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Earnings & mobility in three countries**

**GPRG-WPS-060**

**Justin Sandefur, Pieter Serneels and Francis Teal**

**Global Poverty Research Group**

Website: <http://www.gprg.org/>

The support of the Economic and Social Research Council (ESRC) is gratefully acknowledged. The work was part of the programme of the ESRC Global Poverty Research Group.

# AFRICAN POVERTY THROUGH THE LENS OF LABOR ECONOMICS:

## EARNINGS & MOBILITY IN THREE COUNTRIES

Justin Sandefur<sup>a</sup>, Pieter Serneels<sup>b</sup> and Francis Teal<sup>a1</sup>

December 2006

### Abstract

In this note we make use of embryonic labour market panel surveys of the urban sectors of Ghana and Tanzania, and a longer term survey from Ethiopia, to address some aspects of the determinants of earnings across the wage and self-employed and provide preliminary evidence on transitions across labour market states. We argue that the type of panel data presented here provides insights into the growth process in Africa and directly links to understanding the process of poverty reduction.

### 1 Introduction

To understand poverty in Africa it is crucial to understand the performance of the small scale sector, as this is where the vast majority of the poor earn their living. Across the region, evidence from household surveys shows that the largest share of the poor are in the rural sector, which is dominated by very small scale household based farming enterprises. However, rural and urban income distributions have a large overlap with a significant share of the poor in urban areas, typically concentrated in petty trading and self-employment activities. Thus a common factor spanning both peasant farming and the urban informal sector is the link between small scale activities and poverty.

Two broad views as to the links between poverty and the small scale sector can be identified in the literature. The first, which is an old idea (Lewis, 1954) that has made a more recent reappearance (Murphy et al., 1989), is that the fate of the small scale sector is to disappear as an economy takes off into sustained growth. “Virtually every country that experienced rapid growth of productivity and living standards over the last 200 years has done so by industrializing”. These are the opening words of the Murphy et al (1989) paper. The key idea in their analysis of development is that the

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<sup>1</sup> This paper draws on data collected by the Centre for the Study of African Economies at Oxford University in collaboration with the Ghana Statistical Office, Accra and the Tanzanian National Bureau of Statistics, Dar es Salaam over the period from 2003 to 2005. We are greatly indebted to the staff of these agencies for their assistance in organising the surveys and in collecting the data. Neil Rankin now at the School of Economic & Business Sciences, University of the Witwatersrand, South Africa played a key part in the first rounds of the surveys. Trudy Owens of the University of Nottingham was responsible for setting up the work in Tanzania. The surveys have been funded, in part, by the Department for International Development of the UK. Justin Sandefur and Francis Teal are funded by the Economic and Social Research Council of the UK and are members of the Global Poverty Research Group.

<sup>(a)</sup> Centre for the Study of African Economies, University of Oxford, UK. <sup>(b)</sup> World Bank.

transformation of an economy involves a fundamental change in structure such that the scale of organisation increases within an economy. Indeed the change in the scale of firms is a striking feature of any comparison of the industrial structure in Africa with other economies. It is not simply that such poor economies have a large share of the working population in small scale agriculture it is that within the urban sector small scale activities predominate. Such a proliferation of small scale activities is seen as a failure of the process of industrialisation. While many possible sources of such failure have been argued for - a failure to internalise externalities, the lack of an entrepreneurial class, the existence of kleptocratic autocrats with no interest in long run growth or excessive taxation - all have in common the view that the fate of the small scale sector is to disappear with successful development.

In contrast, the implicit view in many policy discussions is that since the poor reside in the small-scale sector, policies which are pro-poor must involve raising the incomes within this sector (World Bank, 2005). A variant on this second view is that while the rural sector may need to contract a key part of a successful development path is a rise in its productivity so that labour can be “released” to the more rapidly growing modern, urban based, sector. In parallel with this concern to raise incomes within agriculture is the policy focus on promoting small and medium scale enterprise in urban sectors as they are perceived to be pro-poor as they provide jobs and are activities which can be entered with very little capital. Promoting such enterprises has been, and remains, a central part of government policies in virtually all poor countries.

Such a characterisation of alternative views is inevitably broad brush and cannot do justice to the many nuances and qualifications that are to be found in the literature.<sup>2</sup> However what appears striking about the literature - both in its academic and its policy guise - is the lack of evidence concerning dynamics both within and across sectors. If it is true that small scale activities are low income activities are they mainly undertaken by the young as part of an investment in skills which leads to higher income later? Alternatively do we mainly find older workers there who, due to changes in demand or opening up an economy to trade, have lost their wage jobs and are forced into a “sink” sector? Unless we know something about the dynamics of movement we cannot know. Documenting the existence of a small scale sector is uninformative as to the extent of its dynamism.

The first view expects the development process to be dominated by moves across sectors and regions, the second hopes to adopt policies which will ensure that transition from low to higher income earnings opportunities occur within sectors. To empirically investigate either of these processes requires a panel dimension to any data. We need to know who is going where to do what. That is in essence the nature of the development process.

In this note we make use of embryonic labour market panel surveys of the urban sectors of Ghana and Tanzania, and a longer term survey from Ethiopia, to address some aspects of the second view. As Kingdon, Sandefur and Teal (2005) document by far the most rapid increase in employment in both Tanzania and Ghana has been in

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<sup>2</sup> The contrast between the Lewis view and that implied by the Harris-Todaro model is given a detailed discussion in Meier and Rauch (2005, pp.360ff).

non-rural self-employment. So one important dimension of the income path followed by an individual is when and how they move between wage and self-employment. The first step though is to ask about movement into *any* earning activities. One implication of the Harris-Todaro model is that “unemployment” in the urban sector in Africa is a search phenomenon, those who are classified as “unemployed” are simply waiting for the higher earning wage jobs so the role of “unemployment” is to establish an equilibrium between the expected wages across the urban and rural sectors. In section 3 we present the evidence we at present have about both movements into earning activities and, within earning activities, between the self-employed and wage earners.

