsistent.

By taking the time necessary for the work of household reproduction into account, we produce a two-dimensional poverty measure for Ghana. We produce estimates of time-adjusted consumption poverty and time poverty for employed individuals in Ghana. The purpose of our research is to both demonstrate the impact on poverty measurement of taking time as well as consumption expenditures into account and demonstrate the importance to the design of policies meant to reduce poverty. In order to assess the impact of employment policy on time and consumption poverty we carry out an employment simulation. The results of these analyses demonstrate that: the official measure of poverty in Ghana is lacking in that it leaves out a large portion of the population that are in fact poor (that we refer to as the *hidden poor*); the depth of poverty (especially for the time poor) is understated; and paid employment is far from a guarantee of escaping poverty.

The rest of the paper is organized as follows. In the next section we provides some background information on the recent trajectory of the Ghanaian economy as a whole and specifically, the trends in measured consumption poverty. In section 3, we describe the empirical methodology used to produce our estimates of time and consumption poverty in Ghana. The results of our estimates for employed individuals are analysed in section 4. In section 5, we detail the methodology and results of an employment simulation that we use to predict the impact of paid employment on the LIMTCP poverty status of poor individual. In the final section we summarize the results of the analysis and the light that it sheds on our premise regarding the importance of taking time deficits into account in understanding poverty.

2 Background

Ghana is commonly regarded as an African success story due to its growth performance over the last 30 years. Its per capita GDP has increased every year between 1985 and 2013 and accelerated starting with the early 2000s. This growth was associated with the expansion of the service sector while the agriculture sector contracted. Significant discoveries of oil reserves in 2007 further contributed to its recent strong performance with the economy growing at 12 percent in 2012. However, the growth of the industrial and manufacturing sector has been sluggish. Ghana belongs to the group of lower-middle-income countries with the per capita GDP of $1,461.6 in 2014.

The strong performance of the Ghanaian economy has been associated with reductions in poverty. The poverty headcount ratio was high at 51.7 percent during 1991/92 and went down to 39.5 percent in 1998/99, 28.5 percent in 2005/06, and 24.2 percent in 2012/13. Some of these declines can be linked to GDP growth although the responsiveness of poverty measures to the growth in output and consumption has been modest. In Ghana, the elasticity of poverty with respect to per capita GDP was -0.5 and the elasticity of poverty with respect to per capita private consumption was -1.2 between 2005/06 and 2012/13. It is also noteworthy that there has been substantial geographic variation in the poverty reduction. While rural poverty consistently declined (albeit it remains higher than in urban areas), urban poverty in areas other than Accra in fact increased (McKay, Pirttilä, and Tarp 2015).

Arguably, the achievement of poverty reduction requires a multi-faceted strategy that combines improvements in individual capabilities of men and women with the economic restructuring and the strengthening of macroeconomic foundations (e.g. fisheries and salt sector, artisanal mining as a way to escape agricultural poverty, cereal price increases, microfinance and informal credit, fuel subsidy reform, inflation control). In addition, the development of social assistance and welfare infrastructure can contribute substantially to improved poverty outcomes.

Most measures of poverty have focused on the income or consumption dimension of poverty, largely ignoring other key dimensions of economic deprivation, such as time deficits. The issue of time constraints is particularly relevant in settings, such as Sub-Saharan African countries, in which the lack of social and physical infrastructure forces households to spend considerable amount of time on household production, such as food production, childcare provision, and gathering fuel and water. As such, ignoring time deficits that stem from the necessity to engage in household production paints at best an incomplete picture of individual and household well-being and render invisible the role that household production needs play at constraining individuals' access to economic opportunities and improvement in their earnings capacity. Incorporating time deficits into the measurement of poverty highlights strong gender implications of poverty reduction efforts due to the fact that women are primary providers of domestic responsibilities in their households.

3 Empirical methodology

3.1 Statistical matching

The measurement of time and consumption poverty requires microdata on individuals and households with information on time spent on household production, time spent on employment and household consumption expenditures. Given the importance of the intrahousehold division of labour in our framework, it is necessary to have information on the time spent on household production by all persons[1] in multi-person households. Good data on all the relevant information required is not available in a single survey for either country. But, good information on household production was available in the time use surveys (TUS) and good information regarding time spent on employment and household consumption expenditures was available in the household expenditures survey. Our strategy was to statistically match the expenditures survey and TUS so that hours of household production can be imputed for each individual in the expenditure survey. Basic information regarding the surveys used in constructing the synthetic data file for Ghana is shown in Table 3-1.

Table 3-1 Surveys used in constructing the Levy Institute Measure of Time and Consumption Poverty for Ghana

Relevant survey subject	Name	Sample size
Consumption expenditures and employment	Ghana Living Standards Survey (GLSS) 2012-13[2]	72,373 persons in 16,772 households. There were 52,771 individuals of age 10 years or older.
Time-use	Ghana Time Use Survey (GTUS) 2009	9,297 persons of age 10 or older in 4,193 households. The study used a 24-hour diary, divided into one hour slots to record activities. Data was collected from June to July, 2009.

The surveys are combined to create the synthetic file using constrained statistical matching (Kum and Masterson 2010). The basic idea behind the technique is to transfer information from one survey ('donor file') to another ('recipient file'). In this study, the donor file is the time-use survey (GTUS) and the recipient file is the expenditure survey (GLSS). Time allocation information is missing in the recipient file but is necessary for our research.[3] Statistical matching is used to impute the requisite time allocation information of each individual in the expenditure survey (recipient file) provided that the individual's age falls within the age range of individuals for whom time diary information was collected in the time use survey (donor file). As shown in Table 1, the relevant age range of GTUS was 10 years or older. Each individual record in the recipient file is matched with a record in the donor file, where a match represents a similar record in a statistical sense, based on several common variables in both files. The variables are

[1] Our basic concern is that we should have information regarding household production by both spouses (partners) in married-couple (cohabitating) households, and information on older children, relatives (e.g. aunt), and older adults (e.g. grandmother) in multi-person households.
[2] The GLSS was spread out over a year, between October 18, 2012 and October 17, 2013.
[3] Although the GLSS does contain time use information, it is not very detailed and the quality was assessed to be too low for our purposes.

hierarchically organized to create the matching cells for matching procedure. Some of these variables are considered as strata variables, i.e., categorical variables that we consider to be of the greatest importance in designing the match. For example, if we use sex and employment status as strata variables, this would mean that we would match only individuals of the same sex and employment status. Within the strata, we use a number of variables of secondary importance as match variables. The matching progresses by rounds in which strata variables are dropped from matching cell creation in reverse order of importance.

The matching is performed on the basis of the estimated propensity scores derived from the strata and match variables. For every recipient in the recipient file, an observation in the donor file is matched with the same or nearest neighbour based on the rank of their propensity scores. In this match, a penalty weight is assigned to the propensity score according to the size and ranking of the coefficients of strata variables not used in a particular matching round. The quality of match is evaluated by comparing the marginal and joint distributions of the variable of interest in the donor file and the statistically matched file (see Appendix A for a detailed description of the statistical matches).

3.2 Estimating time deficits

We estimated time deficits for individuals aged 15 to 70 years. We restricted our attention to individuals in this age group because they constituted the bulk of the employed population (86 percent). Labor market information is available from the expenditure surveys used in the study for individuals 5 years and older. Persons between the age of 5 and 15 years made up about 12 percent of the employed population; 73 percent of these 1.7 million workers were in rural areas. However, for the purposes of our current research, we exclude the child workers from the calculation of time deficits.

To estimate time deficits, we begin with an accounting identity: the physically fixed total number of hours available to any individual (i.e., 24 hours in a day or 168 hours in a week) equals the sum of time spent on employment, household production, personal maintenance, nonsubstitutable household production, and everything else (e.g. spending time with friends and family, watching TV etc.). We next define the committed time of the individual as the sum of (1) *required* weekly hours of personal maintenance and nonsubstitutable household production; (2) *required* weekly hours of household production; (3) *required* weekly hours of commuting; and, (4) *actual* weekly hours of employment. An individual suffers from a time deficit if their committed time is greater than the number of hours in a week.

The minimum required weekly hours of personal maintenance were estimated as the sum of minimum necessary leisure (assumed to be equal to 10 hours per week)[4], nonsubstitutable household activities (assumed to be equal to 7 hours per week), and the weekly average (for all individuals aged 15 to 70 years) of the time spent on personal care. Personal care was defined as consisting of following activities: sleep; eating and drinking; and, hygiene. Weekly average hours spent on personal care was estimated from the time use surveys. 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). Our conjecture is that this is an artefact of the manner in which information on eating and drinking was collected in the time use survey. Therefore, we assumed that the threshold value for eating and drinking was equal to the actual average time in Tanzania

[4] It should be noted that 10 hours per week was substantially less than the median value of the time spent on leisure (sum of time spent on social, cultural activities, entertainment, sports, hobbies, games and mass media) in Ghana (by approximately 8 hours).

(11.1 hours per week).[5] The resulting estimates are shown below in Table 3-2. The line labelled 'Total' is our estimate of the required weekly hours of personal maintenance and nonsubstitutable household production and applies uniformly to every individual aged 15 to 70 years.

Table 3-2 Thresholds of personal maintenance and nonsubstitutable household activities

	Weekly Hours
Total	**93**
Personal maintenance	86
Personal care	76
Sleep	60.9
Eating and drinking	11.1
Hygiene	4
Necessary minimum leisure	10
Nonsubstitutable household activities	7

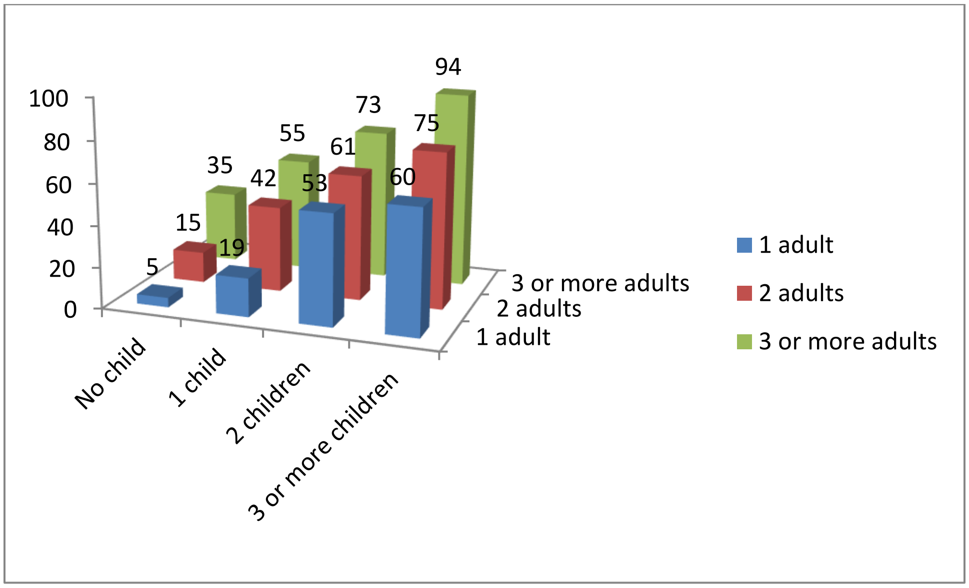
The thresholds for household production hours are set at the *household* level; that is, they refer to the total weekly hours of household production to be performed by the members of the household, taken together. In principle, they represent the average amount of household production that is required to subsist at the poverty level of consumption expenditures. The reference group in constructing the thresholds consists of households with at least one nonemployed adult and consumption around the poverty line. Our definition of the reference group is motivated by the need to estimate the amount of household production implicit in the official poverty line. Since poor households in which all adults are employed may not be able to spend the amount of household production implicit in the poverty line, we excluded such households from our definition of the reference group.

Unfortunately, our preferred source of data for estimating the thresholds, the time use survey, did not contain any information regarding consumption or poverty status of households. Therefore, we had to estimate the thresholds from the matched datafile because it contains information on consumption expenditures, poverty status and (imputed) time allocation. Specifically, we defined households with consumption expenditures not less than 75 percent and not more than 150 percent of their poverty line as subsisting on poverty level of consumption expenditures. We then selected households with at least one nonemployed adult (a person 18 years or older) from this group to constitute our reference group.

In the next step, average hours spent by households on required household production were calculated for 12 subgroups, formed on the basis of the number of children and adults in the household, in the reference group. The calculated average hours of each subgroup in the reference group was set as the required hours of household production for each subgroup in the population. The estimates obtained are shown below in Figure 3-1.

[5] The Ghana estimates were produced as part of a research project that also included producing estimates for Tanzania.

