



Worker Flows and the Impact of Labour Transitions on Earnings in Uganda

by

Susan Namirembe Kavuma, Oliver Morrissey and Richard Upward

Abstract

The paper examines the flow of workers between employment states, the role of education in these transitions and the impact of the transitions on earnings. It uses panel data for three waves (2005/06, 2009/10 and 2010/11) of household surveys in Uganda. Using the Markov chain process, we estimate transition probability matrices and find bi-directional transitions between formal and informal employment but with a higher tendency of workers to transition from formal to informal than in the opposite direction. When we investigate the relation between education and transitions using probit models, we find the transition from informal to formal increases with education but the movement from formal to informal employment and switching from not working to working declines with education. We further investigate the impact of the transitions on the worker's welfare by estimating wage equations and find evidence for a decline in monthly wages for workers moving from formal to informal employment and a wage gain for workers moving in the reverse direction. We suggest that transitions from informal to formal employment are induced by higher wage offers, while transitions in the opposite direction are more likely to be due to losing a job.

JEL Classification: J23, J40, O17, O55,

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1. Introduction

It is well documented in the literature that labour markets in developing countries have two distinct sectors, the formal and informal (Hart, 1971; Fields, 1990; Maloney, 2004). On average, workers in the formal sector earn higher wages than their counterparts in the informal sector (Dickens and Lang, 1985; Magnac, 1991; Gunther and Launov, 2011). Maloney (1999) argues that these wages are above the market clearing level and young workers, migrants and laid-off workers queue up for these jobs while those who cannot afford to remain unemployed join the informal sector. On the other hand, the informal sector is characterised by low levels of productivity (Lewis, 1954; Swaminathan, 1991) and small scale production employing mainly family or unpaid workers because of the limited capital accumulation in this sector. Workers in this sector are not protected by labour legislation and not covered by any social security system. These workers often have verbal and flexible contracts that result in fluctuations in earnings and employment.

The most commonly adopted definition of informality is that of the International Labour Office (ILO, 1972) defining the informal sector as the sum of non-professional (elementary) self-employed, domestic, unpaid workers and workers employed in enterprises employing five or fewer employees. Others define informality in terms of firms (employing five or fewer employees and/or unregistered) or in terms of employment (workers who have no written job contract or are not covered by labour legislation). Following the ILO definition, the Uganda Bureau of Statistics (UBoS) classifies the informal sector as comprising the self-employed to include: employers with small businesses, own-account workers, contributing family workers (unpaid) and household farm workers.¹ The formal sector therefore comprises employees who are paid a wage or salary.

Two major hypotheses are presented in the literature to explain the observed duality in labour markets in developing countries. The segmentation hypothesis (Doeringer and Piore, 1971) views labour markets in developing countries as non-competitive because these countries have a reserve army of unemployed individuals without bargaining power. The labour market consists of two segments which are asymmetric: the primary (formal) sector and the secondary (informal) sector where different wages are paid to comparable workers who have limited mobility between these sectors. Further, the proponents of this

1 Family and household workers are often classified as household enterprises and rural farm labour respectively.

hypothesis argue that there are queues for the preferred (formal) sector and workers face costs of entry such as the rationing of jobs in the preferred sector. The second hypothesis is the competitive or comparative advantage hypothesis based on Roy (1951), which assumes that workers self-select into sectors according to their level of productivity and this heterogeneity among workers causes some to be more productive in one of the sectors and earn higher returns.

The analysis of labour transitions can offer insight into which of these best depicts the Ugandan labour market. First, transitions take into account the initial state of employment which may eliminate the bias on the coefficient on wages, education and other variables correlated with previous labour market history. Secondly, proponents of the segmentation hypothesis argue that labour markets are segmented where two comparable workers in the formal and informal sector are paid different wages and there is limited mobility between these sectors. Analysis of labour transitions assesses the extent of observed mobility. Thirdly, transitions may affect a worker's welfare given the large differences in earnings and employment conditions observed across various types of jobs in these sectors. As sector labour transitions are likely to have large effects on earnings and employment conditions of workers, the role of labour transitions in poverty reduction and income distribution is likely to be important.

This paper analyses labour transitions and the effect of education on these transitions across different employment states in Uganda's labour market. In particular, we analyse the flow of workers between sectors and the impact of education on three transitions: the movement from "not working" to "working"; from "informal" to "formal" employment; and from "formal" to "informal" employment. We are not able to analyse mobility between more precisely defined employment states because of inconsistency in the definition of these states across waves and few observations for some states.

In our empirical strategy, first we estimate transitional probabilities to analyse the probability of changing employment state between time t and $t+1$, conditional on employment state at time t , and second we use probit models to investigate the effect of education on transitions. The motivation for this paper is the likely impact of transitions on a worker's welfare because of the major differences in the sectors of employment in terms of earnings and employment conditions. We hypothesize that if a worker transitions from the informal to the formal sector then the change is likely to result in improved welfare and, conversely, if a worker moves from the formal to the informal sector then their welfare may decline. Our results for the impact of transitions on wages confirm the

hypothesis that a worker transiting from formal to informal employment suffers a wage (welfare) loss, and we observe a wage (welfare) gain for a worker switching from informal to formal employment although it is not statistically significant.

This paper addresses the following empirical questions: What is the estimated rate of labour transition in a particular interval in Uganda (what fraction of workers changes employment state in a given period)? What is the pattern of worker flows across different employment states (are worker flows unidirectional)? What is the role of education; does education encourage transition to particular types of employment states? The aim of this paper is to provide evidence of how well the labour market in Uganda is integrated and the role of the human capital variables in the transition of workers between sectors using longitudinal data. This is the first study for Uganda and one among few studies which analyse sector labour transitions in sub-Saharan Africa. We use three waves of panel data: the 2005/06 Uganda National Household Survey (UNHS; baseline wave), the 2009/10 and 2010/11 Uganda National Panel Surveys (UNPS).

2. Literature Review

Informality is a multi-faceted and contentious concept which can be viewed in terms of enterprises or employment. Scholars who define informality in terms of enterprises consider the informal sector to consist of all workers employed in small firms, typically those with less than five or six employees (Maloney, 1999; Gong et al, 2000). The researchers who define informality in terms of employment use a range of criteria. Some define the informal sector to consist of only self-employed workers which may include those in professional jobs (Duryea et al, 2006), whilst others exclude professionals (Funkhouser, 1997), or include domestic and household or unpaid workers (Funkhouser, 1997; Duryea et al, 2006) or informal salaried workers without social security or medical benefits (Bosch and Maloney; 2007; Pages and Stampini, 2009). Bernabè and Stampini (2009) note that the two dimensions of informality overlap but are not the same and Gong et al (2000) provide evidence of this mismatch. In our case, we adopt the UBoS definition used in the surveys which categorises the self-employed as informal sector workers and all workers in paid employment as formal sector workers.

Labour market dynamism is one of the characteristics of market economies, with workers relocating to new jobs or enterprises. This dynamism may be induced by demand-side factors such as creation and destruction of jobs by firms, or supply-side factors which

cause individuals to enter the labour market or workers to switch jobs (Davis and Haltiwanger, 1998). Theoretically, creation and destruction of jobs relates to job flows, while the hiring and separation of workers reflects worker flows. These worker flows are associated with trade-offs between economic efficiency and job stability. Duryea et al (2006) note that on the one hand, mobility enhances economic efficiency as resources are reallocated to more productive activities, while on the other hand high mobility may create uncertainty for workers because of income instability. Jacobson et al (1993) suggest that job loss may entail large losses of firm-specific human capital and losses in earnings as workers relocate to firms less suited to their skills and productivities. These trade-offs are more visible in developing countries where workers are not insulated from economic risks such as lay-offs. This is because many workers in most developing countries are not covered by social security systems and there is weak enforcement of labour laws, which hugely affect worker's welfare.

In the theoretical literature, labour transitions are analysed using the equilibrium search theory which relates labour market frictions and wage distribution of workers with a matching function (Pissarides, 1994). The search for a job is a complex process because of the presence of market frictions such as information imperfection, skills mismatch, stickiness of wages and the heterogeneity of workers and employers (Pissarides, 2011). Furthermore, the centrality of this search theory is the concern to find a good job match, both for the worker and employer, since the market consists of both "good" and "bad" jobs. To the employer "good" jobs are considered to have higher productivities than the "bad" ones when matched with workers, while to an employee a "good" job is one with a "good" (higher) wage. In this model, the employer sends the first signal by making a job offer, which the worker accepts or declines. According to theory, an unemployed individual only accepts the wage offer if it exceeds their reservation wage, or in the case of an employee when it is above their current wage. Therefore, optimal labour transitions are expected to be welfare enhancing, especially if the transitions are not result of a job loss.

From the point of view of human capital theory, differences in human capital explain wage gaps. Individuals acquire skills and knowledge through formal education, or accumulate these skills at work over time which positively affects wages. Therefore, on the one hand labour transitions can be interpreted as an interruption to accumulation of human capital and may reduce an individual's incentive to move. Theodossiou and Zangelidis (2009) suggest that a positive association between education and job-to-job

mobility may be observed because workers with higher levels of education may have more opportunities available to them, or such workers may be motivated to move if they are likely to gain promotions in their new jobs. However, it is important to note that overall educational attainments affect both the mobility costs and the value of potential offers and therefore the effect of education on mobility is unclear a priori.