In the next section we ask two preliminary questions of the cross-section data. Is it true that incomes among the self-employed are lower than those of wage employees and if so by how much? Is it true in the cross-section that earnings growth through experience and tenure differ across those in self-employment and those in wage employment? As at present we only have answers to these questions from the cross-section we cannot know if the pattern is driven by movement across jobs or changes within jobs. We will conclude this paper with a discussion of just how important it is to know which of these processes is driving the substantial earnings growth we do observe in the cross-section data.

## **2 What are earnings in alternative jobs?**

If movement across activities is an important part of the process of income growth at the individual level then a necessary prelude to understanding such processes is the need to know incomes in alternative occupations. Most work on incomes has focused on wage incomes for the very obvious reason that measuring such incomes is relatively straight forward. However, as has been widely recognised, such a restriction makes virtually useless comparisons across sectors as wage employment is a far smaller proportion of the workforce than is self-employment.

In this section we set out earnings functions for Ghana, Tanzania and Ethiopia for both wage and self-employment. The recorded incomes for wage employees will include an element of the returns to human capital while the self-employed incomes will include the returns to both human and physical capital. As is well known a substantial part of wage dispersion cannot be explained by observed human capital, Mortensen (2005). How much of this is due to unobservable skills, efficiency wages, rent or risk sharing among firms or a process of job search with job matching frictions is a major part of the research agenda for empirical labor economics.

From a policy perspective it matters a lot which of these factors are the most important in explaining the income dispersion we observe among both the wage and the self-employed. If the key is the unobserved skills of the worker then the education and training which imparts those skills becomes a key policy issue for raising incomes. If it is a process of sorting among firms in which firm characteristics play a major role in the income determination process then changes in the industrial structure in the economy will have a direct impact on the process of incomes and their dispersion.

The data for Ghana and Tanzania are from the 2004 and 2005 rounds of the Ghana and Tanzania Household Worker Surveys. Both surveys were based on a representative sample of the working age (15-60 yrs.) population in major urban areas (for Ghana: Accra, Tema, Kumasi, Takoradi and Cape Coast; for Tanzania: Dar es Salaam, Tanga, Iringa, Arusha, Mwanza and Morogoro). While for both countries recall data was collected about the job histories of the workers interviewed that job history is not used in this note. For earnings we confine attention to earnings in the summers of 2004 and 2005.

For Ethiopia the data is taken from urban labor force surveys for two years - 1994 and 2000. The survey instrument in Ethiopia collected self-employment incomes from female headed households differently from that for own account workers who are predominantly male (about 70 per cent). As will be apparent from the Tables this creates a large gender based differential for the self-employed in Ethiopia. We cannot be sure how much of this is a true gender differential and how much is due to the difference in the survey instrument. We control for this by a dummy for female headed households in the Ethiopian regression. While recognising the problems this poses for interpretation our purpose in comparing across the three countries is to draw attention to some of the remarkable similarities which appear to exist both across countries and across the wage and self-employment sectors. Indeed it is part of our purpose to argue that the measurement of self-employment incomes is a key task if the poverty implications of changes to the urban labour force in Africa are to be understood.

We set out the descriptive statistics on which our earnings functions will be based in Tables 1 and 2. Table 1 provides an overview of the earnings data across the three countries in US\$. As the distributions are highly skewed we focus on the medians as a better measure of central tendency than the mean. These median incomes are remarkably similar across the four occupational classifications we have sought to identify from the data - civil servants, private and public sector enterprise workers and the self-employed. Only in Ethiopia is the median for the self-employed markedly below that for wage workers and that may reflect the measurement issue to which we have already referred.<sup>3</sup>

In Table 2 we present the summary statistics on which the regressions in Table 3 will be based. Education is defined as years of education, age is the age of the worker at the time of the interview and tenure is the length of time in their current "job" in years. For the self-employed the variable "employees" is the number of employees in the enterprise run by the self-employed "owner". For wage workers we include a dummy for whether or not the worker is a manger and we also include the log of firm size.

Using this data in Table 2 we report earnings functions for both the self-employed and for wage earners. In the pooled regressions (Columns [1], [4] and [7]) we identify a wage dummy for the three categories of wage worker identified in Table 1. As the pooled regression also includes the log of firm size it needs to be noted that the coefficient on these dummies can only be interpreted conditional on firms of a given

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<sup>3</sup> If female household enterprises (who were administered a separate questionnaire) are removed from the sample, the mean and median of self-employment incomes in Ethiopia are US\$ 145 and \$56 respectively.

size. This is an important point to which we will return when discussing the distributions of the earnings.

From these cross-sections we can see how both human capital characteristics and the nature of the work place are correlated with earnings. In Figure 1 we show how earnings vary with age and tenure for the three countries imputed from the results in Table 3. The shape of the age earnings profile is broadly similar across all the countries and is concave as is found in virtually all such data. What is striking about the age earnings profile for both Ghana and Ethiopia is how steep it is. Over the twenty years from 15 to 35 earnings rise by nearly 80 per cent both countries. There is a rise in Tanzania but it is less steep and less precisely estimated. Figure 1 also shows the tenure profile which is rising over the early part of the working life-cycle for all three countries. The Figure is confined to the average across both wage earners and the self-employed. What seems striking from Table 1 is that such steep profiles are not confined to wage earners. Indeed as the pooled sample is dominated by the self-employed the age earning profiles shown in Figure 1 are effectively those of the self-employed. Something is driving up earnings in both wage and self-employment over the age range from 15 to 35 and understanding the source of these rapid rises in earnings is key to understanding how much poverty status may decline as an individual acquires more work experience. The earnings functions also imply that there are not significant differences in the shape of the earnings education profile across the wage and self-employed in Ghana and Tanzania and that this profile is convex not concave in both sectors (see Söderbom (et al) (2006) for extensive tests on wage data from firm surveys in Kenya and Tanzania as to whether this convexity can be explained by ability bias). In Ethiopia there is no convexity in the earnings education profile for the self-employed but this almost certainly reflects the low levels of education in the sector, the median is 4 years so there are too few observations to pick up the convexity apparent in the other two countries, across both wage and self-employment.