Figure 3-1 Threshold hours of household production (weekly hours per household)



Our assumption is that the required hours should show a positive gradient with respect to the number of adults and a positive gradient with respect to the number of children. That is, the required hours of household production for the household as a whole should increase when there are more adults in the household, and when there are more children in the household. Our assumption is confirmed by the estimates.

Our definition of household production consists of activities that provide unpaid domestic and caregiving services for own use; and, activities of collecting wood and water for own use. According to the United Nations System of National Accounts, collection of water and firewood falls within the "production boundary" because such activities result in the production of goods rather than services. In principle, therefore, people who engage in these activities should be considered as "employed" even if they are not engaged in any other activities usually considered as constituting "employment." However, it is quite unlikely that this principle was implemented to ascertain the usual labor force status in the expenditure survey that we used in our study.

The main question in the GLSS determining the classification of the person as employed or nonemployed was the following: "*Did (NAME) do any work for pay, profit, family gain or did (NAME) produce anything for barter or home use during the last 7 days even if it was for only one hour*?"[6] This survey can not be expected on the basis of this questions to classify as employed people who engage in the collection of water and firewood for own use and engage in no other activities usually considered as employment. Such individuals would either fall into the unemployed or inactive category. However, collection of water

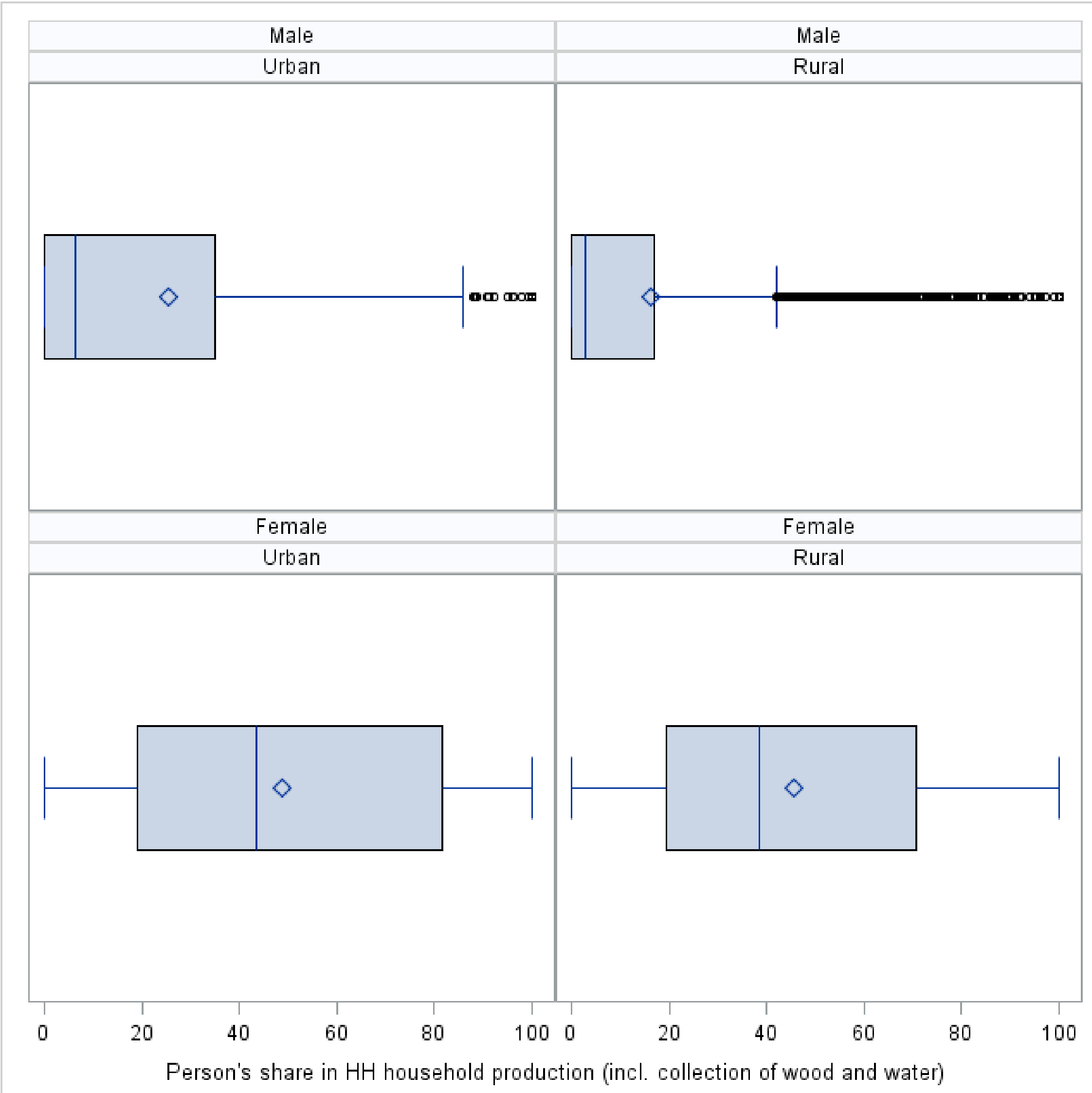
[6] Part A, Section 4, Question 1, GLSS 6 Questionnaire. Supplementary questions seek to identify if the person was an apprentice or temporarily absent from employment during the reference period.

and firewood is absolutely essential for the household to reproduce as a unit and the time spent on these activities should be included in required household production.[7]

After we estimated the threshold hours of household production, we determined the share of each individual in the household in their household's actual household production. This was done using the matched data. We assumed that the share of an individual in the threshold hours would be equal to the share of that individual in the observed total hours of household production in their household. Consider the hypothetical example of a household with only two adults. If the synthetic data showed that the adults spent an equal amount of time in household production, we divided the threshold value of 35 hours equally between them. However, the equal sharing of housework between the sexes is the exception rather than the norm, as indicated in Figure 3-2, below. The left and right edges of the box indicate the intra-quartile range (IQR), i.e., the range of values between the 25th and 75th percentiles. The marker inside the box indicates the mean value. The line inside the box indicates the median value. The picture clearly shows that men's share is much lower, as most of the distribution for men lies to the left of the distribution for women.

[7] Alternatively, we could have, in principle, treated the collection of water and firewood as unpaid family work. This would impose the substantial cost of compromising the compatibility of our estimates of the characteristics of the employed population with official estimates and hence we did not purse this alternative.

Figure 3-2 Person's share in the total hours of household production (percent) by sex and location, persons 15 to 70 years



We derived the thresholds for commuting time to work from the time-use survey (see Table 3-3, below). Our exploratory analysis showed that the hours of employment and location had an important impact on the hours of commuting. Since we cannot reasonably assign commuting time for each possible hour of employment, we assigned thresholds based on the full-time versus part-time employment status of the employed. We assumed that the average values of commuting constitute the threshold values of commuting. Our estimates showed that workers in rural areas did more commuting than workers in urban areas.

Table 3-3 Threshold hours of commuting by hours of employment and location (weekly hours of employed persons, 15 to 70 years old)

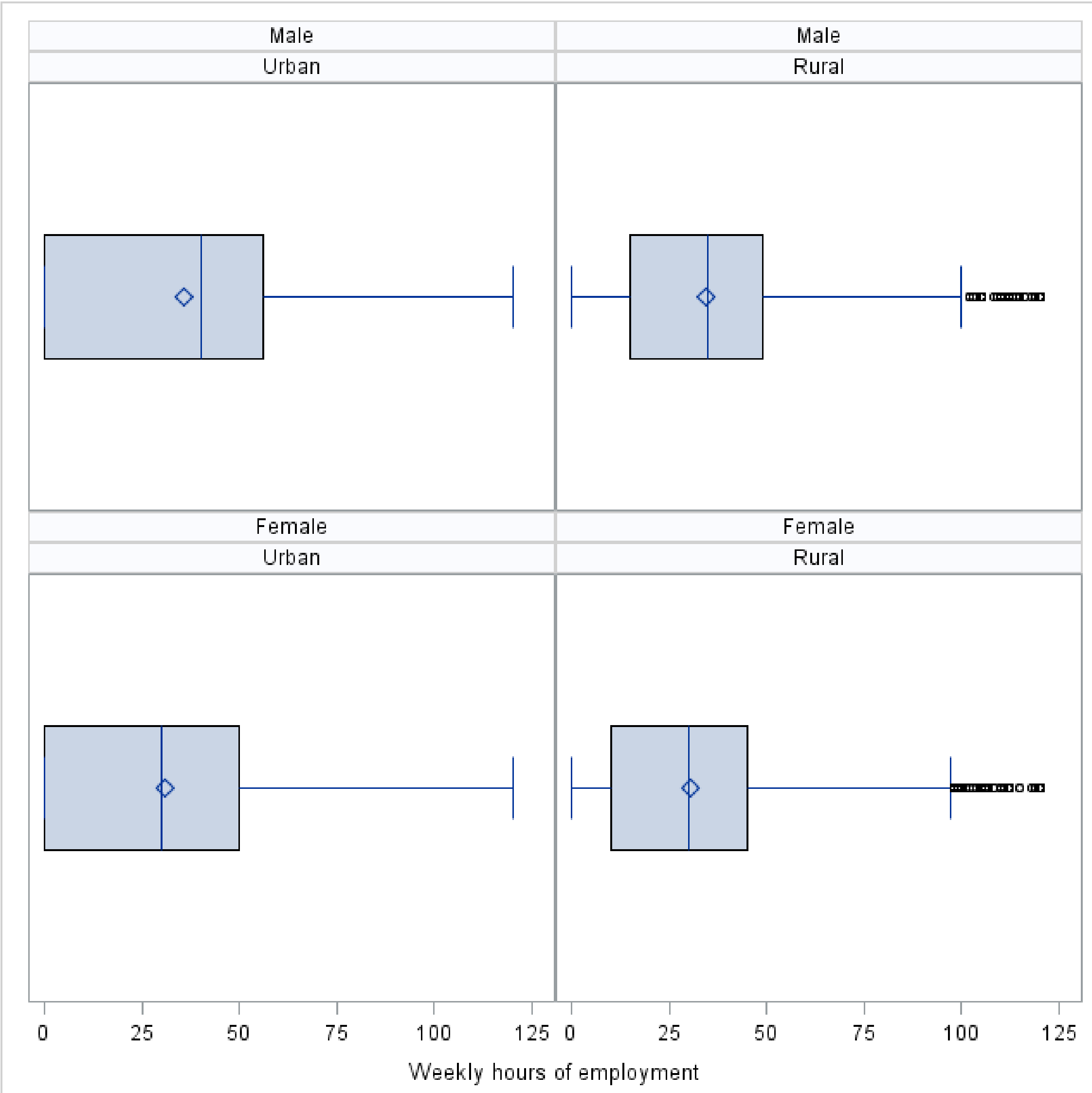
Region	Full-time	Part-time
Urban	7.0	3.2
Rural	8.4	5.7

The final step in calculating the time deficits for individuals consists of obtaining the actual weekly hours of employment. We used the hours reported by individuals in the expenditure surveys. The survey concept of hours of employment differed across the countries. The GLSS collected information on "actual" weekly hours of employment. Missing values were encountered for 2,121observations. Because of the relatively larger number of observations, we employed a multiple imputation method to replace the missing values for hours of work. We first imputed industry, occupation and employment status, since these also had missing values and were needed for the imputation of hours. These were imputed by first collapsing the four-digit codes for industry and occupation into 10 industries and occupations. Missing values for industry of main activity were replaced using the modal value for the listed occupation and then missing values of occupation were replaced with the modal value for the listed industry.[8] Each missing value of employment status was then replaced with the modal value of employment status for the listed industry and occupation pair. We then proceeded to impute actual hours of employment using an ordinary least squares regression. We first ran the regression only for those whose employment status was family farmers. As the dependent variable we used the value of actual hours (since the log of actual hours was more skewed than the variable itself), and for independent variables we used age, age squared, sex, level of educational attainment, and relationship to the household head of the individual, as well as the number of persons in the household, number of children under six years of age, number of children aged six to seventeen and an indicator for polygamous household. We then ran the regression on the rest of the records, using the additional independent variables industry, occupation and employment status. With the results of these regressions we predicted the actual hours of employment and replace all the missing values of actual hours of employment with that value.

The distribution of weekly hours of employment shows some interesting patterns (see Figure 3-3, below). Hours of employment show a greater deal of variation in the urban areas. The p25 value is nearly zero for both sexes in urban areas (as indicated by the starting point of the box) compared to the substantially higher p25 value in rural areas. As is well-known, rate of employment in rural areas is higher than urban areas. On the other hand, the average urban individual generally works longer hours than their rural counterpart as revealed by the comparison of the vertical lines inside the rural versus urban boxes (i.e., the respective median values).