Labour transitions can be analysed in discrete or continuous time. Due to data limitations, caused by lack of observations on continuous labour market histories such as transitions within states and survey intervals, many studies use the discrete time framework (Royalty, 1998; Maloney, 1999; Duryea et al, 2006; Bosch and Maloney, 2007; Bernabè and Stampini, 2009; Pages and Stampini, 2009). Maloney (1999) used discrete time panel data for men aged 16-65 in Mexico obtained from a rich quarterly urban employment panel survey, with a span of five quarters, matched with the micro-enterprise survey with information on workers' reasons for separation and entry into sectors. Bosch and Maloney (2007) estimated continuous time matrices using discrete panel data from employment and household surveys for Argentina, Brazil and Mexico. Bernabè and Stampini (2009) using quarterly discrete data from a rotating panel of individuals and households in the labour force and household survey for Georgia, were able to examine temporary transitions; workers who leave and return to their jobs and are therefore observed in the same state at the start and end of the period.

Markov transition matrices are used in analysing patterns of mobility, where transition probabilities are computed based on previous state. A simple way of analysing turnover rates is to consider instantaneous probabilities of moving from one sector/state to another, but the analysis of moving to multiple destinations introduces complications because of the differences in the size and the rate of opening of the destination sector. For example an unemployed individual may be more likely to enter the informal sector, not because they prefer this sector but because there are more job openings in this sector. To address this one needs to consider the size and rate of opening of the destination sector when computing transition probabilities. Maloney (1999) standardised the transition probabilities by size of the destination sector (P_{ij}/P_j), where P_{ij} is the probability of transiting from sector i to sector j in one move and P_j is the number of workers in sector j at time $t+1$. Bosch and Maloney (2007) adopt the Pages and Stampini (2006) T matrix so that in the absence of barriers to mobility, the probability propensities (standardised transition probabilities by size and rate of opening of the destination sector) can be interpreted as a measure of revealed comparative advantage (worker endowments and

preferences) in the labour market. This measure offers insight in the patterns of mobility across sectors. For example, the higher the level of similarity between two sectors in terms of worker characteristics, the more they are likely to have similar patterns of probability propensities. Conversely, if two sectors require different worker skills then one would expect to find different patterns of probability propensities.

In the empirical literature, several studies use probability intensities as evidence for or against segmentation of the labour market (Maloney, 1999; Gong et al, 2000; Bernabè and Stampini, 2009; Pages and Stampini, 2009). The segmentation hypothesis posits that unexplained wage differentials are persistent and that workers are not able to transition from the secondary (informal) to the primary (formal) sector because of entry barriers. Maloney (1999) suggests that if the labour market is segmented, then workers will graduate from the informal to the formal sector and stay until they retire without any flow in the reverse direction. Pages and Stampini (2009) note that if particular workers are observed in certain sectors, then it may either be due to economic segmentation (i.e. barriers of entry) or self-sorting (depending on their abilities or preference) based on unobserved heterogeneity. However due to data limitations such as lack of data on reasons for choice of sector, it is difficult to empirically establish whether individuals join sectors of employment voluntarily (self-sorting) or involuntarily (choice of last resort).

Transitional probability intensities are reduced form estimates, which combine both worker preferences for a sector and barriers to entry that makes drawing inference from these estimates difficult. Therefore, these estimates may require additional sources of identification such as variation of mobility patterns by age group, education level, gender and business cycle. Bosch and Maloney (2007), in a comparative study of labour markets in Argentina, Brazil and Mexico, investigated variations across worker characteristics with regard to age, education and gender as well as the mobility patterns across the business cycle. In their study, they find the rate of transition into self-employment in all three countries is concave in age, and the older and better educated workers have longer spells in self-employment. In addition, during the economic boom (1987-1991) in Mexico, the study finds a high transition from formal to self-employment exceeding the reverse movement, whereas in economic recessions, the entry into and transition to informal from formal work declined. The expansion of the informal sector during the boom is surprising and in contrast to the segmentation view, which posits that in periods of economic expansion, the formal sector expands and is characterised by a reduction in separation

which leads to increased flow from informal to formal employment and reduced flows in the reverse direction.

Transitional probabilities can be estimated by either duration or discrete choice models to investigate factors associated with labour states or transitions. Duration models estimate the probability of a spell of employment or unemployment in a specific interval ending, given that it has lasted until the previous interval. The discrete choice models estimate the probability of a sequence of “successes” (change of job) or “failures” (staying in the job) observed in each interval (Royalty, 1998). In the discrete choice models, researchers who use static models face the problem of spurious state dependence (Heckman, 1981) caused by the endogeneity of initial state, which is likely to bias the estimates upwards. To address this endogeneity problem, some scholars study a subsample of the working-age population e.g. males by Maloney (1999) and Pages and Stampini (2009), while others (e.g. Duryea et al 2006; Bigsten et al 2007) have used dynamic models to investigate worker characteristics associated with labour transitions. However, the dynamic model approach is challenging because the inclusion of lagged labour market states in the model, correlated with unobserved individual characteristics, leads to serial correlation. To address this problem, some researchers have jointly estimated the transition and initial state models (e.g. Duryea et al 2006; Bigsten et al; 2007) but again face the challenge of properly identifying the initial condition. Heckman (1981) warns that a poorly identified selection equation induces an unknown bias in the estimates which does not improve the results. In our case, cognisant of these challenges and the fact that we have few waves, we use the static model.

Finally, the empirical literature presents evidence that formal employment increases with education while informal employment decreases with education (Maloney, 1999; Gong et al, 2000; Bernabè and Stampini, 2009). Maloney (1999) finds the movement out of formal employment decreases with education and interprets it as a result of workers with lower education facing a low opportunity cost of leaving the formal sector. In reference to the effect of transitions on wages, the available literature is mixed. Duryea et al (2006) find that on average workers who move from formal to informal salaried jobs experience a decline in monthly wages relative to workers who remain in the formal salaried jobs in Argentina, Mexico, Venezuela, Albania and Ukraine. The same study finds workers in Georgia, Poland and Russia who switch from formal to informal salaried jobs receive an increase in monthly wages relative to workers who remain in formal salaried jobs. Mincer and Jovanovic (1981) relate the ambiguity between mobility and wages to variations in

human capital investment, while Bartel and Borjas (1981) associate this relation to causes of separation; where quits are more likely to be wage increasing than lay-offs.

3. Theoretical framework

Labour transitions, whether a change of employment state from unemployment to employment, or switching of jobs can be analysed in the search framework (Lippman and McCall, 1976; Burdett, 1978; Pissarides, 1994; Rogerson et al, 2005). The approach is motivated by a basic job search model within a partial equilibrium framework following Rogerson et al (2005). In this model, a worker searching for a job aims at maximising their own discounted life time earnings:

$$E \sum_{t=0}^{\infty} \beta^t x_t \tag{1}$$

Where $\beta \in (0,1)$ is a discount factor, x_t is income at time t , which in the case of the employed denotes the wage (w) received by the worker, but also captures other job attributes such as desirability of the job in terms of other benefits and location. For the unemployed, $x = b > 0$ which conventionally refers to unemployment benefits (since Uganda has no unemployment benefit scheme we equate this to subsistence earnings in the informal sector), but can be extended to capture the value of leisure and home production. The model assumes the worker is risk neutral (i.e. linear utility functions). Job offers are independently and identically distributed (i.i.d) from a known distribution $F(w)$. Therefore, for the unemployed the optimal strategy for searching for a job is to accept any job offer with a wage greater than their reservation wage. In discrete time and assuming the individual accepts the job offer and keeps it forever, this can be expressed using the Bellman equations:

$$W(w) = w + \beta W(w) \tag{2}$$

Equation (2) implies that a worker's pay-off $W(w)$ is equivalent to the accepted wage w and a stream of future discounted earnings. Alternatively if an individual is unemployed then the pay-off will be:

$$U = b + \beta \int_0^{\infty} \{U, W(w)\} dF(w) \tag{3}$$

Equation (3) implies that an unemployed individual's pay-off is a sum of instantaneous pay-off b and a discounted value of a possible future change in the individual's employment state either to remain unemployed U or employed $W(w)$ with wage w .

From equation (2), $W(w) = w/(1-\beta)$ and is increasing, therefore there is a unique w_r referred to as the reservation wage such that $w_r = U$ where U stands for a state of being unemployed. Thus an individual will only accept a job offer if $w \geq w_r$ and rejects the offer if $w < w_r$. Substituting $U = w_r/(1-\beta)$ and $W(w) = w/(1-\beta)$ into (3), we obtain the optimal search strategy equation:

$$w_r = (1-\beta)b + \beta \int_0^{\infty} \max\{w, w_r\} \partial F(w) \quad (4)$$

If we subtract βw_r from both sides of equation (4), we get the standard reservation wage equation given as:

$$w_r = b + \frac{\beta}{1-\beta} \int_{w_r}^{\infty} (w - w_r) \partial F(w) \quad (5)$$

Integrating equation (5) by parts we get:

$$w_r = b + \frac{\beta}{1-\beta} \int_{w_r}^{\infty} [1 - F(w)] \partial w \quad (6)$$

Intuitively equation (6) implies that an individual's reservation wage must be greater than b , otherwise the individual will have a higher welfare when unemployed than when employed. The difference between the reservation wage and the instantaneous pay (subsistence wage earned in the informal sector in our case) will depend on the discount factor β where the more impatient individual with a smaller β will have a lower reservation wage and more likely to transition, and the expected value from a job offer with $(w - w_r)$ which should be positive to induce a transition.