As already noted the pooled regression includes the log of firm size so the coefficient on this dummy can only be interpreted conditional on firms of a given size. For both Ghana and Tanzania the earnings functions imply that the worker in a small firm (one between 5 and 10 employees) has similar earnings to a worker who is self-employed - controlling for both education and work experience. The point estimate on the log of firm size is not only highly significant it is also large for both countries, indeed very large for Tanzania. The point estimate implies substantial changes in wages as firm size rises. If a worker moves from a firm of 5 employees to one with 100 earnings rise by 52 per cent in Ghana and by 76 per cent in Tanzania. It is possible that some part of this rise with firm size reflects unobserved skills of the workers. However where panel data at the individual level is linked with firm size as in Söderbom, Teal and Wambugu (2005) the size effect remains large. The measured firm size effect is smaller in Ethiopia but this may reflect that the measurement of firm size was rather crude in the data.

The results that emerge from the data are clear. Earnings differ little between those in small firms and the self-employed. It is wage earners in large firms who earn very substantially more than the self-employed on average. We noted in the introduction that evidence from a broad range of sources suggested that there is a substantial overlap in low incomes across sectors. In Figure 2 we show the dispersion of earnings

across both the self-employed and for wage earners where we divide wage earners between those in small and large firms. For all the countries the mean earnings for wage employees in small firms and for the self-employed are very similar, indeed in Tanzania the distributions of the earnings are virtually identical. The picture of an economy in which wage employment offers substantially higher earnings than working in self-employment is very true if we confine attention to wage employment in relatively large firms. It is simply contradicted by our data for wage employment in small firms.

As the regressions use only OLS none of these results can be given any causal interpretation. In particular we cannot know if the processes of rising income we observe are a process of learning within a job or the result of processes of selection by which different “types” of individuals are observed in the labour market at different ages. We are not yet in a position to answer that question but in the next section we take the first step to doing so by asking about the mobility we observe within our data.

### **3 How mobile are individuals between different types of jobs?**

In this section we draw on the panel dimension of our data to present some preliminary evidence as to how mobile individuals are between jobs. For all three countries the data is confined to the urban sector. Thus the transition matrices which we will present measure movement over a six year period for Ethiopia. As already noted the data for Ghana and Tanzania are from the 2004 and 2005 rounds of the Ghana and Tanzania Household Worker Surveys thus measure movement over one year.

For both Ghana and Tanzania we have made assumptions that ensure that these transition matrices are *very conservative estimates* – that is, they should be seen as lower bounds on the amount of churning going on in the data. The picture presented is sensitive to how transitions are defined. We adopted the following rules:

- We only allow transitions for workers who reported (in 2005) a job or unemployment spell that had commenced since their 2004 interview.
- Numerous respondents who, for instance, described themselves as self-employed in 2004 but wage employees in 2005 were considered to be in the same job if the reported starting dates indicated these were in fact the same job.
- For individuals who did not report a job commencing since their last interview we forced their activity in 2005 to correspond to their activity in 2004.

In the next sub-section we will compare the transitions across the three countries. The Ghana and Tanzania data have the disadvantages and advantages of an annual panel. The advantage is that it allows us to measure short term movements and will ensure, if it can be continued, that detailed dynamics can be modelled. However the disadvantage is that measurement error is likely to be severe.

A major issue in the analysis of labor markets in Africa is the possibility of distinguishing between being unemployed or being out of the labor force. Kingdon, Sandefur and Teal (2005) show that measured unemployment varies enormously

across African economies with urban Ethiopia and South Africa having some of the highest measured rates in the world while similarly measured unemployment in Tanzania is 1.2 per cent and in Ghana 3.5 per cent of the labor force. In both Ghana and Tanzania employment growth has been dominated by the growth of non-rural self-employment, most of which has been in urban areas. The ILO definition of unemployment seeks to make a distinction between having a job and not having one but wanting one (ie the unemployed is an individual who has not got a job and is searching for one). In economies experiencing rapid growth of self employment the distinction that is being made between having, and not having, a job breaks down. Jobs are readily available, the issue is not one of being employed or unemployed it is the incomes available from the self-employed activity and the productivity of such activities.

In his classic discussion of these issues Sen (1975, p.32) makes a distinction between three approaches to the analysis of non-wage employment

“The production approach: If this man leaves the family would the output of the family enterprise go down?

The income approach: Is this man’s income (including direct consumption and any other income that he is given) a reward for his work, and will he cease to get it if he stops work?

The recognition aspect: Does he think of himself as “employed”? Do others?”

These distinctions are useful for the economies for which we have comparative data. As we are only using labor force data we cannot measure the production aspect of employment but we can measure some aspects of the income dimension. We focus on “incomes derived from employment activities” by which we mean that the activity generates a monetary income. We thus define as no-income those who are inactive (whether or not they are classified as in or out of the labor force) and those who work as unpaid family labor. We do this to provide the most basic measure of possible transition in the labor market namely between having an “incomes derived from employment activities” and not having one. It needs to be noted that moving between these states from “no-income” to “income” is not necessarily an improvement in expenditure for the individual so moving - a young unemployed man living with his family having to move to a new location for work as his family will no longer support him may well experience a fall not rise in expenditure.

#### *Transition Matrices between “no-income” and “income”*

In Figure 3 we set out our first set of transition matrices, E1, G1 and T1 which show for Ethiopia, Ghana and Tanzania respectively the movements from “no-income” to having a job by which we mean having an “income derived from employment activities”. Recall that the movement for Ethiopia is over six years, while for Ghana and Tanzania it is for one year where we have sought a minimum estimate of movement.



The results are striking in showing, by this definition, far more mobility in Ghana and Tanzania than in Ethiopia. In Ghana 16 per cent of those with no income in 2004 reported an income in 2005, in contrast in Ethiopia only 26 per cent reported as moving to having an income *after six years*. The sample size in Tanzania is very small as we under-sampled those in the household with no income. For this small sample the figures show higher mobility than in Ghana.