[8] One record that had both industry and occupation missing was given the modal industry and occupation couple.

Figure 3-3 Figure 3 Distribution of weekly hours of employment (percent) by sex and location, persons 18 to 70 years



The steps described above yielded information sufficient to estimate the time deficits for all individuals aged 15 to 70 years. The household-level value of time deficits was then obtained in a straightforward manner by summing the time deficits of individuals in the household.

3.3 Adjusting poverty thresholds

The general procedure behind the construction of national poverty thresholds in Ghana follows a variant of the well-known “cost of basic needs” approach. A minimum amount of food expenditures required for survival is first identified (food or “extreme” poverty line). Next, an appropriate number is chosen regarding 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.

The conventional approach to poverty evaluation is to adjust the number of persons in the households according to the age and sex of its members.[9] Household consumption expenditure, adjusted for regional price differences, is then divided by the adjusted household size to obtain (adjusted or equivalent) per capita expenditures. This amount of expenditure is compared to the poverty threshold to evaluate whether the individual/household is poor. The official poverty threshold in Ghana was 1,314 cedi.

We followed a different approach here because we wanted to show how much the consumption poverty thresholds change when time deficits are monetized. For this purpose, instead of adjusting the household's size according to the age and sex of its members, we adjust the consumption poverty threshold for the household. The adjustment is made by multiplying the consumption poverty threshold by the adjusted household size (i.e., the number of equivalent adults). The latter information was available in the expenditure survey.

Accounting for time deficits requires the modification of the official threshold. The modification consists of adding the monetized value of household time deficit to the threshold. We assume that the hourly value of time deficit is equal to the average hourly wage of domestic workers, an assumption that is widely made in research on the valuation of household production. Unfortunately, detailed occupational coding required in estimating such wages are not always available in the microdata; or, even when detailed coding is available, the number of observations sometimes proves to be too small to produce reliable estimates, especially when we need estimates at a geographically disaggregated level. The latter is often a manifestation of the narrowness of the market for domestic workers. Ghana proved to be no exception to this rule.

We wanted to estimate domestic worker wages by urban and rural areas.[10] There does not seem to be a better source of data to perform the estimation than the GLSS. We chose domestic workers by identifying all those individuals that indicated that their primary activity was working for pay in a private household and that their industry was household employment ("Activities of households as employers of domestic personnel", ISIC code 9700) and that their occupation corresponded to household production activities.[11] Unfortunately, only 44 observations were available in the whole sample that allowed a direct identification of domestic workers. Therefore, we used the average wage of "similar workers" in the private informal sector. To identify similar workers, we used the same set of occupations, except hairdressers and beauticians (codes 5141 and 5142) and all industries. This procedure yielded 510 observations. To determine the hourly wage, we added the cash and in-kind pay that each of these individuals reported and divided that by the number of weeks corresponding to the period that their pay covered and their usual weekly hours of work. The results are shown in Table 3-4, below.

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[9] Equivalence scales are generally used to account for differences in needs among households based on their size and composition. The equivalence scale used in Ghana is .

[10] A geographical classification that we have used in other studies, such a classification does not seem to be used generally in research on Ghana.

[11] To identify domestic workers we first identified individuals who identified their main occupation as 5120 "Cooks", 5131 "Waiters", 5132 "Bartenders", 5141 "Hairdressers", 5142 "Beauticians and related workers", 5151 "Cleaning and housekeeping supervisors i", 5152 "Domestic housekeepers", 5153 "Building caretakers", 5162 "Companions and valets", 5169 "Personal services workers not elsewhere", 5249 "Child care workers", 5322 "Home-based personal care workers", 9111 "Domestic cleaners and helpers", 9121 "Hand launderers and pressers", 9122 "Vehicle cleaners", 9129 "Other cleaning workers", and 9613 "Sweepers and related labourers" and their industry as 9700 "Activities of households as employers of domestic personnel". This resulted in 44 observations for all of Ghana.

Table 3-4 Hourly wages of domestic workers by area (nominal amount in national currency)

Region	(New Cedis)
Urban	1.14
Rural	1.04

We considered the hourly wage obtained in the manner described above as the unit replacement cost of time deficits because time deficits are, by definition, deficits in the required levels of household production. Multiplying the unit replacement cost and the weekly hours of household time deficit yields the weekly monetized value of the household time deficits. We converted the weekly value into an annual value because the official poverty line is specified in annual terms.[12]

The monetized value of time deficit was adjusted for regional price differences before it was added to the household poverty line. We performed this adjustment by employing the same price deflator that was used in the survey to adjust household consumption expenditures used in assessing poverty. That is, we multiplied the monetized value of time deficit by the ratio of adjusted consumption expenditures to unadjusted consumption expenditures—the ratio, in effect, constituting the implicit regional price deflator. We refer, in what follows, to the sum of the official poverty line and the adjusted value of time deficit as the LIMTCP poverty line.

Both the official poverty line and poverty line adjusted by the value of time deficits are compared against a measure of household consumption expenditures to assign poverty status. We used the measure of consumption that is used in official estimates of poverty. The consumption measure used in Ghana includes expenditure on food and non-food items including expenditure in housing.

4 Time and consumption poverty of employed individuals

Given our focus on time deficits, we begin with the incidence of time poverty (Table 4-1). Individuals incur time deficits when the time that they spent on employment and required household production exceeds the time that they have available after setting aside the time for personal maintenance and nonsubstitutable household production (see section 3.2). Overall, we found that 27 percent of persons between the ages of 15 and 70 encountered time deficits. Women were almost twice as likely to have time deficits as men (35 versus 18 percent). Time deficits are confined almost entirely to the employed population in Ghana.[13] Almost half of all employed women were time-poor compared to about a quarter of all employed men.

[12] Annual hours were calculated by multiplying the weekly hours of time deficit by 52. Daily poverty lines are also available in the GLSS and this would represent an alternative way to measure poverty that would, however, lead to essentially the same results as using the annual estimates.

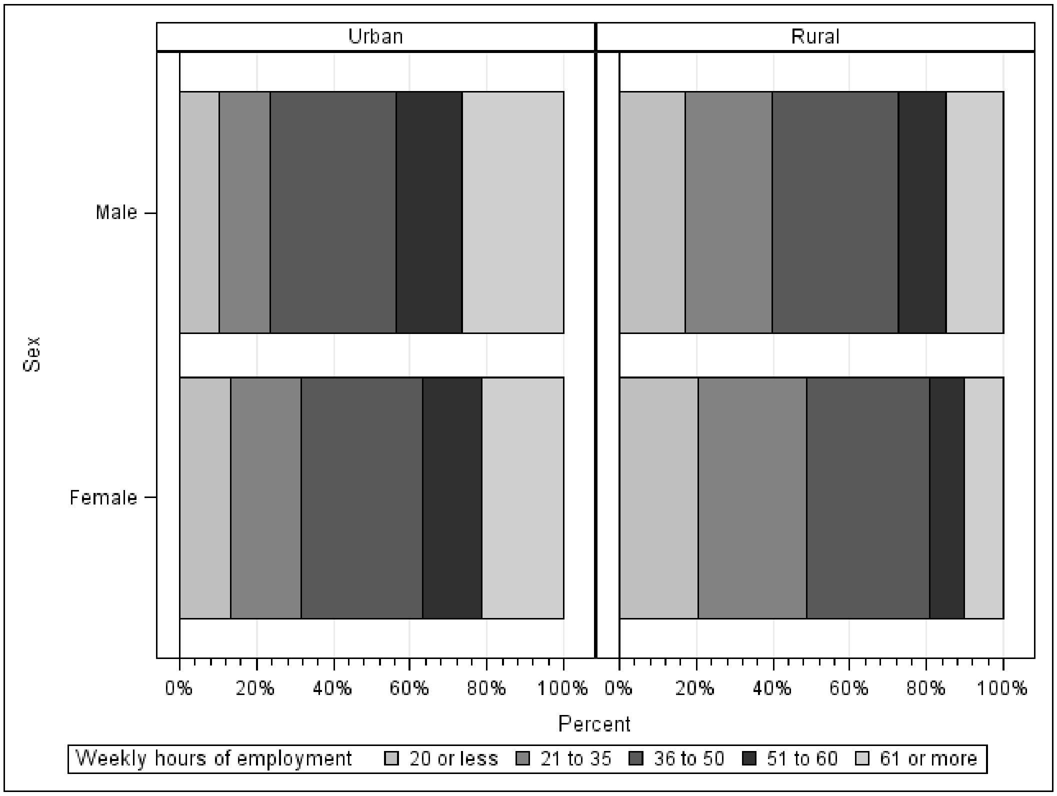
[13] The very small rate of time poverty among nonemployed women results exclusively from the higher burden of household production that falls upon them. An earlier study using the framework used here found that in Argentina, Chile and Mexico, time poverty among nonemployed women, especially women in income-poor households were much higher than the miniscule incidence among Ghanian women (Zacharias, Antonopoulos, and Masterson 2012:130, Table 4-2).

Table 4-1 Incidence of time poverty by sex and employment status (persons 15 to 70 years of age), Ghana

	Time poverty rate (percent)	Number of time-poor persons (millions)
All	27.3	4.20
Men	18.3	1.31
Not employed	0.0	0.00
Employed	23.4	1.31
Women	35.0	2.89
Not employed	0.3	0.01
Employed	47.4	2.89

For employed persons, hours of employment will naturally play a crucial role in determining the likelihood of a person incurring time deficits. We found that roughly one-third of men and women were employed for 36 to 50 hours per week—what may be considered full-time work (Figure 4-1). The proportion of those who work more than 50 hours is higher among men than women while the proportion of those who work less than 36 hours is higher among women than men. Occupational segregation, women's "choice" of jobs with lower hours to meet care responsibilities, educational disparities that reduce women's access to professional jobs and pervasive discrimination that force women into jobs with contingent hours are probably among the key factors that are at work here. There is also a marked contrast between the urban and rural areas: The proportion of those who work more than 50 hours is higher in the urban areas while the proportion of those who work less than 36 hours is higher in the rural areas. Most of this difference may be driven by the sectoral composition of employment, namely, the preponderant reliance of agriculture as a means of livelihood in the rural areas. Casual labor and seasonal employment are, as is well known, quite prevalent in Ghanaian agriculture. Further, the share of own-account workers (in farm as well as nonfarm occupations) who by choice or necessity engage in lower hours of employment is also higher in the rural areas.

Figure 4-1 Distribution of employed persons by area, sex and hours of employment



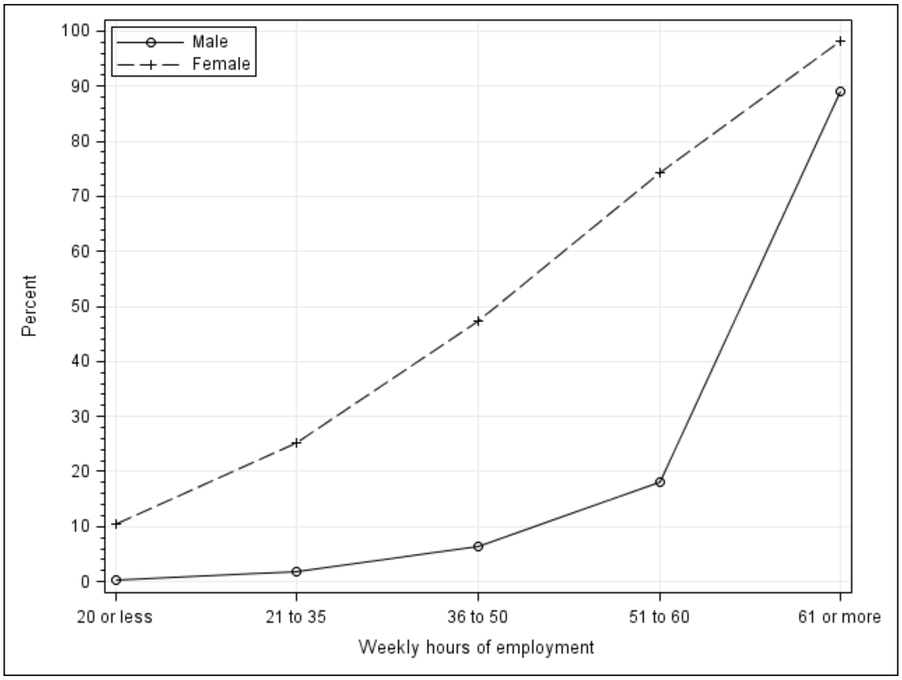
A fairly large proportion of the employed Ghanaians (31 percent) engage in what the International Labor Organization terms as "excessive" hours of employment—more than 48 hours per week.[14] The Labor Act of 2003, in fact, defines "normal" weekly hours as 40 hours per week for employees with labor contracts.[15] Men are more likely to engage in excessive hours than women (36 versus 28 percent) and urban areas witness a greater incidence of excessive hours than rural areas (40 versus 24 percent). We would expect the likelihood of time deficits to be greater with longer hours at the job and this is indeed what we observe in the data (Figure 4-2).