We can extend the analysis to continuous time by generalizing the discrete time model and denote the length of a period as Δ and therefore β can be expressed as $\beta = 1/(1+r\Delta)$. As $\Delta \rightarrow 0$ and if we introduce the rate of job offers to the unemployed denoted as a then we can rewrite equation (6) as:

$$w_r = b + \frac{\alpha}{r} \int_{w_r}^{\infty} [1 - F(w)] \partial w \quad (7)$$

The new parameter a to equation (7) implies that an individual's reservation wage also depends on the job arrival rate, which increases with the reservation wage.

In the case of job-to-job search, we follow Rogerson et al (2005) and assume that jobs end for exogenous reasons at rate λ , which follows a Poisson distribution and that new job offers arrive at different rates for the unemployed, at rate a_0 and the employed at rate a_1 .

Each offer is an i.i.d drawn from a known distribution F . Therefore, the flow value for an unemployed individual can be expressed as:

$$rU = b + \alpha_0 \int_{w_r}^{\infty} [W(w) - U] \partial F(w) \quad (8)$$

Similarly the flow value of a worker can be expressed as:

$$rW(w) = w + \alpha_1 \int_0^{\infty} \max\{W(w') - W(w), 0\} \partial F(w') + \lambda[U - W(w)] \quad (9)$$

Equation (9) implies that the flow value of a worker is a sum of their current wage w and expected change in state (either accepting a new job offer if $w' > w$ or job loss if $w(w) = 0$ happening at the rate of λ). Therefore an individual's reservation wage must be greater than their current wage and the difference between the reservation wage and the current wage will depend on i) the job arrival rate α_1 which increases with the reservation wage, ii) the expected value from a job offer $W(w') - W(w)$ and iii) the job loss rate λ which decreases with the reservation wage. Evaluating equation (9) at $w=w_r$ and combining it with equation (8) we obtain:

$$w_r = b + (\alpha_0 - \alpha_1) \int_{w_r}^{\infty} [W(w') - W(w_r)] \partial F(w') \quad (10)$$

Note that $w_r > b$ if and only if $\alpha_0 > \alpha_1$, thus if an individual gets job offers more frequently when employed than when unemployed s/he is willing to accept wages below b . Differentiating equation (9) we get:

$$W'(w) = \{r + \lambda + \alpha_1[1 - F(w)]\}^{-1} \quad (11)$$

If we integrate equation (10) by parts and insert equation (11) we get:

$$w_r = b + (\alpha_0 - \alpha_1) \int_{w_r}^{\infty} \left[\frac{1 - F(w)}{r + \lambda + \alpha_1[1 - F(w)]} \right] \partial w \quad (12)$$

The parameter λ in equation (12) captures the rate of job destruction which reduces with the reservation wage. A worker's reservation wage is influenced by many factors, such as the instantaneous pay-off b , discount factor r , wage distribution above w_r (reservation wage), the job arrival rate α_0 or α_1 , and job destruction rate λ . We regard the instantaneous pay-off as the subsistence wage earned in the informal sector; this is because most workers in Uganda not absorbed in the formal sector can't afford to remain unemployed (because of lack of unemployment benefit or official family support). The rate of job destruction can be interpreted as retrenchment in the formal sector (a 'push' factor). We expect

individuals to change sector of employment in response to relative rates of growth in sector employment (rates of job offers or losses) and wage differentials.

4. Data sources and description

We investigate three labour market transitions in Uganda for the working age group (14-64 years): “not working” to “working”, “informal” to “formal” and “formal” to “informal”. We use data from three panel waves: 2005/06 UNHS, 2009/10 UNPS and 2010/11 UNPS. The 2005/06 wave is the baseline household survey upon which the 2009/10 survey set out to track the 3,123 household covered in the baseline. Of the 3,123 household covered in 2005/06, a total of 2,975 households were covered in the 2009/10 and 2,716 in 2010/11. Since the surveys are designed to track households² most of the households remained in the sample, but a number of individuals in these households dropped out of the sample either due to failure to locate them or non-response. Therefore, at the household level the attrition rate is very low but at individual level the attrition rate is high, on average 34 per cent between the three waves.

Table 1 presents summary statistics for the distribution of individuals in the employment states for the 2005/06 and 2009/10 waves. The categorisation of workers is based on the survey responses on the main job³. We illustrate both the summary statistics for the unbalanced panel (full) and the balanced panel (estimation sample). A comparison between the unbalanced and balanced sample reveals a similar pattern of the labour market structure in each wave, although when we compare statistics between waves we observe a major difference between the proportion of household and own-account workers. This is largely due to differences in the questions asked in each survey. The 2005/06 survey had no explicit question on whether the workers worked in unpaid businesses, which perhaps prompted some of such workers to choose the own-account option rather than household work. Therefore, in the analysis of transitions we merge these two categories to form the informal sector to minimise the effect of misclassification on the results.

2 Almost 80 percent of the sample resides in rural areas where households rarely change location.

3 In the survey, individuals were asked multiple questions regarding their employment status, both for the main job and second job. The categorisation of workers in this study is based on response for the main job.

Table 1: Distribution of individuals by employment state, 2005/06-2009/10

Employment state		2005/06		2009/10	
		Unbalanced Panel	Balanced Panel	Unbalanced Panel	Balanced Panel
Informal	Not working	171 (3.35)	57 (1.82)	164 (3.46)	57 (1.82)
	Household worker	1,446 (28.35)	822 (26.26)	2,573 (54.28)	1733 (55.37)
	Own account	2,415 (47.34)	1706 (54.5)	1,006 (21.22)	753 (24.06)
Formal	Private	885 (17.35)	421 (13.45)	838 (17.68)	475 (15.18)
	Public	184 (3.61)	124 (3.96)	159 (3.35)	112 (3.58)
Total		5,101	3,130	4,740	3,130

Note: Percentages in parentheses

Source: Authors' construction based on World Bank data (2014 a and b).

As shown in Table 1, the majority of workers (80 per cent for the balanced sample) are employed in the informal sector which consists of household workers (workers in family/household businesses) and own-account workers (self-employed in non-agricultural enterprises). The remaining 20 per cent of workers are mainly employed in the formal sector (18 percent) and only 2 per cent do not have a job in our estimation sample. Those without a job include individuals without a job but actively searching for work (the ILO definition) and job seekers who are either waiting for a reply or not actively searching but are not students or retirees. We have included the latter, those not actively searching because our sample has few unemployed (due to the large informal sector) individuals and in addition it is plausible to regard these individuals as unemployed, especially those with a history of searching (some of these individuals said they were waiting for replies from previous applications).

Table 2 shows the summary statistics for the employment states for the 2009/10 and 2010/11 data with the unbalanced and balanced sample statistics illustrated. The

distribution of workers in 2010/11 UNPS matches with that in 2009/10 data, since the former is the second panel wave in the series. We observe a similar pattern of distribution of workers, with majority (78 percent for the balanced sample) employed in the informal sector, 18 per cent in formal employment and only 2 per cent not working. Similarly, we reason that the observed small size of the unemployed is due to the large informal sector that absorbs the surplus labour; those not employed formally, although many of these workers are underemployed with low marginal productivity such as street and market vendors.

Table 2: Distribution of individuals by employment state for 2009/10 – 2010/11

Employment state		2009/10		2010/11	
		Unbalanced Panel	Balanced Panel	Unbalanced Panel	Balanced Panel
Informal	Not working	165 (3.42)	68 (2.09)	159 (4.05)	97 (2.98)
	Household worker	2,666 (55.21)	1,849 (56.80)	2,218 (56.45)	1,867 (57.36)
	Own account	998 (20.67)	737 (22.64)	756 (19.25)	665 (20.43)
Formal	Private	844 (17.48)	487 (14.96)	628 (15.98)	474 (14.56)
	Public	156 (3.23)	114 (3.50)	168 (4.28)	152 (4.67)
Total		4,829	3,255	3,929	3,255

Note: Percentages in parentheses

Source: Authors' construction based on World Bank data (2014 a and b).

Table 3 shows summary statistics for the transitions between the 2005/06 and 2009/10 waves. Our data lacks information on transitions within the same job (e.g. promotions) and transitions within the survey period. Therefore, the category of movers includes individuals who have changed employment state but excludes those who transition within the same state. The statistics show that individuals transiting to the formal sector are relatively younger than those who stay in the informal sector or remain not working. In addition, individuals who stay in formal or informal employment are less schooled than those who move out of these states. We note that individuals moving out of

unemployment are the most schooled of the three mobility patterns. With regard to gender we note a high mobility of women out of unemployment and lower mobility to formal employment, with a sizeable number of urban dwellers falling in a spell of unemployment.