If we consider the reverse movements ie from “income” to “no-income” we see similar degrees of mobility across the economies. Over the six year period for Ethiopia 21 per cent moved form “income” to “no-income” while in Ghana and Tanzania the figures were 9 and 6 per cent respectively over the one year.

#### *Transition Matrices between “no-income” and “type of income”*

In Figure 4 we present a second set of matrices, E2, G2 and T2 where we focus on transitions between wage- and self-employment. Here we do not record transitions within wage employment (say from one firm to another) or self-employment (abandoning one business to pursue another).

For both Ghana and Tanzania there is very little, if any, difference in the degree of mobility for the wage and self-employed. For both types of employment between 7-10 per cent change occupation i.e. move out of being either a wage of self-employee. For both countries most of those who exit wage employment enter the “no income” category rather than self-employment. A similar pattern exists for the self-employed. Those who exit self-employment are far more likely to enter the “no-income” category than they are to enter wage employment.

Our data for Ghana and Tanzania show relatively little movement between wage and self-employment over the one year period. It is of course almost certain that this will change as the panel lengthens. However little short term movement between the two sectors is consistent with our finding in the last section that there is little income difference between those who work in self-employment and those who earn wages in small scale enterprises. Those who exit from either form of income earnings activity are likely to enter the “no-income” category suggesting that they are close to their reservation wages and that individual idiosyncratic factors are sufficient to move them into preferring not to work.

It is possible that what we are seeing in the Ethiopian data reflects the longer run of the data. Over the six year period 23 per cent of wage employees moved job while 44 per cent of the self-employed did so. It seems rather striking that over this relatively long period of those who moved out of self-employment some 70 per cent moved into the “no-income” category rather than moved into wage employment. For those with a wage job at the beginning of the period movement out is equally divided between those who entered self-employment and those who entered “no-income”.

In the case of Ethiopia we see that there is far more mobility among the self-employed than there is among wage earners. Among those who were self-employed in 1994 44 per cent had moved from being self-employed, the majority of those to “no-income”, by 2000. For the wage employees only 23 per cent had moved.

### *Transition Matrices between “labor force status” and “type of income”*

In Figure 5 we present a third set of matrices, E3, G3 and T3 where we extend the breakdown of “no-income” into being out of the labor force (o.l.f.) and unemployed. It is this distinction which is the most problematic for an analysis of labor markets in these economies. We report the data for Tanzania for completeness but the under sampling of those unemployed and out of the labor force in the first round of the survey mean that the data cannot be used to ask questions relating to movement out of and into either the labor force or unemployment. We focus on Ethiopia and Ghana.

In Ethiopia the striking feature of the data is both the high unemployment rate and the large numbers who are classified as being out of the labor force - two facts that are clearly related. Accepting the classification gives an average unemployment rate of 37 per cent. Movement out of unemployment is very slow. Of those unemployed in 1994 only 36 per cent had found jobs by 2000, half of these as wage employee and the other half as self-employed.

In Ghana, again accepting the classifications used, the unemployment rate is 20 per cent. This is markedly higher than the rates reported in the most recent household survey which gives an average national figure of less than 4 per cent. Mobility here is much higher than in Ethiopia. After one year 19 per cent of the unemployed had moved into a job.

In order to link these processes of movement to the issues raised in the introduction we need to consider both the age and education of those in these occupational categories, a subject for future work. We also need to ask how much this movement is affecting our interpretation of the earnings set out in the last section. In the next section we outline the importance of these issues for policy questions as to how the rapid changes in occupational structure which are occurring in Africa link to poverty reduction.

#### **4 What have we learnt and what do we need to know?**

As is well known there are considerable practical difficulties in measuring incomes in poor countries and part of the research task has been to show that this can be done for both wage earners and the self-employed. In this note we began by showing that it is possible to measure self-employment incomes on an individual basis and to estimate earnings functions which capture the effects of age, education and job characteristics as determinants of earnings. Earnings growth over the working lifetime appears to be as great among the self-employed as it is for wage earners in Ghana and Tanzania.

How can the type of panel data we presented in the last section provide insights into this growth process and directly link to understanding the process of poverty reduction? Data allowing an assessment of the extent to which poverty has been reduced is now based on measures of household per capita (or per adult equivalent) expenditure. The grounds for using such measures are compelling in the light of the difficulties of measuring incomes especially in the poorest countries and in the poorest areas within such countries, which are the rural ones. However such procedures create a gap between the measure of poverty which is expenditure based and the determinants of such poverty which clearly depend on income. As was noted

in the introduction by far the most rapid increase in employment in both Tanzania and Ghana has been in non-rural self-employment and the income implications of this shift are crucial for understanding how this change is impacting on poverty.

We know that expenditure per capita for households headed by a farmer are the lowest of any of the occupational categories for both Ghana and Tanzania. If we are willing to infer from this knowledge of the expenditure data that incomes in rural areas are lower than in urban sectors it suggests that a key part of the process by which poverty has declined in these two countries has been the effects of raising incomes by changes across sectors as indeed the first of the views of the development process set out in the introduction argued would be the case.

While this process of a shift to urban occupations has decreased poverty it has done so very slowly and to a very limited extent. Comparative household expenditure based data for Ghana and Tanzania suggests consumption per capita has been growing at about 10 per cent *per decade* over the 1990s (see Owens and Teal (2005)). This compares with figures for China of some 5 per cent *per year* over a longer period.

Our data provide some possible insights into the source of this divergence. While incomes in urban areas may be higher than in rural areas there are very limited gains available from shifting across occupations. The source of this implied by our data is the lack of growth of jobs in relatively large firms. It is there where the higher income earnings opportunities lie. Policies to promote the small scale at the expense of larger scale organisations would, if this is the case, deepen not alleviate poverty. If poverty is to be tackled effectively understanding how *incomes* differ and why is a central part of the policy agenda.