Figure 4-2 Hours of employment and incidence of time poverty: employed persons (percent)

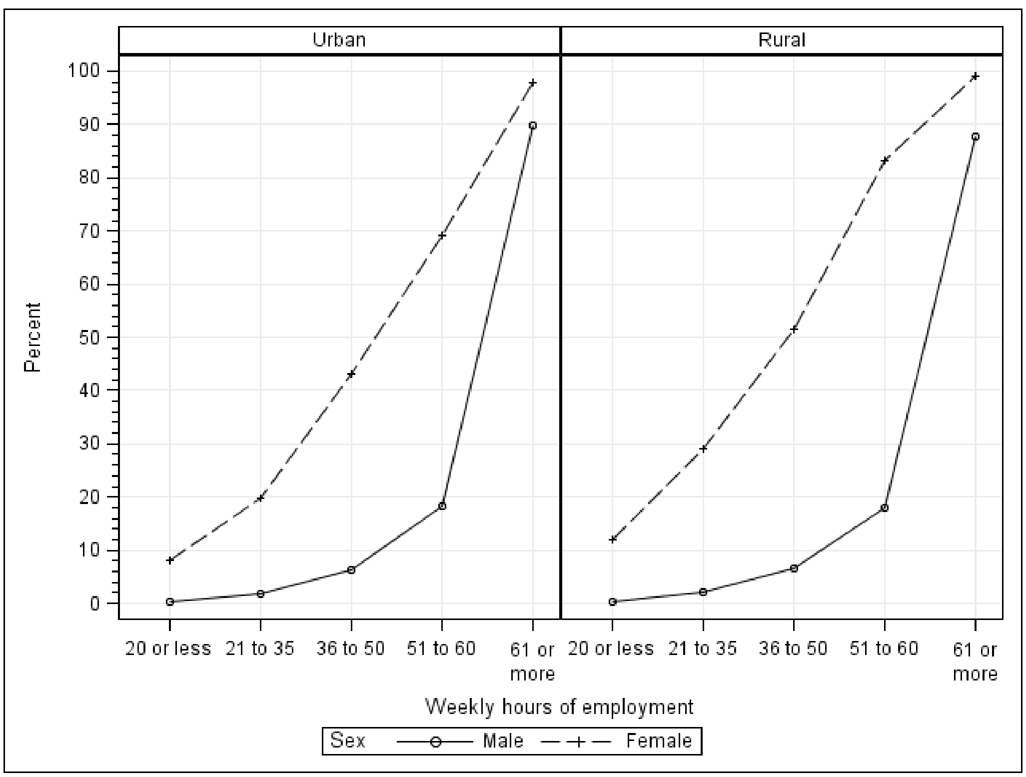
A. All Ghana

[14] Latest available data for other African countries suggest that the incidence of excessive hours in Ethiopia, Morocco, Nigeria and South Africa are respectively, 40, 55, 43 and 25 percent (International Labour Office 2011, p.29, Figure 10).

[15] This information was obtained from the ILO The Database of Working Time Laws, available at www.ilo.org/travdatabase.



B. Urban vs Rural

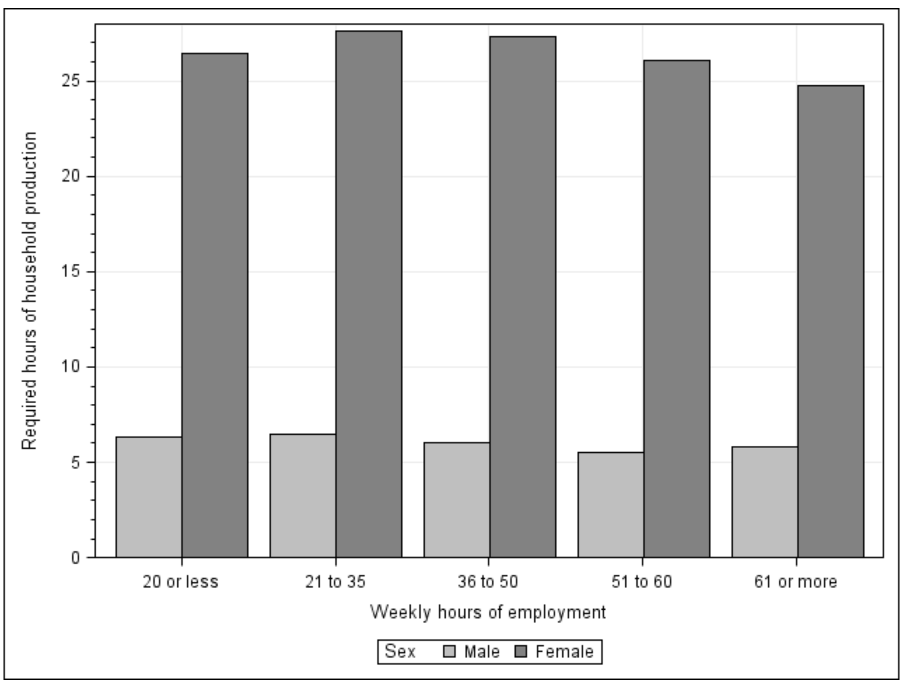


The gender gap in incidence that we already noted (Table 4-1) is evident in every hours interval. In fact, the gap widens with the increase in hours except at the very top interval (61 hours or more) where time poverty is nearly universal among both men and women. We observed earlier that the largest proportion of men and women workers worked 36 to 50 hours per week (Figure 4-1). Here, the rate of time poverty among women was 7.4 times as high as among men (47 versus 6 percent). Rural women appear to be more prone to time deficits than their urban counterparts in every hours interval while no such difference is discernible among men. As a result, the gender gap in the incidence of time poverty among the employed is much higher in the rural areas in every hours interval.

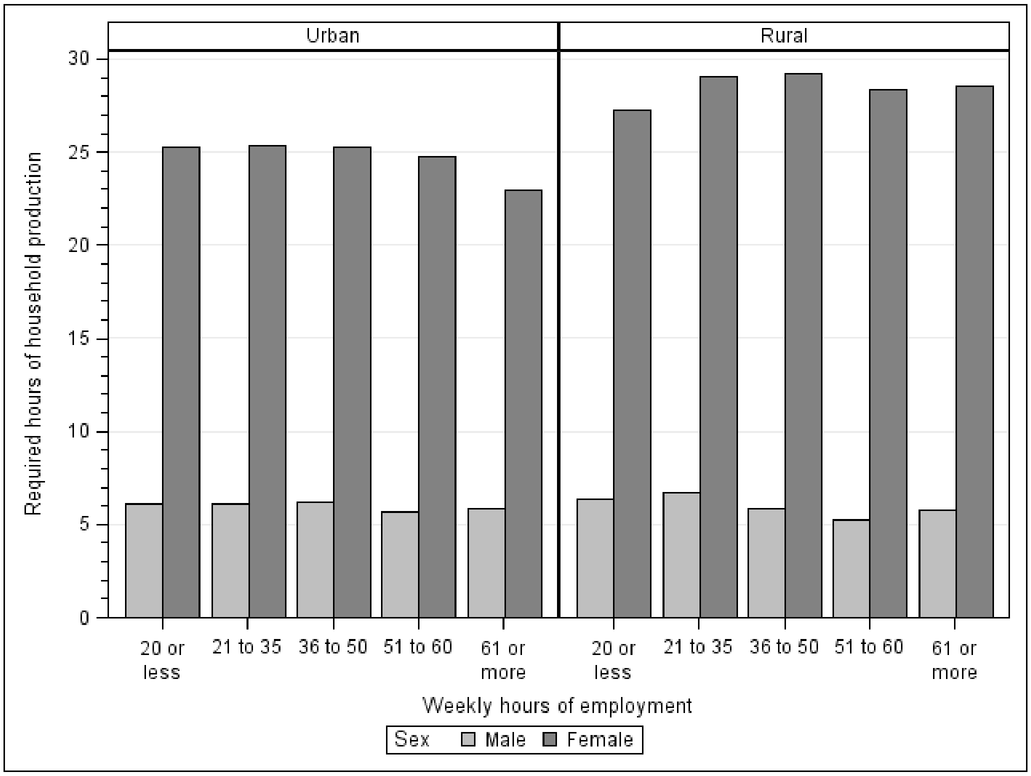
One potential reason behind the difference in the rate of time poverty of one group vis-à-vis another group is the difference in the hours of required household production (see section 3.2). For example, suppose that people with higher hours of employment also faced higher hours of required household production relative to those with lower hours of employment. Then, the larger hours of required household production would also contribute toward a greater risk of time poverty of those who spend longer hours at the job. However, this does not seem to be the case in Ghana. As shown in Figure 4-3, the weekly hours of required household production for women and men show hardly any variation across the intervals of hours of employment. Longer hours at the job rather than higher housework responsibilities appear to lie behind the positive correlation between hours of employment and time poverty rates.

Figure 4-3 Average hours of required household production, by hours of employment and sex: employed persons, Ghana

A. All Ghana



B. Urban vs Rural



On the other hand, there is an enormous disparity between the sexes in the time requirements for household production. Employed women in Ghana need to spend, on the average, 27 hours per week to meet their household responsibilities while their male counterparts need to spend only 6 hours per week on the average. The gender disparity in the division of unpaid work is the explanation for the higher incidence of time poverty among women even after we control for hours of employment. We had earlier noted the higher rate of time poverty among rural employed women *within every bracket of hours of employment* relative to their urban counterparts and no such difference among employed men (Figure 4-2, Panel B).[16] The explanation lies in the greater required hours of household production faced by rural women relative to urban women—29 versus 25 hours per week—and the identical number of hours required of men in both urban and rural areas—6 hours per week. (Figure 4-3, Panel B). What accounts for the existence of the urban-rural differential in the case of women and the absence of such differential for men?

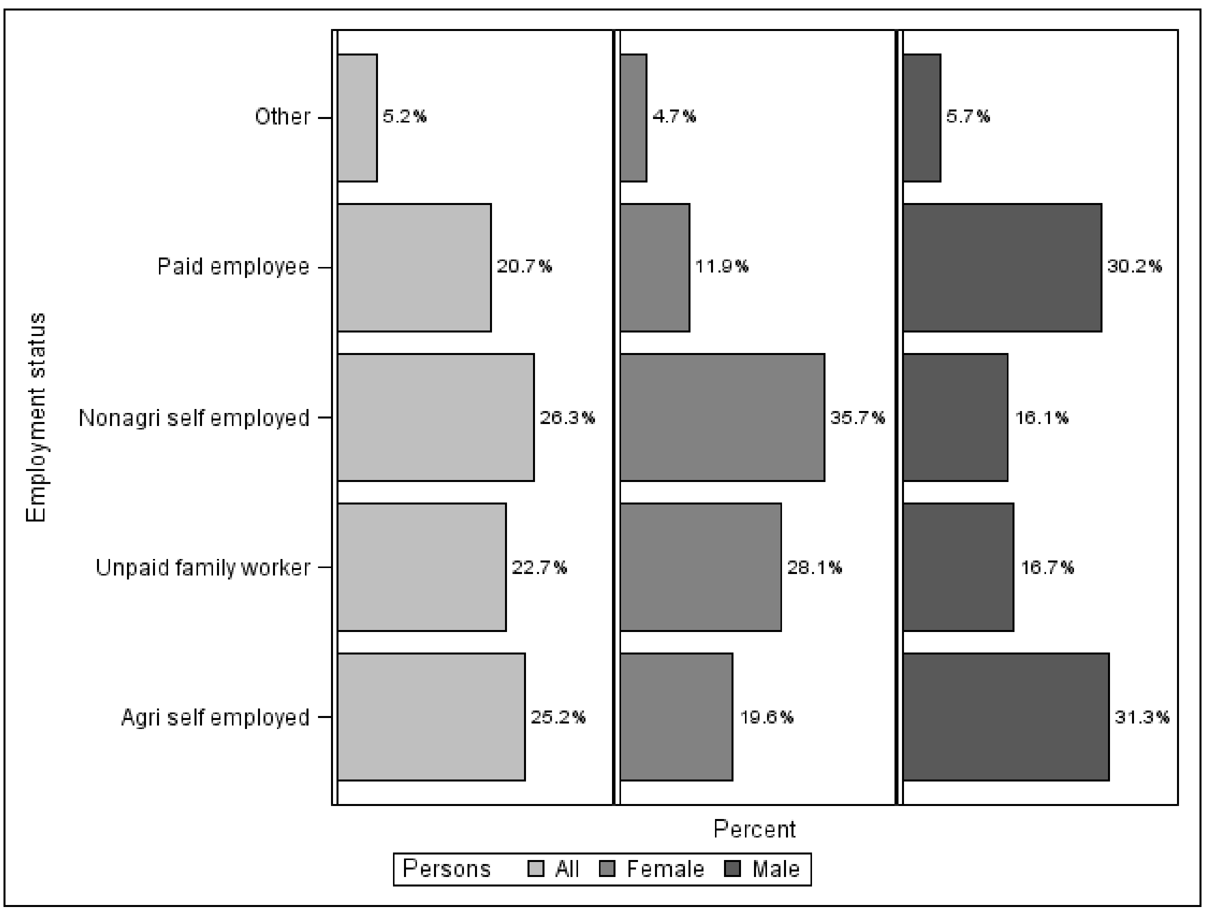
Let us recall that the thresholds for household production hours are set at the *household* level; that is, they refer to the total weekly hours of household production to be performed by the members of the household, taken together. Households tend to have more members in the rural areas and hence the household-level thresholds are higher in the rural areas. On average, the household-level threshold was 45 hours per week in the urban areas and 55 hours in the rural areas. Now, the threshold applicable to an individual in a given household is obtained by multiplying the household-level threshold with the the share of the individual in the observed total hours of household production in their household. The larger-sized households in the rural areas did not appear to have an appreciable effect on diminishing the share of