Table 3: Summary statistics by transitions for 2005/06-2009/10

Employment State	Not working	Informal	Formal
<i>Not working</i>	N=20	N=54	N=40
Age in years	32 (11.92)	35.42 (14.03)	30.32 (7.09)
Years of Education	12.55 (3.00)	5.94 (2.99)	9.62 (4.37)
Female (%)	20.00 (0.41)	55.55 (0.50)	55.32 (0.50)
Urban (%)	70.00 (0.47)	41.74 (0.49)	85.00 (0.36)
<i>Informal</i>	N=80	N=4478	N=498
Age in years	32.71 (14.74)	36.15 (11.46)	33.08 (10.79)
Years of Education	6.89 (3.34)	5.99 (2.95)	7.4 (3.9)
Female (%)	52.5 (0.50)	55.56 (0.50)	27.71 (0.45)
Urban (%)	41.25 (0.49)	12.97 (0.34)	27.51 (0.45)
<i>Formal</i>	N=14	N=440	N=636
Age in years	39.86 (13.31)	36.09 (9.44)	35.15 (10.78)
Years of Education	10.21 (5.15)	10.51 (4.14)	7.78 (3.98)
Female (%)	42.86 (0.51)	24.21 (0.43)	26.36 (0.44)
Urban (%)	71.43 (0.47)	54.87 (0.50)	32.95 (0.47)

Note: standard deviation in parentheses

Source: Authors' construction based on World Bank data (2014 a and b).

In Table 4 we show the summary statistics for the shorter period (2009 – 2011) which is similar to the pattern observed for the longer period (2005-2010) presented in Table 3, though we note a reduction in women and urban movers transiting from not working to working.

Table 4: Summary statistics by transitions for 2009/10 – 2010/11

Employment State	Not working	Informal	Formal
<i>Not working</i>	N=28	N=72	N=36
Age in years	26.68 (8.49)	36.79 (14.45)	28.67 (9.28)
Years of Education	12.11 (4.24)	6.50 (3.29)	9.47 (4.22)
Female (%)	64.28 (0.49)	52.78 (0.50)	33.33 (0.48)
Urban (%)	71.43 (0.46)	33.33 (47.47)	72.22 (0.45)
<i>Informal</i>	N=122	N=4666	N=384
Age in years	30.34 (13.33)	35.89 (12.01)	32.06 (11.36)
Years of Education	7.19 (3.94)	6.03 (3.10)	7.85 (4.01)
Female (%)	59.02 (0.49)	54.86 (0.50)	28.64 (0.45)
Urban (%)	24.59 (0.43)	14.57 (0.35)	25 (0.43)
<i>Formal</i>	N=44	N=326	N=832
Age in years	28.27 (6.85)	35.55 (10.62)	33.83 (11.12)
Years of Education	9.84 (4.57)	10.09 (4.35)	7.22 (3.6)
Female (%)	36.36 (0.49)	25.84 (0.44)	30.67 (0.46)
Urban (%)	50.00 (0.51)	51.68 (0.50)	27.61 (0.45)

Note: standard deviation in parentheses

Source: Authors' construction based on World Bank data (2014 a and b).

Due to the high attrition rate at the individual level, we investigate whether the attrition could bias our estimation results. Consequently, we compare the summary statistics for individuals who remain in the sample and those who exit (attrition) based on our outcome variable (employment) and test whether the sample means are statistically different. The results for the t-tests are presented in Table 5. In view of the p-values, it is clear that the sample means for age and marital status are statistically different between the exits and the non-exits for the two data sets and in addition the mean for the number of children between the exits and non-exits is statistically different for the 2005-2010 period.

Table 5: A comparison of the sample means between the exits and the non-exits

Variable	2005-2010			2009-2011		
	Lost (exits)	Remain (non-exits)	P-value	Lost (exits)	Remain (non-exits)	P-value
Education	7.09	6.75	1	7	6.81	0.9791
Age	28.73	35.74	0	28.81	35.29	0
Female	0.5	0.5	0.9627	0.53	0.48	1
Married	0.46	0.77	0	0.48	0.71	0
Children/size	3.33	3.52	0.0002	6.67	6.53	0.949
Non-labour income	0.3	0.27	0.9993	0.35	0.33	0.9623
Urban	0.36	0.21	1	0.32	0.22	1
Observations	3,546	6,232		2,248	6,510	

Notes: Number of children for 2005-10 but household size for the 2009-11.

Source: Authors' construction based on World Bank data (2014 a, b and c).

Given the differences in some sample means of characteristics between the exits and the non-exits, we further investigate whether the attrition in our data is non-random based on observables by estimating a probit model (recognizing that attrition may be non-random based on unobservables). We construct a dummy variable equal to 1 if the observation of the outcome variable (transition) is missing in the second wave; implying the individual attrits and equal to 0 if the outcome variable is observed in both waves. The results confirm that attrition is non-random which increases if the individual resides in an urban area but reduces with age and being married for the 2005-2010 period, while we also find a non-random attrition process for the 2009-2011 period, with the same variables affecting attrition in addition to being female. The probit results for the two periods of analysis are presented in Table 16 in the appendix. Consequently we control for attrition bias using the inverse probability weighting (Wooldridge, 2002) when estimating the effect of education on transitions.

5. Methodology

We estimate conditional transitional probabilities i.e. conditional on initial state, using the Markov chain process and probit models. The Markov transition probabilities are

computed to analyse the movement of workers between sectors of employment, while we employ probit models to analyse the effect of education on the observed labour transitions. The Markov chain process assumes the likelihood of observing a future state j depends on the current state s where the probability of transition is given as $P = P_{sj}$ which shows the likelihood of staying in the same state or moving to another of the $J-1$ states over a specified period.

More generally, if we denote n_{sj} as the total number of individuals in the state j in period $t+1$ and s in period t , we can estimate the probability of an individual being in state j in period $t+1$ given that they are in state s in period t , using the formula:

$$P_{sj} = \frac{n_{sj}}{\sum_{j=1}^J n_{sj}} \quad (13)$$

Using equation (13), the probability of transition from the initial state s to the destination state j is equal to the proportion of individuals in state s at time t that are in state j at time $t+1$. In this study, we investigate transition between three employment states using the Markov transition matrix. These states are: “not-working” to “working”, “informal” to “formal” and “formal” to “informal” sector of employment. These three states allow for six possible transitions. However, small sample sizes mean that we group together all transitions out of “not-working”, and we ignore the very small number of transitions between employment and not-working. This leaves three transitions:

1. Transitions from “not-working” to “working” (either formal or informal)
2. Transitions from formal to informal employment
3. Transitions from informal to formal employment

We merge household and own-account workers to constitute informal employment and also merge the private and public sector to create a pool of formal sector workers. We decide to merge household and own-account workers because we notice major differences in the composition of the labour market between the 2005/06 and 2009/10 surveys which could be a result of misclassification rather than transitions (Tables 1 and 2). The public and private sector are merged because the public sector consists of too few observations to analyse these workers separately. We estimate two separate matrices for the 2005/06 - 2009/10 and 2009/10 - 2010/11 periods to compare transitions in a longer and shorter period and also as a robustness check.

The probabilities obtained from equation (13) only shed light on the probability of mobility (labour turnover) but offer little information on the random allocation of workers across available positions in all possible destination sectors which can be influenced either by an individual's preference or higher rate of job opening in a sector. In this respect, we compute the probability tendencies matrix T (Pages and Stampini, 2006 cited in Bosch and Maloney, 2007) as:

$$T_{sj} = \frac{n_{sj} / (n_{s\bullet} - n_{ss})}{(n_{\bullet j} - n_{jj}) / \sum_{m \neq s} (n_{\bullet m} - n_{mm})} \quad (14)$$

Where n_{sj} is the number of individuals moving from sector s to j which measures the propensity of transition, $n_{s\bullet}$ is the number initially in sector s , n_{ss} is the number of individuals who remain in the same state and in turn, $n_{s\bullet} - n_{ss}$ is the net flow of workers from state s (number of individuals who left sector s and are looking for a job in sector $m \neq s$). The term $n_{\bullet j}$ refers to the number of individuals in sector j in period $t+1$ (after the transition), therefore $n_{\bullet j} - n_{jj}$ is the net flow of workers in state j . Finally, $n_{\bullet m}$ is the number of individuals in sector $m \neq s$ after the transition and in turn, $n_{\bullet m} - n_{mm}$ is the net inflow of workers into all sectors except s . If the values of probabilities T_{sj} are equal to one, then the rate of job opening is the same between the destination sector and the other possible sectors of destination. But if the probabilities T_{sj} in the matrix are above one this implies a positive tendency to transition to the destination sector relative to the other possible destination sectors, while values below one indicate a lack of tendency to change to the destination sector relative to other possible destination sectors. Since the T matrix computes net flows, probabilities for individuals who remain in the same sector cannot be computed, therefore the diagonal cells of this matrix are empty.

Using probit models, we estimate the effect of education on labour transitions conditioned on being observed in the initial employment state s at time t , given as:

$$\Pr(E_{it+1} = j | E_{it} = s, X_{it}) = \Pr(E_{it+1}^* > 0 | X_{it}) = G(X_{it}\beta_j) \quad (15)$$

Where E_{it+1} is the employment state at $t+1$

The probit model is modelled from a latent variable E_{it+1}^* expressing the utility maximisation behaviour of individuals, such that an individual will choose alternative j which maximises his/her utility given both observed X_{it} and unobserved ε_{it} characteristics that vary across individuals:

$$E_{it+1}^* = X_{it} \beta_j + \varepsilon_{it} \quad (16)$$

Where $E_{it+1} = 1$ if $E_{it+1}^* > 0$ and $E_{it+1} = 0$ if $E_{it+1}^* < 0$

We model three mobility patterns as described earlier and therefore j takes three forms; working, formal and informal sector. The transitions are between two discrete time periods: initial state in 2005/06 or 2009/10 and destination state in 2009/10 or 2010/11 for the longer and shorter period respectively.