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Table 1. Earnings by Occupation Category

|                       | Ghana             |                | Tanzania           |                | Ethiopia          |                |
|-----------------------|-------------------|----------------|--------------------|----------------|-------------------|----------------|
|                       | Mean<br>(s.d.)    | Median<br>(n)  | Mean<br>(s.d.)     | Median<br>(n)  | Mean<br>(s.d.)    | Median<br>(n)  |
| Civil Servant         | 108.52<br>(59.02) | 99.22<br>(63)  | 121.09<br>(114.37) | 90.42<br>(130) | 61.81<br>(39.55)  | 52.15<br>(321) |
| Private Sector Worker | 64.52<br>(61.12)  | 47.94<br>(296) | 58.71<br>(94.63)   | 41.67<br>(141) | 46.34<br>(40.99)  | 34.32<br>(155) |
| Public Sector Worker  | 101.69<br>(63.48) | 88.89<br>(37)  | 124.53<br>(90.56)  | 111.94<br>(23) | 55.74<br>(44.69)  | 47.52<br>(132) |
| Self-Employment       | 59.74<br>(61.22)  | 46.30<br>(798) | 62.57<br>(103.94)  | 34.72<br>(635) | 87.87<br>(186.48) | 21.96<br>(209) |

Note: All earnings are reported in U.S. Dollars, averaged over all waves of data.

Table 2. Summary Stats for Regression Sample

|                  | Ghana             | Tanzania         | Ethiopia          |
|------------------|-------------------|------------------|-------------------|
| Male             | 0.45<br>(0.50)    | 0.46<br>(0.50)   | 0.53<br>(0.50)    |
| Age (Yrs.)       | 34.30<br>(9.33)   | 38.69<br>(9.98)  | 35.76<br>(9.82)   |
| Education (Yrs.) | 8.64<br>(4.21)    | 8.40<br>(3.33)   | 9.03<br>(4.61)    |
| Tenure (Yrs.)    | 10.45<br>(9.13)   | 10.79<br>(8.35)  | 10.25<br>(9.03)   |
| Firm Size        | 67.02<br>(124.46) | 37.64<br>(93.40) | 91.00<br>(182.68) |
| Employees        | 1.30<br>(1.07)    | 1.28<br>(0.87)   | 3.79<br>(22.19)   |

Values reported are the sample means; standard deviations are in parentheses. "Firm size" refers to the employment level in the firm where a wage employee works (reported only for wage employees here). "Employees" refers to the number of workers *employed by* a self-employed individual (reported only for self employed).

Table 3. Determinants of Earnings in Three African Countries

|                          | Ghana                |                     |                      | Tanzania             |                     |                      | Ethiopia             |                      |                      |
|--------------------------|----------------------|---------------------|----------------------|----------------------|---------------------|----------------------|----------------------|----------------------|----------------------|
|                          | All                  | Self                | Wage                 | All                  | Self                | Wage                 | All                  | Self                 | Wage                 |
|                          | (1)                  | (2)                 | (3)                  | (4)                  | (5)                 | (6)                  | (7)                  | (8)                  | (9)                  |
| Male                     | 0.251<br>(0.048)***  | 0.30<br>(0.066)***  | 0.208<br>(0.067)***  | 0.276<br>(0.059)***  | 0.372<br>(0.065)*** | 0.144<br>(0.119)     | 0.298<br>(0.061)***  | 0.478<br>(0.356)     | 0.285<br>(0.045)***  |
| Age                      | 0.066<br>(0.019)***  | 0.051<br>(0.025)**  | 0.084<br>(0.026)***  | 0.036<br>(0.025)     | 0.026<br>(0.023)    | 0.058<br>(0.055)     | 0.056<br>(0.034)*    | 0.073<br>(0.08)      | 0.059<br>(0.020)***  |
| Age <sup>2</sup> /100    | -0.077<br>(0.025)*** | -0.06<br>(0.034)*   | -0.097<br>(0.034)*** | -0.045<br>(0.034)    | -0.027<br>(0.028)   | -0.086<br>(0.08)     | -0.05<br>(0.043)     | -0.042<br>(0.099)    | -0.066<br>(0.026)**  |
| Educ                     | -0.038<br>(0.015)**  | -0.032<br>(0.023)   | 0.017<br>(0.024)     | -0.03<br>(0.029)     | -0.018<br>(0.031)   | -0.03<br>(0.059)     | 0.044<br>(0.038)     | 0.21<br>(0.102)**    | -0.05<br>(0.025)**   |
| Educ <sup>2</sup> /100   | 0.413<br>(0.097)***  | 0.301<br>(0.174)*   | 0.236<br>(0.128)*    | 0.627<br>(0.198)***  | 0.423<br>(0.204)**  | 0.824<br>(0.398)**   | 0.314<br>(0.199)     | -0.604<br>(0.677)    | 0.777<br>(0.132)***  |
| Tenure                   | 0.029<br>(0.007)***  | 0.029<br>(0.011)*** | 0.021<br>(0.008)**   | 0.00<br>(0.011)      | 0.01<br>(0.014)     | -0.008<br>(0.018)    | 0.035<br>(0.013)***  | 0.038<br>(0.031)     | 0.025<br>(0.008)***  |
| Tenure <sup>2</sup> /100 | -0.061<br>(0.020)*** | -0.055<br>(0.032)*  | -0.054<br>(0.017)*** | 0.015<br>(0.034)     | -0.041<br>(0.036)   | 0.083<br>(0.07)      | -0.07<br>(0.037)*    | -0.133<br>(0.083)    | -0.02<br>(0.024)     |
| Ln(employees)            | 0.265<br>(0.070)***  | 0.257<br>(0.072)*** |                      | 0.373<br>(0.092)***  | 0.383<br>(0.092)*** |                      | 0.211<br>(0.145)     | 0.267<br>(0.174)     |                      |
| Ln(firm size)            | 0.14<br>(0.020)***   |                     | 0.141<br>(0.020)***  | 0.186<br>(0.052)***  |                     | 0.185<br>(0.054)***  | 0.045<br>(0.024)*    |                      | 0.041<br>(0.024)*    |
| Civil Ser.               | 0.616<br>(0.083)***  |                     | 0.755<br>(0.116)***  | 0.611<br>(0.119)***  |                     | 1.023<br>(0.255)***  | -0.263<br>(0.187)    |                      | 0.192<br>(0.128)     |
| Pub. Ent.                | -0.124<br>(0.141)    |                     | 0.008<br>(0.109)     | -0.406<br>(0.502)    |                     | 0.069<br>(0.383)     | -0.477<br>(0.223)**  |                      | -0.009<br>(0.07)     |
| Priv. Ent.               | -0.205<br>(0.073)*** |                     |                      | -0.577<br>(0.192)*** |                     |                      | -0.426<br>(0.220)*   |                      |                      |
| Fem HH Ent.              |                      |                     |                      |                      |                     |                      | -1.162<br>(0.262)*** | -0.992<br>(0.352)*** |                      |
| Trend                    | -0.014<br>(0.044)    | -0.002<br>(0.058)   | 0.023<br>(0.061)     | 0.044<br>(0.058)     | 0.007<br>(0.062)    | 0.1<br>(0.126)       | -0.006<br>(0.064)    | -0.433<br>(0.246)*   | 0.109<br>(0.044)**   |
| Constant                 | 37.311<br>(88.63)    | 14.166<br>(116.39)  | -37.857<br>(121.94)  | -83.148<br>(116.00)  | -10.012<br>(123.84) | -197.469<br>(253.43) | -1.288<br>(0.69)*    | -2.369<br>(1.69)     | -1.231<br>(0.371)*** |
| Observations             | 1194                 | 798                 | 396                  | 929                  | 635                 | 294                  | 791                  | 188                  | 603                  |
| R-squared                | 0.26                 | 0.13                | 0.54                 | 0.25                 | 0.19                | 0.32                 | 0.41                 | 0.35                 | 0.47                 |