[16] It is important to note that the urban-rural difference in time poverty is reckoned here after controlling for hours of employment. On average, time poverty rate is higher in the urban than in rural areas because relatively more workers are found in the higher brackets of hours of employment in the urban than in rural areas.

household responsibilities that falls on employed women: the average share of employed women was, respectively, 52 and 50 percent in the urban and rural areas. In contrast, a pronounced diminishing effect was evident for men since the average share of employed men was only 19 percent in the rural areas, compared to 29 percent in the urban areas. It seems like the larger average size of rural households (relative to urban households) has an implication for the gendered intrahousehold division of labor—it tends to reduce the contribution made by employed men to household production while having no such effect on employed women. A demographic difference between urban and rural areas is mediated by gender relations that work in favour of men and results in the higher rate of time poverty among women in rural areas as compared to urban areas, after controlling for hours of employment.

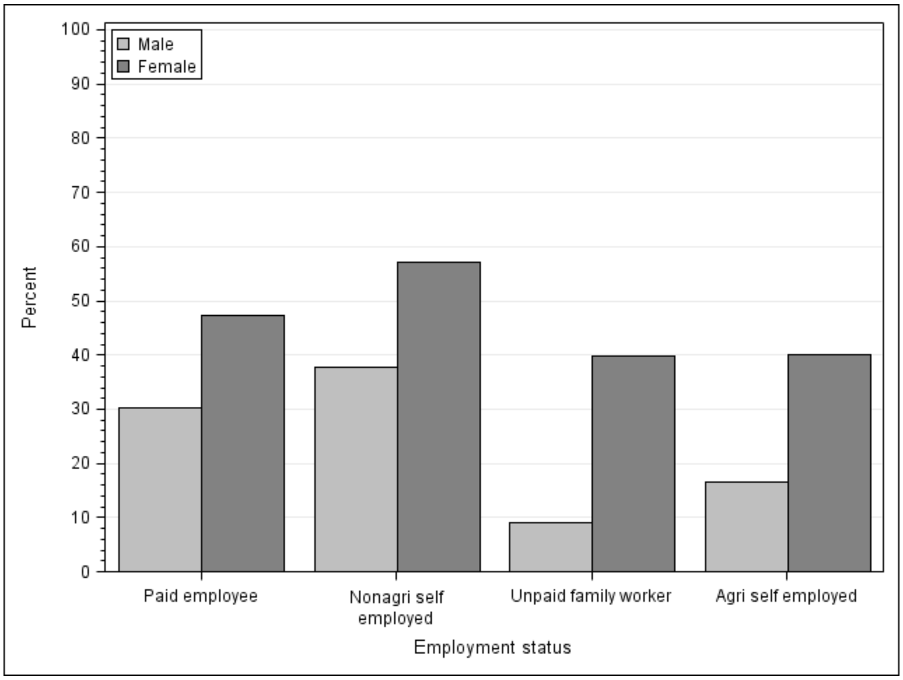
Gender segregation by employment status appears to be a structural feature of the Ghanaian labor market (Heintz 2005). While paid employees and the agricultural self-employed constitute, respectively, 21 and 25 percent of overall employment, they make up notably lower proportions of female employment—12 and 20 percent (Figure 4-4). Employed women were also found more, relative to all employed persons, to be in the status of nonagricultural self-employed (36 versus 26 percent) and unpaid family worker (28 versus 23 percent). Since the share of men and women are roughly equal in total employment, the estimates suggest that men are disproportionately represented in the statuses of paid employee and agricultural self-employed.

Figure 4-4 Percent of total employment in each employment status by sex



The incidence of time poverty was the highest in the category of nonagricultural self-employed for both men and women, followed by the category of paid employee (Figure 4-5). For women, time poverty rate was virtually the same among unpaid family workers and the agricultural self-employed; male unpaid family workers had substantially lower rate than the agricultural self-employed. Within each employment status, there exists a pronounced gender disparity with women much more prone to time poverty.

Figure 4-5 Time poverty rates by employment status and sex (percent)

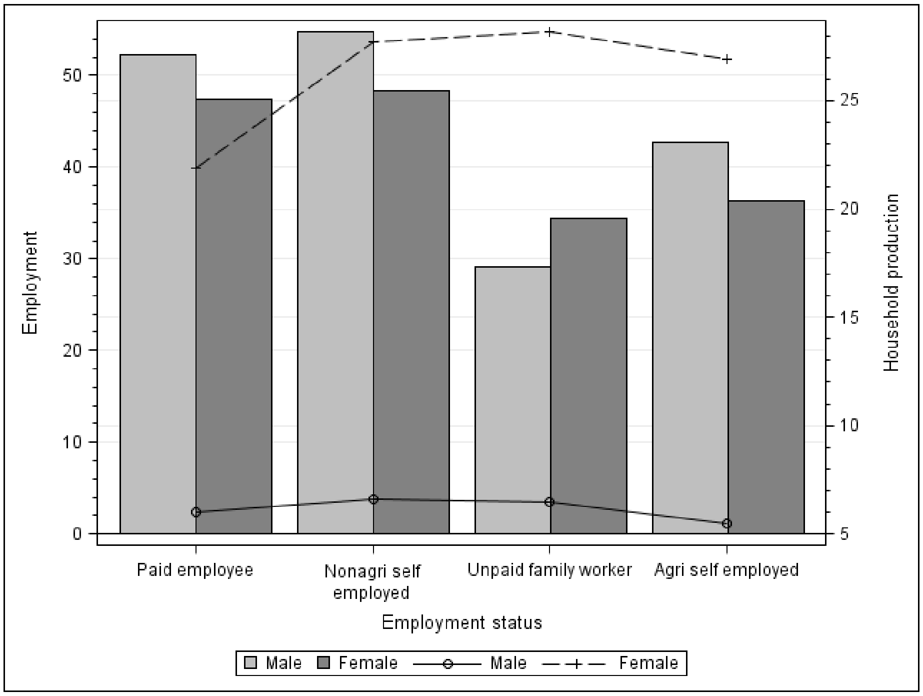


Note: The small category of employment status "Other" is omitted here.

As it turns out, the gender disparity is driven by the greater responsibility of required household production that falls upon women than men (Figure 4-6). While men do engage in more hours of employment than women (with the exception of the category of unpaid family workers[17]), this difference is dwarfed by the difference in hours of household production. For example, consider the case of self-employed nonagricultural workers. Male workers in this category spent, on the average, *seven hours* more than women (55 versus 48); but, women spent *21 hours* more on meeting the household production requirements (7 versus 28). The ordering of time poverty rates across categories of employment status coincide with the ordering of hours of employment for men because their household production requirements display little variation across categories. This holds true for women too, with the exception of women employed as paid employees who faced considerably lower required hours of household production than women in other categories.

[17] Roughly 90 percent of male and female unpaid workers were employed in agriculture. It appears that males bear this status by and large during their youth while for women it may very well be over their entire employed life. This is reflected in the huge gap in the average age by sex among these workers: 21 years for men vs 31 years for women. The age gap suggests that the difference in their hours of employment reflects the greater responsibilities that fall upon the older women in the running of the household farm compared to the younger men.

Figure 4-6 Average weekly hours of employment and required household production, by employment status and sex



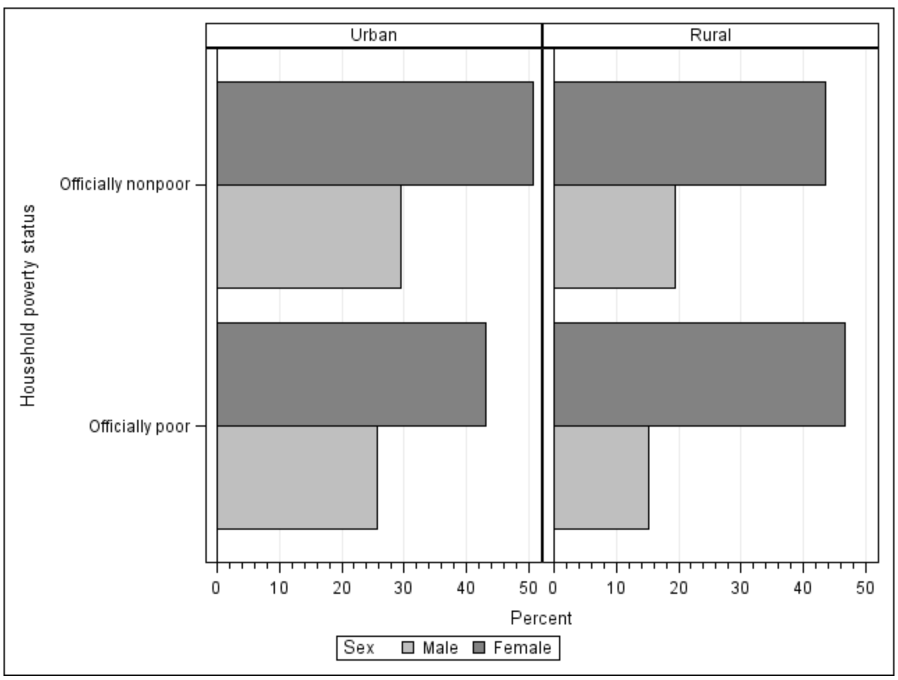
Note: The bars indicate hours of employment (left vertical axis) and endpoints of lines indicate hours of required household production (right vertical axis). We have omitted the small category of employment status "Other" here.

Our measurement framework suggests that their lower (individual) household production requirements could, in principle, stem from lower household-level requirements and/or their lower relative contribution toward meeting the household-level requirements as a result of a more egalitarian division of domestic labor. Some available research suggests that women gain greater control over the household decision making process with better employment (in terms of pay and social standing) because it translates into greater economic empowerment. Assuming that, typically, a paid employee is in a better employment situation than a self-employed worker or unpaid family worker allows us to examine this intuition using our data. We do so by comparing some relevant statistics for female paid employees with the group formed by combining the self-employed women and female unpaid family workers in our sample. The latter group is referred to as "nonwage workers" for short.

Our estimates show that the lower average hours of required household production borne by female paid employees was not due to their lower share in the household-level requirements of household production. That is, they are not privileged to a more egalitarian division of household production. The average value of the individual's share in household-level requirements was actually higher for female paid employees than female nonwage workers (56 versus 50 percent). However, the average value of household-level requirements was lower for female paid employees than female nonwage workers (47 versus 59 hours per week). This lower threshold translated into lower average hours of required household production for female paid employees. As discussed in section 3.2, we used 12 household-level thresholds depending on the number of adults and children (Figure 3-1). Inspection of our data showed that the combined proportion of the larger sized groups (two adults with three or more children and three or more adults with three or more children) among females paid employees was only 20 percent as compared to 40 percent among female nonwage workers. On the other hand, female paid employees were three times as likely to live alone than female nonwage workers (12.6 versus 4.2 percent). These findings indicate that compared to female nonwage workers, female wage workers may possess greater degree of control over decisions regarding marriage and fertility, i.e. over the size and composition of their household. The latter tends to be such that the average hours of required household production fall considerably below that of female nonwage workers.