X_{it} is a vector of explanatory variables which are individual and household characteristics such as education (years of schooling or levels of educational attainment), age, gender, marital status, number of children (household size for the shorter period for which the variable on number of children is missing in the 2010/11 wave) in the household, non-labour income and residence. The ε_{it} are unobserved characteristics affecting individual preferences for each sector choice which are independently and identically distributed. The β_j is a vector of parameters to be estimated. We estimate static probit models, which assume the initial labour market state is exogenous.

Since we observed that the attrition may bias our results (in view of the statistics in Table 5), we weight the regression equation (15) using the inverse probability weights. We start by calculating the predicted probabilities from estimating a unrestricted model that includes all explanatory variables; the auxiliary variables (a_{it}) refer to variables significantly affecting attrition (based on the probit results in Table 16) and the outcome variable, and the non-auxiliary variables (c_{it}) which affect only the outcome variable, expressed as:

$$A = c_{it} \gamma + a_{it} \delta + v_i \quad (17)$$

Where A is the attrition binary variable equal to 1 if the individual attrits and zero if the individual appears in both waves, c_{it} includes; education, female, children/household size and non-labour income but female is excluded for the 2009-2011 data set. The a_{it} includes; age, age squared, marital status and urban residence and we include female for the 2009-2011 data set. After estimating the unrestricted model, we calculate the predicted probabilities from estimating a restricted model which includes only the non- auxiliary variables:

$$A = c_{it} \gamma + \varphi_i \quad (18)$$

The ratio from the predicted probabilities in equation (17) and (18) give the inverse probability weight written as:

$$W_i = \frac{P^r}{P^u} \quad (19)$$

Where P^r is the restricted model and P^u is the unrestricted mode. The inverse probability weight is useful, because it gives more weight to individuals with similar initial characteristics who exit than individuals with characteristics which make them more likely to remain in the sample. As the coefficients estimated from equation (15) do not have any direct intuitive meaning (Greene, 2003), we estimate the marginal effects given as:

$$\frac{\partial \Pr_{ij}(X_{it})}{\partial X_{ijk}} = \Pr_{ij}(X_{it}) [1 - \Pr_{ij}(X_{it}) \beta_k] \quad (20)$$

Where $k = 1 \dots K$, corresponding to the number of explanatory variables. The marginal effects in equation (20) are computed for each individual with respect to an independent variable and averaged over the entire estimation sample to get the average marginal effects (AME). This is also done for the sample disaggregated by gender and age group.

Furthermore, we investigate our hypothesis of a welfare gain for workers transiting from informal to formal employment and a welfare loss for workers moving from formal to informal employment by estimating the following wage equation:

$$\Delta \ln w_{it} = \alpha_s + \beta_s trans_{it} + \delta_s X_{it} + \varepsilon_{it} \quad (21)$$

Where $\Delta \ln w_{it}$ is the log change in monthly wage or log change in monthly income,⁴ $trans$ is a dummy variable representing the transition of the worker which takes two forms; equal to 1 if the worker transitions from “informal” to “formal” or from “formal” to “informal” and equal to 0 if the worker remains in the same employment state either “informal” or “formal” employment, X_{it} is a vector of personal characteristics which include; years of schooling, age and gender. The α_s and β_s are parameters to be estimated and δ_s is a vector of

4 Given that our sample has very few individuals with reported earnings, we calculate a monthly income from household consumption expenditure which is obtained by summing up all household consumption expenditure per month divided by the number of adults; 14 years and above. The aim is to retain a large number of individuals in our sample and consequently improve the level of precision of our estimates.

parameters to be estimated. If β_t is positive (negative) then the worker experienced an increase (decrease) in wage (welfare) after transiting.⁵

6. Discussion of results

6.1 Markov transition probability estimates

In Table 6, we present the probability estimates of transition between employment states based on the Markov transition processes for discrete time period for the longer period (2005-2010), where the rows show the initial state and the columns show the destination state. In this Table, we consider all the five categories of employment states in our sample to convey the entire picture of the transitions, and later present the three mobility patterns used in our estimates in Table 7. The detailed probability matrix presented in Table 6, shows the conditional probability of an individual being in a destination state j given that they started in state s and basically show the turnover rates. The diagonal cells represent individuals who remain in the same employment state during the period of analysis and the totals for the rows are the sum of individuals in the initial state and for the columns the sum of individuals in the destination state. The probabilities in the diagonal of the matrix convey the retention rate, given as P_{ss} representing individuals who remain in the same state, although this category will also include workers who change jobs in the same sector.

Overall, the probabilities show that the market is relatively fluid compared to labour markets in countries in Western Europe (Theodossiou and Zangelidis, 2009), Eastern Europe and Latin America (Duryea et al, 2006).⁶ For example, in our sample none of the movers from not working joined the public sector and only one household worker moved to the public sector. Also, we observe few individuals who fall into spells of unemployment, especially those in private and public sector employment.

5 We assume an increase (decrease) in welfare when an individual's income (using consumption expenditure as a proxy for income) increases (decreases).

6 Theodossiou and Zangelidis (2009), estimated mean transition probabilities for labour market states in six countries in Western European. Average retention rates for those who stay in the same job for both males and females were: UK (72%), Finland (84.58%), Germany (84.32%), France (90.66%), Spain (81.39%) and Greece (88.30%). Duryea et al (2006) analysed labour mobility patterns in Albania, Georgia, Hungary, Poland, Russia and Ukraine and Argentina, Mexico and Venezuela. They found the following ranges of retention rates; out of the labour force (75-89.9%), unemployed (12-66.8%), wage formal (74.9-90.1%), wage informal (39.4 – 49.3%), non-agricultural self-employment (18-85.6%) and agricultural self-employment (62.9 – 83.4%).

Interestingly we note that household workers have the highest retention rate, followed by those in the public sector. These results are surprising but could be signalling the inability of household workers to change jobs due to limited human (on average these workers have the least years of schooling) and financial capital (most of these workers are unpaid) especially for those desiring to transition to self-employment. On the side of public sector workers, the immobility could be due to lack of better jobs outside formal employment. However, our results are consistent with findings by Duryea et al (2006) who found a slightly higher retention rate for the self-employed in agriculture than in wage formal employment in Poland. As expected, not working has the least retention rate, because individuals have to earn to meet their basic necessities, especially in the absence of unemployment benefits as in Uganda's case.

Table 6: Transition probability matrix for 2005/06 – 2009/10

Employment state	Not working	Household worker	Own-account	Private	Public	Total (n_i)
Not working						
Probability (P_{sj})	0.175	0.263	0.21	0.351	0	1
Number (n_i)	10	15	12	20	0	57
Household worker						
Probability (P_{sj})	0.021	0.791	0.103	0.084	0.012	1.01
Number (n_i)	17	650	85	69	1	822
Own-account						
Probability (P_{sj})	0.014	0.562	0.32	0.095	0.01	1
Number (n_i)	23	958	546	162	17	1706
Private						
Probability (P_{sj})	0.017	0.238	0.233	0.48	0.033	1
Number (n_i)	7	100	98	202	14	421
Public						
Probability (P_{sj})	0	0.081	0.097	0.177	0.645	1
Number (n_i)	0	10	12	22	80	124
Total (n_i)	57	1,733	753	475	112	3,130

Source: Author computation from 2005/06 UNHS and 2009/10 UNPS data

In Table 7, we present a summary of the probabilities of the three mobility patterns in Panel A and also illustrate transition tendencies in Panel B. As earlier noted, we observe some inconsistency in the categorisation of household and own-account workers in the two waves, which prompted us to merge household and own-account workers to form the informal sector and private and public sector to constitute the formal sector. Consistently, we observe a higher retention rate for informal than formal sector workers and note that the labour movements are bi-directional but with fewer workers moving out of informal to formal employment than out of formal to informal employment. As noted in Table 6, the large movements out of formal employment are a result of workers leaving private rather than public sector employment. With regard to movement out of informal employment, a half of own-account workers move to household employment but due to inconsistency in the categorisation of workers in these two waves, the movements could be due to reclassification rather than transitions.

In Panel B, we present transition tendencies (T matrix), which take into account the size and rate of job opening of the destination state. The results indicate a positive tendency of the unemployed to join the informal sector and a lack of tendency to join the formal sector, which is consistent with the results in Table 6. In addition, we note the transitions are bidirectional with a positive tendency of workers moving out of informal to formal employment and in the reverse direction. Similarly, the tendency to transition from informal to formal employment is lower than switching from formal to informal employment. These results are surprising and in contrast with results of similar studies (Bosch and Maloney, 2007; Bernabè and Stampini, 2009), although we note that our study may not be directly comparable to these studies because of differences in the classification of workers. Bosch and Maloney (2007) computed the T matrix to investigate labour transitions in Argentina, Mexico and Brazil and found the probability of moving from informal salaried (workers in paid employment but without social security or medical benefit) to formal salaried is much higher than the opposite direction in all the three countries. Similarly Bernabè and Stampini (2009) analysed the T matrix for Georgia and found a higher tendency for workers to move from informal wage employment to formal employment than in the opposite direction, both for the urban and rural sample.