The dependent variable is the log of monthly earnings, before tax, in real domestic currency. “Ln(employees)” and “Ln(firm size)” are defined in the notes for Table 2. “Employees” takes a value of 1 for those not employing wage labor. Similarly, “firm size” is 1 for the self-employed. “Public Enterprise”, “Civil Servant”, “Private Enterprise” and “Female Household Enterprise” are dummy variables taking a value of 1 for individuals employed in that sector. Standard errors are in parentheses.

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Figure 1. Age- and Tenure-Earnings Profiles

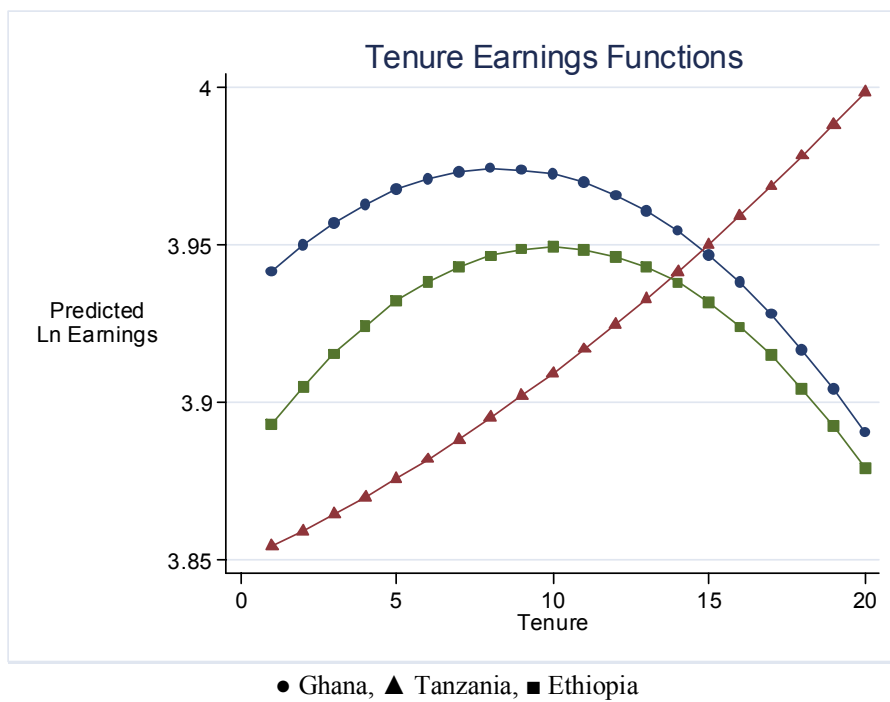
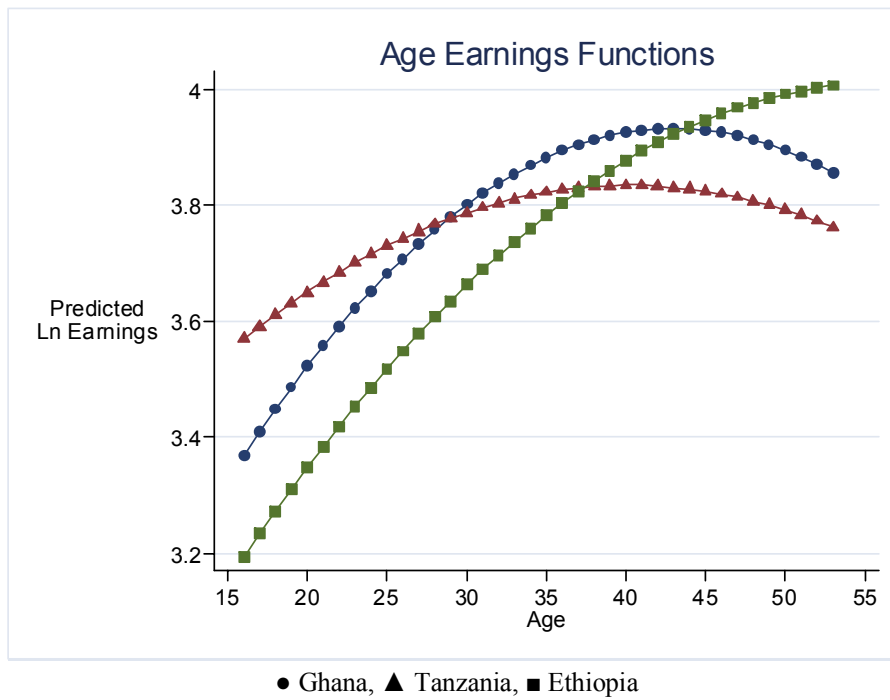