We next turn to examine the incidence of time deficits by official poverty status. The latter is defined according to poverty lines specified in terms of minimum necessary consumption expenditures. As is customary, consumption poverty is a household-level concept; that is, every individual that lives in a consumption-poor household is considered as consumption-poor. Time poverty was somewhat higher among the nonpoor than the poor employed persons for Ghana as a whole (37 versus 32 percent). However, when we break down the time poverty rates also by area of residence (rural/urban) and sex, it emerges that this pattern does not hold for rural employed women (Figure 4-7). The gender disparity that we observed earlier in the incidence of time poverty is visible within the consumption-poor and consumption-nonpoor groups.

Figure 4-7 Time poverty rates by official poverty status, area of residence and sex (percent), employed persons (15 to 70 years of age), Ghana



The rationale for our adjusted poverty thresholds lie in the differential impact of time deficits (see Section 3.3). For some households, time deficits could be potentially “bought off”, i.e. the required household production services could be replaced by its market substitutes, because they have the resources to do. Such a course of action is generally not feasible for households who already fall below the official poverty line without falling deeper into poverty. A sizeable proportion of poor urban and rural employed women (43 and 47 percent, respectively) live in such households; given the gender disparity in the incidence of time deficits, it is not surprising to find that a smaller share of poor employed men belong to such households (26 and 15 percent in urban and rural areas, respectively). Furthermore, there may be other time-poor households who are officially consumption-nonpoor but would actually appear to be consumption-poor if they attempt to buy off their time deficits ("the hidden poor").

To contextualize the importance of hidden poverty for employed people, it is useful to begin by considering the picture conveyed by using the official poverty thresholds. Poverty among employed individuals (15 to 70 years of age) is heavily concentrated in the rural areas. While the employed population is split almost evenly between the urban and rural areas, 80 percent of the employed poor live in the rural areas. This is also reflected in the official poverty rates. Working poor amounted to 22 percent of all employed individuals for Ghana as a whole; in the rural areas, however, the incidence of poverty was almost *four times* as high as the urban areas (35 versus 9 percent). Within urban and rural areas, there was hardly any gender disparity in the working poverty rate (Table 4-2).

Table 4-2 Poverty among employed persons (15 to 70 years of age): Official vs. Adjusted

	Poverty rate (percent)			Number of poor persons (millions)		
	Official	Adjusted	Hidden	Official	Adjusted	Hidden
Urban	9.2	16.2	7.0	0.53	0.93	0.40
Male	9.5	15.9	6.4	0.26	0.43	0.17
Female	9.0	16.4	7.4	0.27	0.50	0.23
Rural	34.7	43.8	9.1	2.06	2.59	0.53
Male	34.1	42.7	8.6	0.98	1.22	0.24
Female	35.3	44.8	9.5	1.08	1.37	0.29
Ghana	22.2	30.2	8.0	2.59	3.52	0.93
Male	22.1	29.6	7.5	1.23	1.65	0.42
Female	22.2	30.7	8.5	1.35	1.87	0.52

Note: The numbers in the column "Hidden" are obtained by subtracting the numbers in the column "Official" from those in the column "Adjusted".

Once we accounted for time deficits, the measured poverty rate among the employed increased dramatically by 8 percentage points to 30 percent (representing an increase of nearly a million people to the ranks of the working poor). The urban-rural gap in poverty rate is a little bit diminished but still very sizeable (44 versus 16 percent). However, the greater relative increase in the urban poverty rate led to a lesser measured rural bias in poverty as 26 percent of the poor are now urban. This reflects the disproportionate share of the urban areas (43 percent) in the hidden poor. Just as with the official measure, our measure also indicates a virtual absence of gender disparity in the incidence of poverty among the employed.

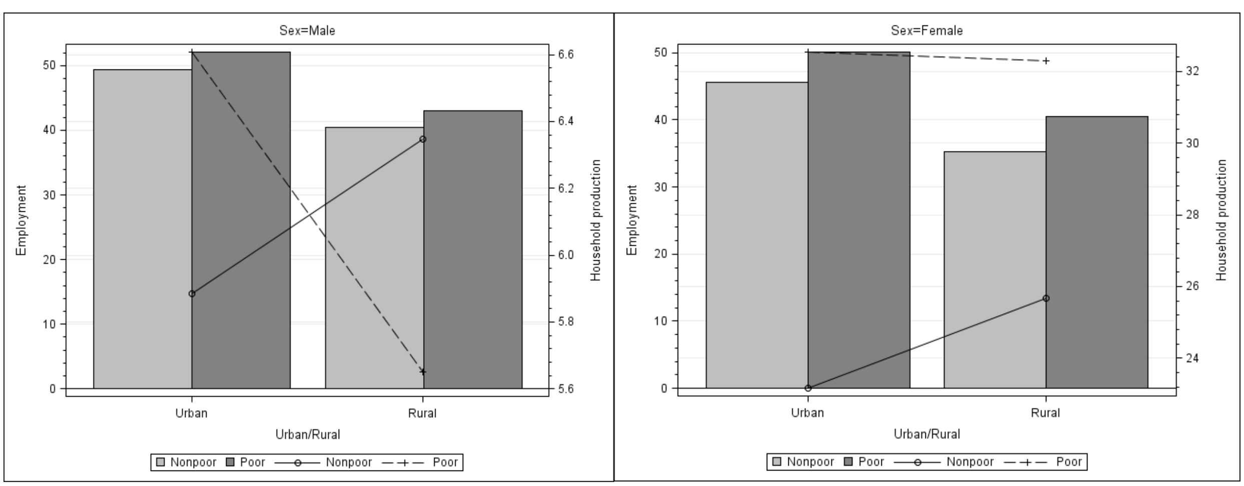
Accounting for time deficits in the measurement of consumption poverty allows us now to examine the joint distribution of time and consumption poverty among the employed (Table 4-3). First, the double bind of time and consumption poverty afflicts women more than men in both rural and urban areas. The double bind is borne by 24 and 10 percent of women respectively in the rural and urban areas compared to 8 and 6 percent among men in respectively rural and urban areas. Second, the incidence of time poverty is notably higher among the consumption-poor than consumption-nonpoor for men and women in both the urban and rural areas. This contrasts sharply with the finding, on the basis of the official poverty measure, that time poverty rates are generally higher among the nonpoor than the poor (Figure 4-7).

Table 4-3 Distribution of employed persons (15 to 70 years of age) by LIMTCP and incidence of time poverty

	LIMTCP classification of individuals (percent)					Time poverty rate (percent)	
	Consumption-poor and time-poor	Consumption-poor and time-nonpoor	Consumption-nonpoor and time-poor	Consumption-nonpoor and time-nonpoor	Total	Nonpoor	Poor
Urban	8.2	8.0	32.0	51.8	100	38.2	50.5
Male	5.7	10.2	23.5	60.7	100	27.9	35.8
Female	10.4	6.0	39.6	43.9	100	47.4	63.2
Rural	16.5	27.3	15.3	41.0	100	27.2	37.7
Male	8.2	34.5	9.7	47.6	100	17.0	19.2
Female	24.3	20.5	20.4	34.8	100	37.0	54.3
Ghana	12.4	17.8	23.5	46.3	100	33.7	41.1
Male	7.0	22.6	16.4	54.0	100	23.4	23.6
Female	17.4	13.3	30.0	39.3	100	43.3	56.6

What is behind the higher time poverty rate of the employed poor, especially among women workers? As we have seen before, the differences are largely driven by differences in hours of employment and required household production. Our estimates show that poor employed women engaged in higher average hours of employment in the rural (40 versus 35 hours) and urban (50 versus 46 hours) areas (Figure 4-8, below). *And*, they also faced higher average hours of required household production than their nonpoor counterparts in both the rural (32 versus 26 hours) and urban areas (33 versus 23 hours). Poor employed men also worked longer average hours in employment than nonpoor employed men (by about three hours) but the gap in average hours of required household production was rather small (under 40 minutes per week).

Figure 4-8 Average weekly hours of employment and required household production, by sex, area and adjusted consumption poverty status



Note: The bars indicate hours of employment (left vertical axis) and endpoints of lines indicate hours of required household production (right vertical axis).

The fact that the employed poor women engage in higher hours of employment is consistent with the commonplace observation that the strategy of eking out a livelihood by working long hours at relatively low-productivity employment is widely prevalent among them. As for the other factor behind their long workweek, required household production, we should examine the differences between poor and nonpoor women in household-level requirements of household production and intrahousehold division of household production responsibilities.[18] We found that the main force at work here was not the latter but the former.

Nonpoor employed women lived in households with lower average household-level requirements of household production than poor employed women (Table 4-4). But, the share of household-level requirements that women shouldered were not, on the average, notably different by poverty status and hovered around 50 percent. In turn, the lower household-level requirements of household production among the nonpoor may reflect their lower average household size. The number of adults as well as children per household is higher among the poor, though the larger difference is to be found in the number of children. As we saw while discussing the differences among women by employment status, the complex relationship between fertility decisions and economic empowerment also appears here and requires further examination. It is worthwhile to note however the sharp contrast between poor and nonpoor women in terms of their employment status. About a third of all poor women work as unpaid family workers compared to only 14 percent of nonpoor women; on the other hand, only under 5 percent of poor women are paid employees in contrast to 15 percent of nonpor women. Pathways out of consumption poverty *and* time poverty are thus likely to be tied partly to expansion of decent wage employment for women. Of course, public investment in the provisioning of care and infrastructure (e.g. water supply) that benefits disadvantaged groups can also alleviate the impoverishing effects of time deficits via lowering the thresholds of required household production.

Table 4-4 Factors affecting employed women's required hours of household production

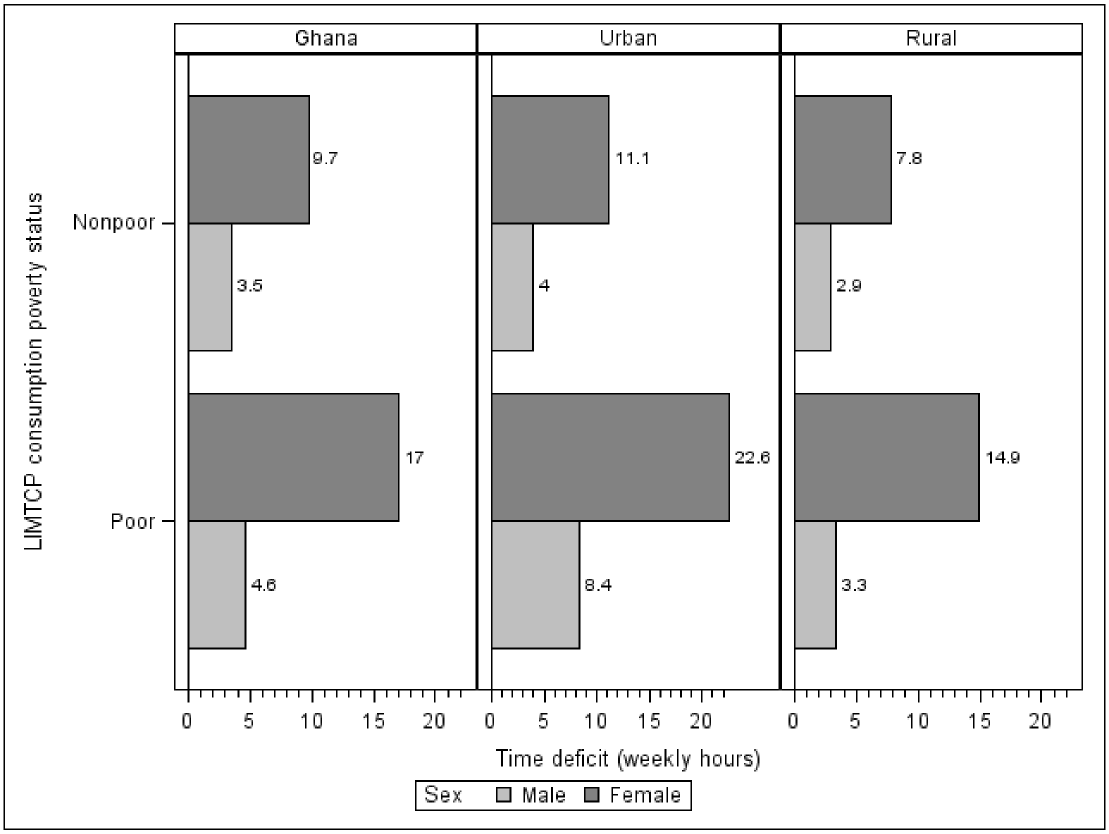
Average values	Urban		Rural	
	Poor	Nonpoor	Poor	Nonpoor
Household's required household production (weekly hours)	68	50	71	54
Number of adults	2.50	2.27	2.67	2.33
Number of children under 18 years	3.02	1.78	3.35	2.10
Individual's share in the household's required household production (percent)	51	52	47	53

The stark gender disparity among the employed poor in the incidence of time poverty, with women facing a much higher rate of time poverty than men is mirrored in the size of the time deficits (Figure 4-9). Indeed, our estimates showed that, for Ghana as a whole, the weekly time deficits of poor women were about *3.7 times* higher than that of poor men (17 versus 5 hours per week). Women in the ranks of the urban working poor emerge as the worst-off group with the average shortfall among them amounting to

[18] It may be recalled that we used the same procedure to diagnose the contrast between female paid employees and nonwage workers earlier (see above the discussion following Figure 4-6).

almost a full day (23 hours) per week. Nonpoor men and women incur lower time deficits than their poor counterparts—just as they did more favorably in terms of rates of time poverty.[19]

Figure 4-9 Time deficit of employed men and women (average weekly hours) by LIMTCP poverty status



Because time poverty is almost absent among the nonemployed, we can consider the rate of time poverty of a population subgroup as approximately equal to the time poverty rate of the employed members of that group multiplied by the employment rate of that group. While there is some gender gap in employment rates, nationally as well as within urban and rural areas, the rural-urban gap in employment rates are relatively larger. This suggests that we should pay greater attention to the differences in employment rates when we compare the incidence of time poverty for the population as a whole in rural and urban areas.