The observed mobility pattern may be due to the ease of entry in the informal sector and high barriers of entry in the formal sector especially the public sector due to considerably low rate of job opening in this sector relative to other sectors. Given the contrast of our results with earlier studies, we reclassify workers to investigate whether our

results are driven by our classification of workers. We categorise all workers in paid employment but not contributing to a social security fund as informal workers, and the rest of paid workers contributing to the fund as formal workers, for the 2009/10 – 2010/11 period for which this data is available. We adopt categorisation of workers in recent literature: self-employed, informal salaried and formal salaried and a detailed transition matrix is presented in Table 17 in the appendix. However, as shown in Table 18 in the appendix, the mobility patterns are consistent with the observation that there is a higher tendency to move out of formal to the informal employment than in the reverse direction. Interestingly, we find informal salaried workers have a higher tendency to transition to self-employment than formal employment, while formal salaried workers have a higher tendency to switch to informal salaried work than self-employment.

Table 7: P and T matrix probabilities, 2005/06 – 2009/10

Employment state	Not-working	Informal	Formal
<i>Panel A: P matrix</i>			
Not-working	0.175	0.473	0.351
Informal	0.016	0.886	0.098
Formal	0.013	0.404	0.583
<i>Panel B: T matrix</i>			
Not-working		1.198	0.888
Informal	0.926		1.012
Formal	0.194	1.153	

Source: Authors' construction based on World Bank data (2014 a and b).

The detailed probability matrix for the period 2009/10 – 2010/11 is presented in Table 8, which is consistent with results in Table 7 except in two situations. First, private employment has lower retention rates than own-account work which is surprising but consistent with available literature (Maloney, 1999; Gong et al, 2000; Bernabè and Stampini, 2009). Informal salaried workers (after reclassifying the workers we discover almost all workers in private employment are not protected by social security) have the lowest retention rates compared to the self-employed (in our case the own-account workers) and salaried formal workers. Second, as expected the retention rates for each category are higher than for the longer year period.

Table 8: Transition probability matrix for the 2009/10 – 2010/11

Employment state	Not working	Household worker	Own-account	Private	Public	Total
Not working Probability (P_{ij})	0.206	0.338	0.191	0.235	0.029	1.00
Number (n_i)	14	23	13	16	2	68
Household worker Probability (P_{ij})	0.026	0.821	0.084	0.06	0.009	1.00
Number (n_i)	48	1,518	155	111	17	1,849
Own-account Probability (P_{ij})	0.018	0.293	0.602	0.077	0.009	1.00
Number (n_i)	13	216	444	57	7	737
Private Probability (P_{ij})	0.045	0.216	0.1	0.583	0.058	1.00
Number (n_i)	22	105	48	284	28	487
Public Probability (P_{ij})	0.000	0.044	0.044	0.053	0.86	1.00
Number (n_i)	0	5	5	6	98	114
Total (n_i)	97	1,867	665	474	152	3,255

Source: Author computation from 2009/10 and 2010/11 UNPS data.

Similarly, we present conditional probabilities for the informal and formal sector as well as the probabilities for the T matrix in Table 9. Overall, the pattern is maintained with a higher tendency of those not working transiting into informal than formal employment. Although the T probabilities reveal a general lack of tendency for the unemployed to join any of these two sectors, because they are below one which generally signals a low rate of job opening in both sectors, which could be a result of a shorter period of study or a bigger problem of less access to jobs by individuals in Uganda's labour market over time. Additionally, we observe a positive tendency of workers in the informal sector to join the formal sector and in the reverse direction, which suggests that the labour market in Uganda is integrated.

Table 9: P and T matrix probabilities, 2009/10 – 2010/11

Employment state	Not-working	Informal	Formal
<i>Panel A: P matrix</i>			
Not-working	0.206	0.529	0.265
Informal	0.024	0.902	0.074
Formal	0.037	0.271	0.692
<i>Panel B: T matrix</i>			
Not-working		0.945	0.447
Informal	0.852		1.058
Formal	0.405	1.248	

Source: Authors' construction based on World Bank data (2014 b and c).

6.2 Probit probability estimates

In order to establish the effect of education on labour transitions in Uganda, we estimate three probit models for the three mobility patterns both for the longer (2005-2010) and shorter (2009-2011) period. The results are presented in Table 10. In both cases, the results are consistent, and suggest similar effect of education on labour transitions in Uganda. Surprisingly, the more educated individuals are less likely to transition to work. More educated individuals may prefer to work in the formal sector which has limited job openings, and choose to wait for a job opportunity in the formal sector rather than join the informal sector. Other factors may influence an individual's decision to wait, such as the availability of family support and lack of financial capital to become self-employed. Note a slightly higher effect of schooling on transition from informal to formal employment in the shorter period (2009-2011) at 0.9 percent than in the longer period at 0.6 percent. These results could be signalling the increasing difficulty of educated individuals to transition from informal to formal employment. However for the transition from formal to informal employment the effect of schooling is the same for both periods, suggesting a 3 percent decrease in the likelihood of an educated individual transiting between these sectors.

In reference to the other control variables, in particular the age variable, observe an inverse relation between age and labour mobility when a worker is moving out of unemployment and formal employment. These results are consistent with theory which predicts a decline in labour mobility with age. Consistent with the descriptive statistics, being female increases an individual's chance of working in the 2005-2010 period. In contrast, being female reduces the likelihood of transiting from informal to formal

employment and conversely increases the likelihood of switching to informal employment. These results could be due to women possessing low skills, which lowers the opportunity cost of leaving the formal sector and/or the employment terms in the informal sector could be more attractive for women than in the formal sector.

With regard to marital status, individuals who are married are more likely to transition from not working to working and from formal to informal employment. On the other hand, being married reduces an individual's likelihood of transiting from the informal to the formal sector. Married individuals may have more responsibilities, especially those with children, and cannot afford to remain unemployed and may prefer informal employment which offers flexible employment terms.

In reference to the number of children (or household size for the 2010/11 wave) where the variable for number of children was lacking), the presence of children in a household reduces the probability of transiting to the formal sector but increases the likelihood of switching to the informal sector. These results suggest that the employment terms in the formal sector may not be attractive for working parents. With regard to non-labour income, as expected individuals with more non-labour income reduce the probability of starting to work. We note the results for the effect of non-labour income on transitions from informal to formal employment are inconsistent for the two periods. In the longer period (2005-2010) an individual with more non-labour income reduces the likelihood of switching to formal employment, while in the shorter period (2009-2011) receiving non-labour income increases the probability of moving to formal employment. Lastly, residing in the urban area increases a worker's likelihood of switching from informal to formal employment and reduces the probability of movement in the opposite direction. These results are plausible in Uganda's case where most formal jobs are found in urban areas.

Table 10: Marginal effect of schooling on labour transition- full sample

Transition	Not working to working		Informal to formal		Formal to informal	
	2005-2010	2009-2011	2005-2010	2009-2011	2005-2010	2009-2011
Years schooling	-0.026*** (0.007)	-0.025*** (0.007)	0.006*** (0.002)	0.009*** (0.002)	-0.034*** (0.004)	-0.035*** (0.004)
Age	-0.030* (0.016)	-0.007 (0.014)	0.004 (0.003)	0.001 (0.003)	-0.035** (0.015)	-0.012 (0.012)
Age squared	0.000* (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000** (0.000)	-0.000 (0.000)
Female	0.089* (0.048)	-0.068 (0.054)	-0.087*** (0.012)	-0.062*** (0.011)	0.055 (0.052)	0.094** (0.043)
Married	0.285*** (0.066)	0.158 (0.117)	-0.048*** (0.018)	-0.033** (0.015)	0.104** (0.051)	0.089* (0.040)
Children/size	-0.013 (0.012)	-0.003 (0.011)	-0.008*** (0.003)	-0.005*** (0.002)	0.007 (0.011)	0.014** (0.006)
Non-labour income	-0.165** (0.071)	0.123 (0.076)	-0.027** (0.013)	0.038*** (0.013)	0.078 (0.049)	0.011 (0.039)
Urban	-0.002 (0.048)	-0.029 (0.069)	0.057*** (0.019)	0.01 (0.015)	-0.123*** (0.044)	-0.141*** (0.037)
Observations	56	65	2,466	2,473	533	568

Notes: Number of children for 2005-10 but household size for the 2009-11. Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Results in Table 11 re-estimate the probit models using levels of educational attainment and confirm that more education is associated with a reduction in the probability of transiting from not working to working with the effect evident for post primary education. The effect of education on the reduced probability of transiting from not working to working is greatest with the secondary and degree holders, which perhaps suggests that the supply of these individuals is higher than their demand in Uganda's labour market. Post primary education is associated with an increase in the probability of moving out of informal to formal employment with the impact increasing with level of educational attainment. Consistent with the results in Table 10, more education reduces the probability of switching from formal to informal employment which also increases with level of

education and more education would strongly influence transiting from formal to informal than in the reverse movement. The results suggest that more educated workers have a higher opportunity cost of leaving formal employment than those less educated and, due to the low rate of job opening in the formal sector, not all individuals who would prefer to get a job in the formal sector find one.