Figure 2. Individual Income Distributions by Occupation Category

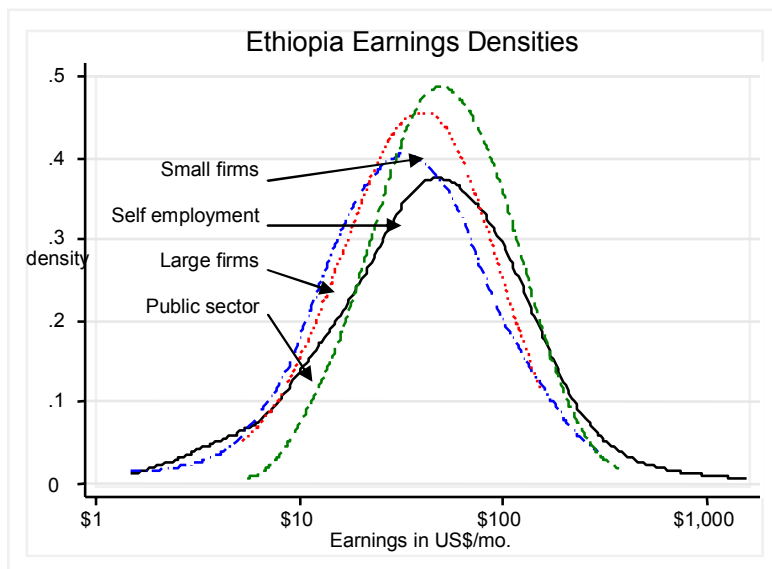
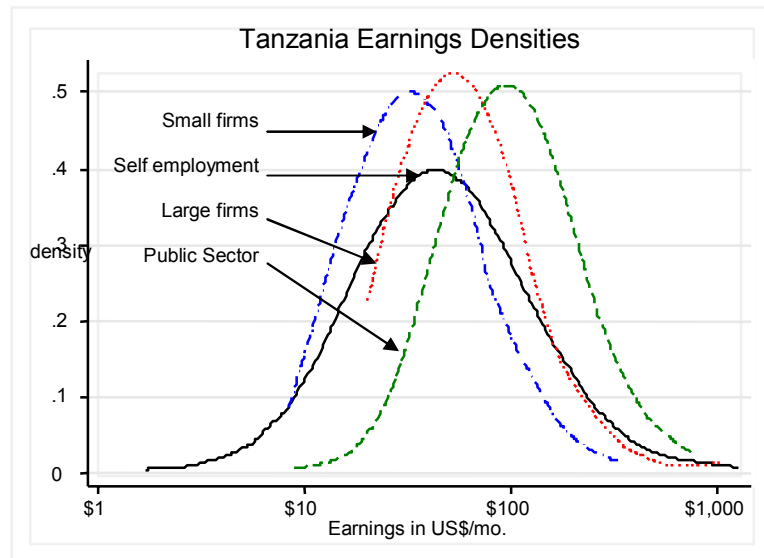
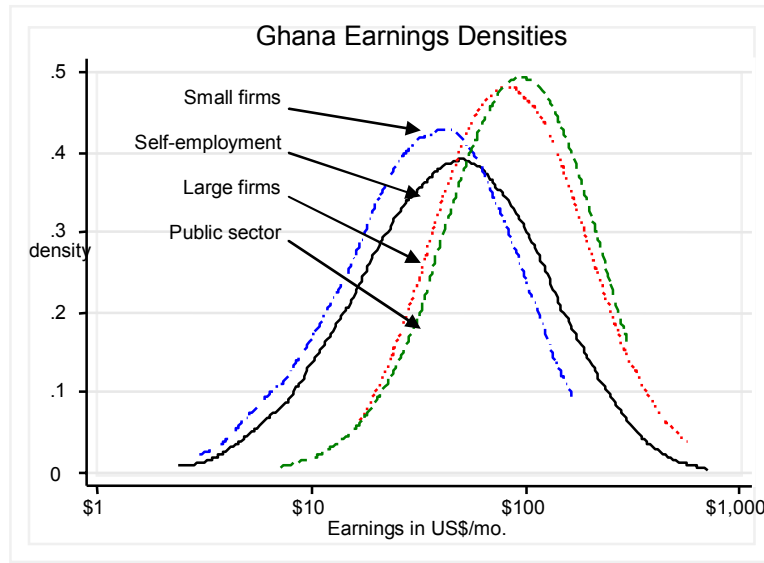




Figure 3. Transition Matrices

Percentages

**Matrix G1. Ghana**

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 83.69     | 0.00     | 16.31   | 100   |
| income    | 8.80      | 85.21    | 5.99    | 100   |
| Total     | 36.66     | 53.60    | 9.75    | 100   |

**Matrix T1. Tanzania**

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 78.95     | 0.00     | 21.05   | 100   |
| income    | 5.91      | 90.93    | 3.16    | 100   |
| Total     | 8.72      | 87.42    | 3.85    | 100   |

**Matrix E1. Ethiopia**

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 74        | 0        | 26      | 100   |
| income    | 21        | 49       | 30      | 100   |
| Total     | 55        | 17       | 27      | 100   |

Absolute Numbers

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 277       | 0        | 54      | 331   |
| income    | 50        | 484      | 34      | 568   |
| Total     | 331       | 484      | 88      | 899   |

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 15        | 0        | 4       | 19    |
| income    | 28        | 431      | 15      | 474   |
| Total     | 43        | 431      | 19      | 493   |

|           | no income | same job | new job | Total |
|-----------|-----------|----------|---------|-------|
| no income | 1245      | 0        | 430     | 1675  |
| income    | 189       | 446      | 275     | 910   |
| Total     | 1434      | 446      | 705     | 2585  |