5 Employment Simulation

Consumption poverty in Ghana is certainly not the result of individuals' lack of economic activity. Some emphasis has been given to the relative efficiency of the uses to which households' labor power is put.

[19] Our findings regarding the disparities in time deficits remain qualitatively unchanged when we compare the averages for only time-poor individuals rather than all individuals. For example, the average values of time deficit for time-poor men and women were respectively 20 and 30 hours per week.

Can a switch from agricultural production for own consumption to paid employment provide a way out of poverty for consumption poor households? We attempt to answer this question with a microsimulation exercise, based on similar exercises we have done for other countries (Zacharias, Masterson, and Kim 2009; Antonopoulos, Masterson, and Zacharias 2012).

It must be stressed that *this simulation is not an attempt to model a full-employment situation*, in which all of the job recipients are moved into paid labor as a result of some job-creating policy intervention or economic growth process. Rather it is an estimation for each time-adjusted consumption poor household of the impact on that household of all able-bodied and available adults in that household not currently working more than ten hours per week for pay moving into paid employment. The results we present below are aggregate impacts for regions and individuals. As such they tell us, for example, the percentage of individuals that could move out of time-adjusted consumption poverty if all the adults in their households moved in to paid work, not the reduction in poverty produced by a policy that produces paid employment for all adults. Before we get to the results, we outline the method used.

5.1 Simulation Methodology

The purpose of the simulation exercise is to estimate the real impact on time and consumption poverty of some policy aimed at alleviating poverty through the promotion of *paid employment*. Any such shift into paid employment entails not only changes in household earnings from paid work and the distribution of time allocated to necessary household production in affected households, but also a shift away from time spent on productive activities already being carried out by members of consumption-poor households on the family farm or in a family business enterprise. In previous simulations we rejected job assignments if the resulting changes in individuals' earnings were negative (if the individual was already doing paid work, but we attempted to assign full-time employment, for example), since we were attempting to estimate the effect of voluntary, not mandatory, paid employment. In this simulation we compare the new earnings from the simulation not only to actual earnings but also to the contribution of the individuals receiving the paid job to their households' farm and nonfarm income.

An employment simulation always requires a series of several intermediate steps to complete. For this project, we incorporated a new step into our employment simulation model: estimating the contribution of each individual in the simulation to household farm income and nonfarm business income. This estimate is used to compare the gain in earnings from a possible switch to paid employment in order to assess whether it would be worthwhile for each individual to make the switch. We now specify in detail the steps we took to produce the simulation estimates.

The first step is to identify the donor and recipient pools for job assignments. We first determine which of the individuals in the base data set is eligible for the analysis. By eligible we mean between the ages of 18 and 70 and not in school, retired, or disabled. This step reduces the number of records to 36,146 (representing 13,624,024 people) from the total of 71,717. We next separate the eligible individual records into potential donors and recipients. The recipients are those who may be assigned a paid job in the simulation. These are individuals in LIMTCP poor households who are: not employed in any capacity; working for pay for less than 10 hours per week; or working in an actual primary activity other than paid employee or apprentice. The latter categories included "Non-agricultural contributing family worker," "Agricultural self-employed without employees," or "Agricultural contributing family worker."[20] The majority of the potential recipients were those who were working in unpaid work (95 percent). The donor pool consists of those individuals who are currently working for pay for 10 hours per week or more as their primary activity.

Next, we estimate separate production functions for farm and non-farm family business income for each household engaging in these activities. The results of these models will be used to estimate the reduction in output due to each individual potential recipient's leaving the family farm or business to take up paid employment. We estimate a *log-linear* production function defined as

$$\ln Y = \alpha + \boldsymbol{\beta} \ln \boldsymbol{L_F} + \gamma_1 \ln L_H + \gamma_2 \ln H + \gamma_3 \ln K + \gamma_4 \ln X + \boldsymbol{\varphi Z} + \mu$$

Where $\ln Y$ is the natural log of the value of total output, $\boldsymbol{lnL_F}$ is a vector of the natural log of the amount of family labor used by age categories[21] and sex, $\ln L_H$ is the natural log of the amount of hired labor, $\ln H$ is the natural log of the amount of land operated (in the case of farm businesses), $\ln K$ is the natural log of the amount of capital employed, $\ln H$ is the natural log of the value of other inputs into production, $\boldsymbol{Z}$ is a vector of household characteristics, including dummies for agro-climatic zone (in the case of farms), region, rural/urban status, age, sex and education level of the household head.[22]

We then estimate the contribution to production of each individual. First, we predict the level of output for each farm/business using the results of the regression. Next, we calculate the level of operating expenses per weekly hour of family labor employed. Then, for each individual in the household that works on the farm or in the business: we subtract their weekly hours worked from the household total for their age-sex category and we subtract the amount of inputs (operating expenses) for their hours of work. Then we predict the output for that household *at the individual level* using the same regression results with adjusted household totals. Subtracting this result from the overall household prediction produces an estimate of the gross contribution of each individual family worker to gross output. We scale the sum of all the individual contributions in the household to equal the actual gross output for the household and then subtract (for each individual), the cost of the operating expenses that would not be used due to their not working on the farm/business.[23] The result is an estimate for each individual of their net contribution to the family farm or nonfarm business enterprise.

The next step in assigning jobs to recipients is to determine what are the likeliest industry and occupation for each of the potential job recipients. This is done using a multinomial logit procedure. Industry and occupation are regressed on age, age squared, sex, rural/urban status, education and geographic region in the donor pool. The likelihood for each industry and occupation is then predicted in the recipient pool, using the results of the multinomial logit. Then each recipient is assigned the industry and occupation corresponding to the largest predicted likelihoods.

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[20] From Section 4, part A, question 20 of the GLSS 6: "What was the status of (NAME) in this job?"

[21] The six categories are: less than 18 years old, 18 to 24 years old, 25 to 44 years old, 45 to 64 years old, and 65 or older.

[22] Using a translog or quadratic log function greatly increased the complexity of the regression without adding appreciable to the explanatory power of the estimated coefficients.

[23] We assumed here that the relationship between operating costs (inputs) and family labor inputs is linear.

We then impute the earnings and usual weekly hours of paid work using a three-stage Heckit procedure (Berndt 1996, p. 627), separately for each combination of four age categories[24] and sex. The first stage is a probit estimation of labor force participation:

$$lf_i = \alpha_1 + \beta X + \varepsilon_i$$

The vector of explanatory variables, *X*, comprises the number of children aged less than five and the number of children aged six to seventeen 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. The Mills ratio is calculated for all individuals using the results of the first stage regression:

$$\lambda = f\left(\frac{-\hat{lf}}{\sigma_{\hat{lf}}}\right) \Bigg/ \left(1 - F\left(\frac{-\hat{lf}}{\sigma_{\hat{lf}}}\right)\right)$$

Where *f* is the normal density function, *F* is the normal distribution function, $\hat{lf}$ is the estimated probability of labor force participation, and $\sigma_{\hat{lf}}$ is the standard deviation of $\hat{lf}$.

The second stage is an OLS estimate of the log of hourly wage:

$$\ln w_i = \alpha_2 + \gamma_2 Z + \theta_2 \lambda + \mu_i$$

This regression is run only on those that are actually employed for pay. The vector of explanatory variables, *Z*, in this stage 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 donors and recipients from the results of the regression, with industry and occupation replaced for the latter by the industries and occupations assigned in the previous step.

The third stage is a regression of usual hours of paid work per week:

$$h_i = \alpha_3 + \gamma_3 Z + \omega \ln \hat{w}_i + \theta_3 \lambda + \eta_i$$

The regression is once again run only on those in paid employment. The vector of explanatory variables, *Z*, in this stage is the same as the previous stage, with the addition of the number of children aged less than five and the number of children aged six to seventeen in the household in the household. Finally, the imputed wage predicted in the second stage and the Mills Ratio calculated in the first stage are included. Imputed hours per week are predicted for donors and recipients using the results of the regression, replacing the industry and occupation of the latter with their assigned values. The results of the last two stages give us the remaining variables with which we perform the hot-decking procedure to assign actual earnings, hours, industry, and occupation to recipients.

[24] Less than 25 years old, 25 to 34 years old, 35 to 54 years old, and 55 and older.

We can now assign earnings, usual hours of work, industry, and occupation to those individuals in the recipient pool. The assignment method is statistical matching with hot-decking (Andridge and Little 2010). The matches are performed within cells formed from combinations of age, sex and educational attainment. The variables used to assess nearness of match are family type, spouse's labor force status and educational attainment, assigned industry and occupation, the number of children aged less than five and the number of children aged six to seventeen in the household, and the two imputed variables, log of wage and hours worked. We use affinity score matching, which allows us to weight the matches of each of the matching variable by importance. Industry and occupation are the most heavily weighted variables, followed by imputed hours and wage. After these, we weight family type and spouse's full-time/part-time status, then marital status and spouse's education and labor force status, and then the variables detailing the number of children in the household. Matches are drawn randomly from all those donor records with the highest affinity score for an individual recipient. Industry, occupation, earnings and hours from both the donor's primary and secondary activity are transferred to the recipient.

Once the hot-decking is finished, we compare the earnings each recipient gets with the net value of lost production, calculated as described above. We cancel any assignments with a large enough negative impact, and for the rest adjust income from household farm/business. We define the cutoff for a 'large enough' negative impact using the ratio of the simulated earnings to the recipient's estimated net contribution to family farm/business output plus reported individual earnings. For those individuals for whom this ratio is less than 75%, we reverse the results of the simulation. The rest of the recipients remain in the 'adjusted' recipient pool.

Finally, we need to reallocate the shares of required household production in order to recompute individuals' time deficits/surpluses as a result of the simulation. Since individuals' paid/unpaid work hours may have changed as a result of the simulation, we need to adjust the shares of household production for all the adult members of all the households with adjusted simulation job recipients. We use a second round of hot-decking to assign new weekly hours of household production, and new commuting hours to each of the adults, based on updated labor force participation variables for the recipients of jobs in the first stage. The method is the same as the first stage, with the exception of the matching variables used and their relative weighting in the procedure. In this stage, the variables used to assess nearness of match are family type, spouse's labor force status, number of adults, number of children, and the number of children aged less than five and six to seventeen in the household, simulated net household income, the income share of each individual,[25] simulated usual weekly hours of employment and household total simulated hours of employment. All income and labor force variables are updated to reflect the new job assignments received in the previous stage. In this round of hot-decking, the number of children and number of adults in the household are weighted most heavily of all the variables. Next most heavily weighted are family type and income share. Then, the variables detailing the number of young children in the household, followed by net household income, hours of employment and household hours of employment, and finally spouse's labor force status. For each match, the weekly hours of household production are transferred. We now have the income and time use variables necessary to recalculate time and income poverty for recipient households.[26]

[25] Income share is included to reflect changes in bargaining power within the household and its impact on the distribution of household production work.
[26] For details about the results of the stages of the simulation see Masterson, Rios Avila, and Kim (2016).