Table 11: Marginal effect of level of educational attainment on labour transition

Transition	Not working to working		Informal to formal		Formal to informal	
	2005-2010	2009-2011	2005-2010	2009-2011	2005-2010	2009-2011
Primary			-0.015 (0.016)	0.017 (0.014)	-0.215*** (0.065)	-0.093 (0.059)
Secondary	-0.227*** (0.041)	-0.132 (0.094)	0.034** (0.015)	0.032** (0.013)	-0.254*** (0.051)	-0.227*** (0.045)
Diploma	-0.087 (0.067)	-0.184* (0.094)	0.087*** (0.033)	0.137*** (0.026)	-0.389*** (0.060)	-0.396*** (0.057)
Degree	-0.209*** (0.078)	-0.442*** (0.135)	0.142** (0.069)	0.140** (0.046)	-0.458*** (0.133)	
Age	-0.005 (0.011)	0.000 (0.000)	0.003 (0.003)	0.001 (0.003)	-0.036** (0.015)	-0.014 (0.013)
Age squared	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000** (0.000)	0.000 (0.000)
Observations	51	55	2,466	2,473	533	537

Notes: Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, other control variables include: gender, marital status, non-labour income, number of children and urban, uncompleted primary is the reference group.

We further investigate whether there is a difference in the effect of education on labour market transitions in Uganda by gender and the results are presented in Table 12. We were not able to get meaningful results for the not working group, because of missing observations on some of the control variables, given the small sample of these individuals. Consequently, we report results only for the informal and formal mobility patterns. The results show that education increases the likelihood of males entering the formal sector more than females, and conversely education reduces the probability of females leaving formal employment more than males. Generally, these results signal less mobility of female than male workers which is consistent with literature (Royalty, 1998; Theodossiou and Zangelidis, 2009).

Table 12: Marginal effect of schooling on labour transition by gender

Transition	Informal to formal		Formal to informal	
	2005-2010	2009-2011	2005-2010	2009-2011
<i>Panel A: Females</i>				
Years of schooling	0.007*** (0.002)	0.005*** (0.002)	-0.041*** (0.007)	-0.041*** (0.006)
Observations	1,191	1,308	123	155
<i>Panel B: Males</i>				
Years of schooling	0.009** (0.004)	0.011*** (0.003)	-0.027*** (0.006)	-0.025*** (0.005)
Observations	1,081	1,166	379	413

Notes: Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, other control variables include: age, marital status, non-labour income, number of children and urban.

To gain insight on the variation of mobility patterns by age, we estimate the probit models by age group and cohort. In the case of age group, we group all individuals below 30 years as young, while those aged 30 years and above are categorised as old. For the cohort, we categorise all individuals born before 1976 as old, while individuals born in 1976 and after are grouped as young. We choose 1976 because by 2005, all individuals born before this year were at least 30 years old whom we consider old, in reference to the age limit of a youth in Uganda which is 30 years (according to official reports by the Uganda Bureau of Statistics). Results for the probit models with age and cohort effects are shown in Table 13. For the same reason as with gender, we present only results for informal and formal mobility patterns. The results demonstrate that education increases the probability of a young worker to switch from informal to formal employment more than the old worker and the impact of education on the transition from formal to informal is not statistically different between age groups for the longer period. The observed greater positive relation between education and transition to formal employment by the young than the old is plausible, given that jobs in the formal sector especially the public sector often have an age limit, while employment in the informal sector may be open especially for self-employment. We note that the age effect is stronger than the cohort effect, emphasising that age plays an important role in labour transitions in Uganda.

Table 13: Marginal effect of schooling on labour transition by age

Transition	Informal to formal		Formal to informal	
	2005-2010	2009-2011	2005-2010	2009-2011
<i>Panel A: Young</i>				
<i>Age effect</i>				
Years of schooling	0.012*** (0.004)	0.002 (0.004)	-0.031*** (0.009)	-0.008 (0.009)
Observations	812	760	160	183
<i>Cohort effect</i>				
Years of schooling	0.011*** (0.004)	0.005* (0.003)	-0.028*** (0.008)	-0.027*** (0.006)
Observations	968	1,148	207	268
<i>Panel B: Old</i>				
<i>Age effect</i>				
Years of schooling	0.005** (0.002)	0.009*** (0.002)	-0.030*** (0.005)	-0.035*** (0.004)
Observations	1,666	1,714	373	385
<i>Cohort effect</i>				
Years of schooling	0.004* (0.002)	0.008*** (0.002)	-0.029*** (0.005)	-0.032*** (0.004)
Observations	1,493	1,326	323	300

Notes: Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, other control variables include: gender, marital status, non-labour income, number of children, residence and survey date.

We investigate the effect of the transitions on the worker's wage by estimating equation (21) and present the results in Table 14. We find evidence of a decline in wages for workers transiting from formal to informal relative to workers who remain in formal employment, which is consistent with findings by Duryea et al (2006) in Argentina, Mexico, Venezuela, Albania and Ukraine but not in Georgia, Poland and Russia. Duryea et al (2006) found a monthly wage decline for workers transiting from formal to informal salaried employment in Argentina, Mexico, Venezuela, Albania and Ukraine but found a monthly wage increase for workers moving from formal to informal salaried employment in Georgia, Poland and Russia. We interpret our results as a signal for the likely cause of the transition, which may be lay-offs rather than quits for workers switching from formal to informal employment. Conversely, we find a positive association between transiting from informal to formal employment relative to staying in informal employment but it is not statistically significant.

Table 14: Effect of labour transition on wages

Dependent variable: log change in monthly earnings				
	2005-2010		2009 -2011	
	Informal to formal	Formal to informal	Informal to formal	Formal to informal
Transition	0.265 (0.402)	-1.006* (0.556)	0.837 (0.761)	-0.454 (0.329)
Education	0.074** (0.034)	0.045* (0.025)	0.179* (0.102)	0.024 (0.027)
Age	-0.140 (0.121)	-0.038 (0.077)	-0.160 (0.187)	0.099 (0.068)
Age squared	0.002 (0.002)	0.000 (0.001)	0.001 (0.002)	-0.001 (0.001)
Female	-0.444 (0.307)	-0.305 (0.206)	-1.296 (0.780)	-0.793*** (0.273)
Intercept	4.598** (2.191)	4.270*** (1.434)	5.099 (3.146)	1.533 (1.251)
R-squared	0.103	0.057	0.438	0.057
Observations	78	210	17	212

Notes: Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Given that we lose so many observations when estimating equation (21) using the wage variable (because of the limited number of individuals with reported earnings), we compute a proxy for income from household consumption expenditure divided by the number of adults in the household and re-estimate equation (21). The results are presented in Table 15 and are consistent with the observation that workers transiting from informal to formal employment experience a welfare gain and those who switch from formal to informal employment suffer a welfare loss. Though we find it is only the coefficient on transition from formal to informal employment for the 2009-2011 period which is statistically significant. All other explanatory variables have the expected signs with education increasing an individual's probability of welfare gain regardless of the sector of transition. Similarly, age increases an individual's welfare when one moves from informal to formal employment and also being female increases the likelihood of a welfare gain when an individual transitions from informal to formal employment.

Table 15: Effect of labour transition on income (welfare)

Dependent variable: log change in monthly income				
	2005-2010		2009 -2011	
	Informal to formal	Formal to informal	Informal to formal	Formal to informal
Transition	0.030 (0.056)	-0.097 (0.077)	0.088 (0.059)	-0.185** (0.074)
Education	0.091*** (0.006)	0.087*** (0.009)	0.075*** (0.005)	0.081*** (0.008)
Age	0.062*** (0.009)	0.007 (0.025)	0.041*** (0.007)	0.007 (0.017)
Age squared	-0.000*** (0.000)	0.000 (0.000)	-0.000*** (0.000)	0.000 (0.000)
Female	0.191*** (0.032)	-0.089 (0.081)	0.088*** (0.030)	0.104 (0.071)
Intercept	2.129*** (0.167)	3.578*** (0.462)	2.150*** (0.138)	3.007*** (0.313)
R-squared	0.183	0.212	0.133	0.225
Observations	2,276	505	2,410	539

Notes: Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

7. Conclusion and policy recommendations

The paper has analysed labour transitions in Uganda by estimating transition probabilities using the Markov chain process and probit models. We find Uganda's labour market relatively fluid compared to labour markets in countries in Western Europe, Eastern Europe and Latin America, with significant bidirectional worker flows i.e. informal to formal and formal to informal, although with stricter entry into formal than informal employment, especially public sector employment. Our results provide evidence of asymmetry between the informal and formal sector with a greater preference for formal than informal employment for the more educated individuals especially males and the young. In addition, we note that household and public sector work have high retention rates while own-account and private sector work have low retention rates.

Furthermore, we observe a higher tendency to transition from formal to informal employment than from informal to formal employment. These results are surprising and in contrast with patterns reported in similar studies (Bosch and Maloney, 2007 for three Latin

American countries; Bernabè and Stampini, 2009 for Georgia) which find higher flow of workers from the informal to the formal sector than the reverse direction. Even when we reclassify the workers to conform to common categorisation in the mentioned literature such as; self-employed, informal salaried and formal salaried our results remain robust. We attribute the observed mobility pattern to ease of entry in the informal sector and high barriers of entry in the formal sector especially the public sector due to the rationing of jobs.

In view of our results, among the factors causing this heterogeneity in workers is education, where the more educated workers are more likely to remain in formal employment and the less educated workers more likely to switch from formal to informal employment. In addition, we find evidence of a decline in monthly wages and welfare for workers transiting from formal to informal employment and a positive relation between transitions from informal to formal employment although not statistically significant. We interpret these results as a signal for the cause of the transitions, where movements from informal to formal employment are likely to be motivated by higher wages but the reverse movements could be involuntary transitions as a result of lay-offs rather than quits. We suggest future surveys should be enriched to provide more data on worker histories such as; reason for transiting, transiting within states, worker benefits, employment terms and worker earnings to provide data for a better analysis of labour market dynamics in Uganda. As an area of future research it would be instructive to investigate the rate of job creation and destruction in the informal and formal sectors.