Figure 4. Transition Matrices

Percentages

**Matrix G2. Ghana**

|           | wage  | app   | self  | no inc. | Total |
|-----------|-------|-------|-------|---------|-------|
| wage      | 91.07 | 0.60  | 1.79  | 6.55    | 100   |
| app       | 0.00  | 90.48 | 7.14  | 2.38    | 100   |
| self      | 1.50  | 0.25  | 89.00 | 9.25    | 100   |
| no income | 7.96  | 1.04  | 9.69  | 81.31   | 100   |
| Total     | 20.24 | 4.78  | 43.38 | 31.59   | 100   |

**Matrix T2. Tanzania**

|           | wage  | self  | no inc. | Total |
|-----------|-------|-------|---------|-------|
| wage      | 92.52 | 1.36  | 6.12    | 100   |
| self      | 1.22  | 92.97 | 5.81    | 100   |
| no income | 5.26  | 15.79 | 78.95   | 100   |
| Total     | 28.60 | 62.68 | 8.72    | 100   |

**Matrix E2. Ethiopia**

|           | wage | self | no inc. | Total |
|-----------|------|------|---------|-------|
| wage      | 77   | 11   | 12      | 100   |
| self      | 12   | 56   | 32      | 100   |
| no income | 12   | 14   | 74      | 100   |
| Total     | 23   | 22   | 56      | 100   |

Absolute Numbers

|           | wage | app | self | no inc. | Total |
|-----------|------|-----|------|---------|-------|
| wage      | 153  | 1   | 3    | 11      | 168   |
| app       | 0    | 38  | 3    | 1       | 42    |
| self      | 6    | 1   | 356  | 37      | 400   |
| no income | 23   | 3   | 28   | 235     | 289   |
| Total     | 182  | 43  | 390  | 284     | 899   |

|           | wage | self | no inc. | Total |
|-----------|------|------|---------|-------|
| wage      | 136  | 2    | 9       | 147   |
| self      | 4    | 304  | 19      | 327   |
| no income | 1    | 3    | 15      | 19    |
| Total     | 141  | 309  | 43      | 493   |

|           | wage | self | no inc. | Total |
|-----------|------|------|---------|-------|
| wage      | 326  | 47   | 51      | 424   |
| self      | 58   | 283  | 160     | 501   |
| no income | 199  | 227  | 1,239   | 1,665 |
| Total     | 583  | 557  | 1,450   | 2,590 |

Figure 5. Transition Matrices

**Percentages**

**Matrix G3. Ghana**

|        | wage  | app   | self  | o.l.f. | unemp | Total |
|--------|-------|-------|-------|--------|-------|-------|
| wage   | 91.07 | 0.60  | 1.79  | 0.60   | 5.95  | 100   |
| app    | 0.00  | 90.48 | 7.14  | 0.00   | 2.38  | 100   |
| self   | 1.50  | 0.25  | 89.00 | 0.75   | 8.50  | 100   |
| o.l.f. | 8.82  | 1.47  | 8.09  | 73.53  | 8.09  | 100   |
| unemp  | 7.19  | 0.65  | 11.11 | 3.27   | 77.78 | 100   |
| Total  | 20.24 | 4.78  | 43.38 | 12.12  | 19.47 | 100   |

**Matrix T3. Tanzania**

|        | wage  | self  | o.l.f. | unemp | Total |
|--------|-------|-------|--------|-------|-------|
| wage   | 92.52 | 1.36  | 4.08   | 2.04  | 100   |
| self   | 1.22  | 92.97 | 4.89   | 0.92  | 100   |
| o.l.f. | 7.69  | 15.38 | 76.92  | 0.00  | 100   |
| unemp  | 0.00  | 16.67 | 0.00   | 83.33 | 100   |
| Total  | 28.60 | 62.68 | 6.49   | 2.23  | 100   |

**Matrix E3. Ethiopia**

|            | wage | self | o.l.f. | unemp | Total |
|------------|------|------|--------|-------|-------|
| wage       | 0.77 | 0.11 | 0.06   | 0.06  | 1.00  |
| self       | 0.12 | 0.56 | 0.23   | 0.09  | 1.00  |
| o.l.f.     | 0.09 | 0.11 | 0.60   | 0.20  | 1.00  |
| unemployed | 0.18 | 0.18 | 0.18   | 0.46  | 1.00  |
| Total      | 0.23 | 0.22 | 0.35   | 0.21  | 1.00  |

**Absolute Numbers**

|        | wage | app | self | o.l.f. | unemp | Total |
|--------|------|-----|------|--------|-------|-------|
| wage   | 153  | 1   | 3    | 1      | 10    | 168   |
| app    | 0    | 38  | 3    | 0      | 1     | 42    |
| self   | 6    | 1   | 356  | 3      | 34    | 400   |
| o.l.f. | 12   | 2   | 11   | 100    | 11    | 136   |
| unemp  | 11   | 1   | 17   | 5      | 119   | 153   |
| Total  | 182  | 43  | 390  | 109    | 175   | 899   |

|        | wage | self | o.l.f. | unemp | Total |
|--------|------|------|--------|-------|-------|
| wage   | 136  | 2    | 6      | 3     | 147   |
| self   | 4    | 304  | 16     | 3     | 327   |
| o.l.f. | 1    | 2    | 10     | 0     | 13    |
| unemp  | 0    | 1    | 0      | 5     | 6     |
| Total  | 141  | 309  | 32     | 11    | 493   |

|            | wage | self | o.l.f. | unemp | Total |
|------------|------|------|--------|-------|-------|
| wage       | 326  | 47   | 24     | 27    | 424   |
| self       | 58   | 283  | 117    | 43    | 501   |
| o.l.f.     | 101  | 129  | 678    | 221   | 1,129 |
| unemployed | 98   | 98   | 94     | 246   | 536   |
| Total      | 583  | 557  | 913    | 537   | 2,590 |