5.2 Results

Turning to the results, we first remind ourselves that though we speak of simulated poverty rates etc., we really mean the percentage of people who we estimate would remain poor even if all the adults in their household got the paid job they were most likely to get. We first look at the aggregated results of the simulation for the consumption poverty of all individuals (Figure 5-1, below). In terms of consumption poverty reduction, the employment strategy seems to be a success. Both official and time-adjusted poverty rates fall drastically in the simulation. Overall official consumption poverty drops to 9.1 percent from 24.2 percent, while time-adjusted poverty falls from 32.3 to 19.9 percent. The final time-adjusted poverty incidence is still almost as high as the official poverty rate without a simulation. Note that in the capital, Accra,[27] the impact is much smaller than in other urban areas and especially rural areas, where the drop in poverty rates is greatest in relative terms. This owes in no small part to the much lower poverty rate in Accra to begin with. It is important to note that despite substantial reductions in poverty, the phenomenon of hidden poverty remains very important. In Ghana as a whole, hidden poverty has actually increased, to more than ten percent from about eight percent in the actual situation. In Accra, though, there is a slight decrease from 4.3 percent to 4.1 percent. In other urban areas, the hidden poverty rate rises from 8.4 to 9.1 percent, while in rural areas the rate jumps from 9.1 to 14.4 percent. Breaking these numbers down further will help to illuminate what is driving these patterns.

[27] To identify records from Accra, we use the intersection of the Greater Accra region and urban categories.

Figure 5-1 Actual and Simulated Official and LIMTCP Poverty Rates for Individuals by Region

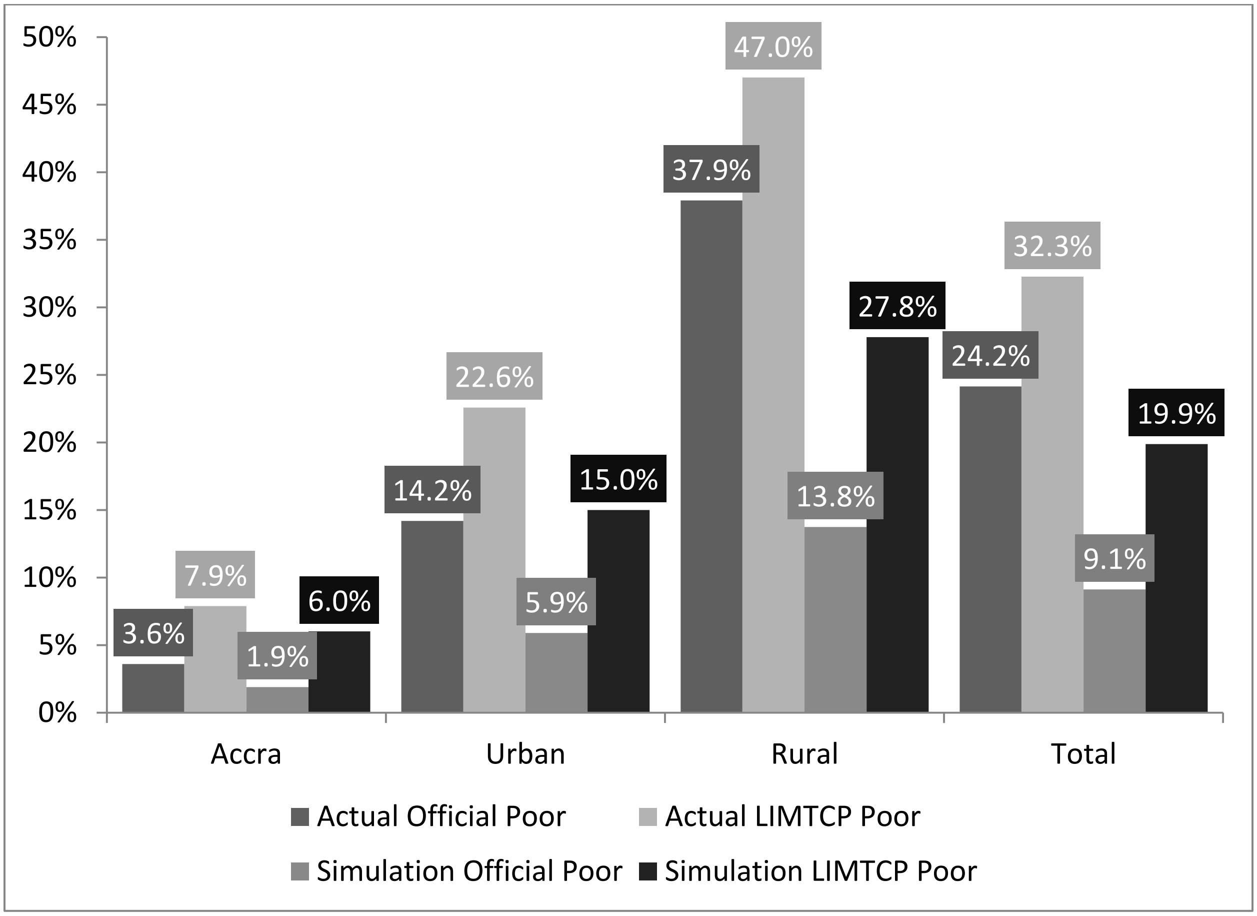

Table 5-1 shows the simulated impact of a transition to paid employment on the consumption and time poverty status of consumption poor employed adults. Most employed adults (55.7 percent) that were consumption poor remained so despite the transition to paid employment. In addition there was an increase in time poverty rates among these individuals from 41.1 percent to 51.8 percent. A majority (65.2 percent) of the individuals who were both time and consumption poor remained consumption poor and of those that escaped consumption poverty, less than one in four also escaped time poverty. Slightly over half of those who were consumption poor and time nonpoor escaped consumption poverty, but nearly a third of those who did fell into time poverty. A fifth of those who did not escape consumption poverty also became time poor in the simulation.

Table 5-1 Simulated Consumption and Time Poverty Status of Consumption Poor Employed Adults

	Consumption and Time Poor	Consumption Poor and Time Nonpoor	Consumption Nonpoor and Time Poor	Consumption and Time Nonpoor
Time Poor	60.8	4.4	26.9	7.9
Time Nonpoor	10.8	38.2	15.9	35.1

Total	31.4	24.3	20.4	23.9

In Table 5-2 we present the distribution of simulation job recipients by their actual time poverty and job status. Of the individuals who received jobs in the simulation, most of them were workers on the household farm, whether unpaid family workers or self-employed farm workers. Almost all of the *time poor* job recipients were farm workers, while among the time nonpoor job recipients a greater proportion of those who were working were also self-employed farm workers. Most of those job recipients who were not working in the actual situation in Ghana were time nonpoor. It is noteworthy that most of the adults in consumption poor households are employed in some capacity (those not receiving jobs were already in paid employment, or would not have received a job that covered enough of their current contribution to the household).

Table 5-2 Simulation Job Recipients by Actual Time Poverty and Job Status

	Time Poor	Time Nonpoor	Total
Not Working	3,572	546,266	549,838
Paid		2,742	2,742
Nonfarm Self-employed	2,113	9,649	11,762
Nonfarm Family	8,397	11,776	20,173
Farm Self-employed	224,956	556,163	781,119
Farm Family	218,696	337,699	556,395
Total	454,162	915,287	1,369,449

Next, we break down the changes in consumption and time poverty status for individuals that received jobs in the simulation, by actual time poverty status and job status (Table 5-3, below). We focus here on the changes of the largest groups in the simulation: farm workers and the non-employed. Among those who were time poor, large proportions (roughly one third) of the family farm workers remained both time and consumption poor in Ghana. A somewhat greater proportion remained time poor but helped their households to escape consumption poverty. Only 21 percent of the self-employed and 13 percent of the unpaid family workers both escaped time poverty and contributed to their household escaping consumption poverty. A smaller proportion of the job recipients that were time nonpoor family farm workers remained both time and consumption poor (roughly 16 percent). About 31 percent remained time poor but helped their households to climb out of consumption poverty. Another 42 percent also escaped time poverty, while 11 percent remained in consumption poverty but were relieved of their time deficits as a result of the simulation. Among the non-working time nonpoor job recipients, the largest share (44 percent) were in households that left consumption poverty and remained time nonpoor. Another quarter of such individuals fell into time poverty as a result of the simulation, but helped their households to escape consumption poverty in the process. So it appears that the greatest impact of a transition to paid employment is for those individuals that are not working.

Table 5-3 Simulation Time and Consumption Poverty Status of Job Recipients by Actual Time Poverty and Job Status

		Consumption and Time Poor	Consumption Poor and Time Nonpoor	Consumption Nonpoor and Time Poor	Consumption and Time Nonpoor
Time Poor	Not Working	46.9%	6.1%	44.7%	2.3%
	Nonfarm Self-employed	83.7%	0.0%	16.3%	0.0%
	Nonfarm Family	31.0%	9.5%	39.5%	19.9%
	Farm Self-employed	31.1%	9.0%	38.7%	21.2%
	Farm Family	36.4%	6.5%	44.2%	12.9%
Time Nonpoor	Not Working	17.2%	12.9%	25.6%	44.3%
	Paid	18.1%	21.8%	6.3%	53.8%
	Nonfarm Self-employed	50.7%	0.0%	24.5%	24.8%
	Nonfarm Family	21.3%	18.1%	17.4%	43.2%
	Farm Self-employed	16.8%	11.7%	30.7%	40.8%
	Farm Family	15.8%	11.2%	31.0%	41.9%

Finally we look at the differential impact of the simulated transition to paid employment by the sex of the individual receiving a job. As, we saw above, three fifths of time poor job recipients remained time and consumption poor and there was little difference between male and female job recipients in this category. However, of those whose households were able to move out of consumption poverty, females were half again as likely to remain time poor as males. Just 10 percent of time poor females became time nonpoor while nearly 19 percent of males did. Of job recipients who were time nonpoor to begin with, females were more likely than males to slip into time poverty as a result of the transition to paid employment. Nearly one third of female job recipients became time poor, while only 23 percent of males did. There was little difference between males and females in the likelihood of exiting consumption poverty in the simulation.

Table 5-4 Simulation Time and Consumption Poverty Status of Job Recipients by Actual Time Poverty and Sex

		Consumption and Time Poor	Consumption Poor and Time Nonpoor	Consumption Nonpoor and Time Poor	Consumption and Time Nonpoor
Male	**Time Poor**	61.7	7.1	19.7	11.5
	Time Nonpoor	9.2	40.2	14.3	36.3
Female	**Time Poor**	60.5	3.4	29.5	6.6
	Time Nonpoor	13.2	35.2	18.5	33.1

As we have seen, the effectiveness of paid employment in alleviating poverty is in serious doubt, especially for those individuals that are time and consumption poor.

6 Conclusion

The results of our study fall into three main points. First, time poverty in Ghana is a phenomenon that is linked to paid employment. Second, consumption poverty is more widespread than the official measure suggests. Third, paid employment is not a guaranteed pass out of consumption poverty. Taken together these points lead to the conclusion that policies aimed at poverty alleviation must take the time necessary for households to reproduce themselves into account in their design.

Time poverty in Ghana is linked to long work hours and unequal sharing of household production for women. Almost all time poor persons are employed in some fashion already. Less than a quarter of employed men are time poor, while almost half of employed women are. Among employed adults, men tend to work more hours. But time poverty rates are higher for women for all categories of length of work hours. Time poverty among women is therefore a combination of work hours and the unequal burden of household production time that falls to them.

Consumption poverty is a much larger problem than the official poverty measure suggests. Nearly one million employed adults in Ghana are not officially consumption poor, but are in households that fall below the time-adjusted poverty line. This hidden poverty increases the poverty rate by 8 percent among all employed adults, with a slightly higher rate in rural areas and slightly lower rates in urban areas. Women are more heavily represented than men among the hidden poor. Given the widespread time poverty among employed adults, one might be tempted to guess that time poverty is a phenomenon limited to those above the official poverty line. Nothing could be further from the truth. Time poverty rates are uniformly higher among the consumption poor than the non-poor.

While most of the time and consumption poor employed adults are not in paid employment, our simulations show that a transition to paid employment will not move most people out of poverty. In fact, a majority of employed persons would remain poor despite all adults in their household working for pay. And while some individuals would escape consumption poverty, most time poor individuals would remain so, and many time non-poor individuals would become time poor. Clearly more than paid employment is necessary to address poverty in Ghana.

Poverty alleviation policy must take time into account. Increased income cannot by itself make up for increased time deficits. These twin deficits can only be addressed by policies that achieve one or more of the following objectives. A first goal is increasing pay for Ghanaians with lower educational achievement. This would increase the probability that transitioning to paid employment could relieve consumption poverty. A second goal is reducing work hours for those that are employed. Long work hours is strongly associated with high rates of time poverty for both men and women. A third objective is providing social infrastructure that can relieve time burdens on household members, especially women. The provision of subsidized child care services is a prime example of this sort of social infrastructure. An extension of this research now being carried out will look into the impact of increased investment in social infrastructure.

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