The probit results indicate that more education would reduce an individual's probability of transiting from not working to working, especially if they have post-primary education. These results signal lack of jobs for the more educated workers and suggest a need to increase the availability of skilled jobs to employ the more educated workers. We find that a more educated worker is more likely to transition from informal to formal employment, while a less educated worker is more likely to move from formal to informal employment. These results indicate that more educated workers prefer formal to informal employment. Therefore, there is need to expand the formal sector by both the government and private sector to avail more employment opportunities for the more educated individuals. In order to provide employment opportunities for the less educated individuals, we suggest government promotes vocational education to provide skills targeted for self-employment and employment in the private sector. In particular, we propose the redesigning of the education curriculum to impart more practical skills at all

levels of education and increased government funding to technical institutions, which is likely to improve the employability of Uganda's labour force. In addition, government should promote a conducive economic, business and legal environment for informal activities to expand and transform into formal activities. We believe that if informal activities expand, then worker's employment conditions may improve which is likely to make this sector symmetric to the formal sector leading to higher retention of workers and will eventually attract the more educated individuals.

References

- Bartel Ann and George Borjas (1981). Wage Growth and Job Turnover: An Empirical Analysis. *Studies in Labor Markets*, 65-90.
- Becker Gary S. 'Investment in Human Capital: A Theoretical Analysis', *The Journal of Political Economy*, Vol.70, Issue 5 Part 2, Investment in Human Beings (Oct 1962), 9-49.
- Bernabè Sabine and Marco Stampini (2009). Labour Mobility during Transition: Evidence from Georgia. *Economics of Transition*. Vol. 17(2), 377-409.
- Bigsten Arne, Taye Mengistae and Abebe Shimeles (2007). Mobility and earnings in Ethiopia's Urban Labor Markets: 1994-2004. *The World Bank, Policy Research Working Paper* 4168.
- Burdett Kenneth (1978). A Theory of Employee Job Search and Quit Rates. *The American Economic Review*, Vol. 68, No.1, 212-220.
- Davis J. Steven and John Haltiwanger (1998). Measuring Gross Worker and Job Flows. *Labour Statistics Measurement Issues*, 77-122.
- Dickens William and Kevin Lang (1985): Testing Dual Labour Market Theory: A Reconsideration of the Evidence, National Bureau of Economic Research (NBER) *Working Paper Series*. No. 1670.
- Doeringer Peter and Michael Piore (1971): *Internal Labor Markets and Manpower Analysis*, Sharpe Publishers 3 Henrietta Street, London WC2E 8 LU.
- Duryea Suzanne, Gustavo Marquez, Carmen Pages and Stefano Scarpetta (2006). For Better or for Worse? Jobs and Earnings Mobility in Nine Developing and Emerging Economies. *Brookings Trade Forum*, 187- 203.
- Fields Gary (1990). *Labour Market Modelling and the Urban Informal Sector: Theory and Evidence*, Cornell University ILR School.
- Funkhouser Edward (1997). Mobility and Labor Market Segmentation: The Urban Labor Market in El Salvador. *Economic Development and Cultural Change*, Vol.46 No.1, 123-153.
- Gong Xiaodong, Arthur Van Soest and Elizabeth Villagomez (2000). Mobility in the Urban Labour Market: A Panel Data Analysis for Mexico. *IZA Discussion paper*, No.213.
- Greene William (2003). *Econometrics Analysis*, Fifth Edition, Pearson Education International.
- Gunther Isabel and Andrey Launov (2011): Informal Employment in Developing Countries, *Journal of Development Economics* (2011), doi:10.1016/J.jdeveco.2022.01.001
- Harris R. John and Michael P. Todaro (1970): *Migration, Unemployment and Development: A Two-sector Analysis*.
- Hart Keith (1973): Informal Income Opportunities and Urban employment in Ghana, *The Journal of Modern African Studies*, Vol. 11, No. 1 (Mar 1973), 61-89
- Heckman James (1981). The Incidental Parameters Problem and the Problem of Initial Conditions in Estimating a Discrete Time-Discrete data Stochastic Process.
- International Labour Office (ILO), 1972. *Employment, Income and Equality: A Strategy for Increasing Productivity in Kenya*. Geneva.

- Jacobson Louis, Robert Lalonde and Daniel Sullivan (1993). Economic Losses of Displaced Workers. *The American Economic Review*, Vol. 83, No.4, 685-709.
- Lewis Arthur (1954): Economic Development with Unlimited Supplies of Labour, *Manchester School* 22 (2), 139-191.
- Lippman A. Steven and John J. McCall (1976). The Economics of Job Search: A Survey. *Economic Inquiry*, June 1976; 14, 2; Periodicals Archive Online, 155.
- Magnac Thierry (1991): Segmented or Competitive Labor Markets. *Econometrica*, Vol. 59, No.1 (Jan 1991), 165-187.
- Maloney William (1999). Does Informality Imply Segmentation in Urban Labour Market? Evidence from Sectoral Transitions in Mexico. *The World Bank Economic Review*, Vol. 13, No.2, 275-302.
- Maloney William (2004). Informality Revisited. *World Development*. Vol.32, No7, 1159-1178. 2004 Elsevier Limited.
- McFadden Daniel (1974). The Measurement of Urban Travel Demand. *Journal of Public Economics* 3, 303-328. North-Holland Publishing Company.
- Mincer Jacob and Boyan Jovanovic (1981). Labour Mobility and Wages. *Studies in Labor Markets*, 21-64.
- Pages Carmen and Marco Stampini (2009). No Education, no good jobs? Evidence on the Relationship between Education and Labor Market Dynamics Using the Markov Processes: An Application to Informality. *The World Bank, Policy Research Working Paper* 4429.
- Pissarides Christopher (1994). Search Unemployment with On-the-job Search. *Review of Economic Studies* 61, 457-475.
- Pissarides Christopher (2011). Equilibrium in the Labor Market with Search Frictions. *American Economic Review* 101, 1092-1105.
- Rogerson Richard, Robert Shimer and Randall Wright (2005). Search Theoretical Models of Labor Market: A Survey. *Journal of Economic Literature*. Vol. XL111, 959-988.
- Roy A.D (1951). Some Thoughts on the Distribution of earnings. *Oxford Economic Papers*, Vol. 3, Issue 2, 135-146.
- Royalty Anne Beeson (1998). Job-to-Job and Job-to-Nonemployment Turnover by Gender and Education Level. *Journal of Labor Economics*, Vol. 16 No.2, 392-433.
- Swaminathan Madhura (1991). Understanding the 'Informal Sector': A Survey. World Institute for Development Economics Research (WIDER) of the United Nations University.
- Theodossiou I and A. Zangelidis (2009). Should I Stay or Should I go? The effect of Gender, Education and Unemployment on Labour Market Transitions. *Labour Economics* 16, 566-577.
- World Bank databank (2014a). '2005/06 Uganda National Household Survey data'.
- World Bank databank (2014b). '2009/10 Uganda National Panel Survey data'.
- World Bank databank (2014c). '2010/11 Uganda National Panel Survey data'.

Appendix.

Table 16: Probit results for attrition

	2005-2010	2009-2011
Education	0.001	0.001
	(0.002)	(0.001)
Age	-0.045***	-0.031***
	(0.002)	(0.002)
Age squared	0.000***	0.000***
	(0.000)	(0.000)
Female	0.003	0.033***
	(0.010)	(0.010)
Married	-0.161***	-0.081***
	(0.013)	(0.013)
Children	0.002	0.001
	(0.002)	(0.002)
Non-labour income	0.007	-0.016
	(0.010)	(0.010)
Urban	0.160***	0.095***
	(0.013)	(0.013)
Observations	9,775	8,539

Cluster standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Transition probability matrix for the 2009/10 – 2010/11 (reclassification)

Employment state	Not-working	Self-employed	Informal	Formal	Total
<i>Not-working</i>					
Number (n_i)	14	36	16	2	68
Probability (P_{si})	0.206	0.529	0.235	0.029	1
<i>Self-employed</i>					
Number (n_i)	61	2,333	177	15	2,586
Probability (P_{si})	0.024	0.902	0.068	0.006	1
<i>Informal</i>					
Number (n_i)	19	149	289	33	490
Probability (P_{si})	0.039	0.304	0.59	0.067	1
<i>Formal</i>					
Number (n_i)	3	10	36	61	110
Probability (P_{si})	0.027	0.091	0.327	0.555	1
Total	97	2,528	518	111	3,254

Source: Authors' construction based on World Bank data (2014 b and c).

Table 18: P and T probability matrix, 2009/10 – 2010/11 (reclassification)

Employment state	Not-working	Self-employed	Informal salaried	Formal salaried
<i>Panel A: P matrix</i>				
Not-working	0.207	0.53	0.236	0.027
Self-employed	0.024	0.902	0.068	0.006
Informal salaried	0.039	0.304	0.59	0.067
Formal salaried	0.027	0.091	0.327	0.555
<i>Panel B: T matrix</i>				
Not-working		1.623	0.613	0.352
Self-employed	1.052		1.107	0.427
Informal salaried	0.328	1.096		0.947
Formal salaried	0.366	0.401	1.593	

Source: Authors' construction based on World Bank data (2014 b and c).