

Dimova, Ralitzka; Nordman, Christophe J.; Roubaud, François

**Working Paper**

## Allocation of labour in urban West Africa: implication for development policies

IZA Discussion Papers, No. 3558

**Provided in Cooperation with:**

IZA – Institute of Labor Economics

*Suggested Citation:* Dimova, Ralitzka; Nordman, Christophe J.; Roubaud, François (2008) : Allocation of labour in urban West Africa: implication for development policies, IZA Discussion Papers, No. 3558, Institute for the Study of Labor (IZA), Bonn, <https://nbn-resolving.de/urn:nbn:de:101:1-2008062578>

This Version is available at:

<https://hdl.handle.net/10419/35288>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

IZA DP No. 3558

## Allocation of Labour in Urban West Africa: Implication for Development Policies

Ralitza Dimova  
Christophe J. Nordman  
François Roubaud

June 2008

# **Allocation of Labour in Urban West Africa: Implication for Development Policies**

**Ralitza Dimova**  
*Brunel University and IZA*

**Christophe J. Nordman**  
*IRD, DIAL, Paris*

**François Roubaud**  
*IRD, DIAL, Paris*

Discussion Paper No. 3558  
June 2008

IZA

P.O. Box 7240  
53072 Bonn  
Germany

Phone: +49-228-3894-0  
Fax: +49-228-3894-180  
E-mail: [iza@iza.org](mailto:iza@iza.org)

Any opinions expressed here are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but the institute itself takes no institutional policy positions.

The Institute for the Study of Labor (IZA) in Bonn is a local and virtual international research center and a place of communication between science, politics and business. IZA is an independent nonprofit organization supported by Deutsche Post World Net. The center is associated with the University of Bonn and offers a stimulating research environment through its international network, workshops and conferences, data service, project support, research visits and doctoral program. IZA engages in (i) original and internationally competitive research in all fields of labor economics, (ii) development of policy concepts, and (iii) dissemination of research results and concepts to the interested public.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

## ABSTRACT

### **Allocation of Labour in Urban West Africa: Implication for Development Policies<sup>\*</sup>**

With the use of comparable data from seven West African capitals, we attempt to assess the rationale behind development policies targeting high rates of school enrolment through the prism of allocation of labour and returns to skills across the formal and informal sectors. We find that people with high levels of education allocate to the small formal sector and receive high compensation for their education and experience. Less educated workers allocate to the informal sector. While self-employment reveals some characteristics of a sector of dynamic entrepreneurship, the characteristics of the informal salaried sector are closer to those of a sector of hidden unemployment, or a stepping stone for better jobs in the future.

JEL Classification: J24, J31, O12

Keywords: returns to skills, allocation of labour, self-selection, informal sector, Sub-Saharan West Africa

Corresponding author:

Christophe J. Nordman  
DIAL  
4 rue d'Enghien  
75010 Paris  
France  
E-mail: [nordman@dial.prd.fr](mailto:nordman@dial.prd.fr)

---

<sup>\*</sup> We thank Francis Teal and participants and the annual CSAE conference in Oxford and the Third IZA-World Bank conference in Rabat for helpful comments.

## **1. Introduction**

Educational investment in general and investment in basic education in particular have long been among the main targets of both bilateral and multilateral donors. Between the 1960s and the turn of the 21<sup>st</sup> century, the World Bank, the single largest donor, doubled its total investment, while the eight largest bilateral donors reached a contribution of more than USD 100 million per annum (EFA Global Monitoring Report, 2005). As Sub-Saharan Africa has consistently been the primary destination of educational investment, it is not surprising that gross elementary school enrolment rates in the sub-continent increased from 40% in the 1960s to 87% in the 1990s, while gross secondary school enrolment rates rose from 3.4% to 26% over the same period (World Bank, 2004). Yet, the number of adults without basic literacy increased from 131.4 million in 1990 to 136 million in 2000, more than one in 10 children continued to repeat at least one grade in more than half of the Sub-Saharan African countries and the expected link between increasing levels of educational enrolment and growth remains as elusive as ever (UNESCO, 2007; Pritchett, 2001).

A plausible, but often ignored, explanation of the above pattern could be the low usability of the available stock of education or barriers to its productive utilization in the Sub-Saharan African labour market, which decrease both the individual incentive to acquire education and the association between educational enrolment and growth. The two strands of literature touching upon this issue have failed to reach a consensus. On the one hand, there has been an ongoing debate on the appropriate measurement of returns to

different types of education. Some authors find a convex relationship between education and earnings (Schultz, 2004; Söderbom et al., 2006; Kuepie et al., 2006), while others assume this relationship to be concave (Psacharopoulos and Patrinos, 2002). At least part of the inability to reconcile these findings - with clearly conflicting policy implications - comes from empirical shortcomings related to concordance of data sampling and econometric techniques across different countries, as well as inadequate accounting for unobserved characteristics in estimates of returns to observed skills (Bennell, 1996).

On the other hand, research on the allocation of skills across different labour market niches has established that following the structural reform of the 1980s, the formal urban sector across Sub-Saharan Africa shrank, while allocation of people into the informal sector and not working rose (Rama, 1998; Calvès and Schoumaker, 2004). In several countries, this process coincided with the rising inflow of highly educated people into the pools of informal, unemployed and discouraged labourers (Serneels, 2004; World Bank, 2006).

However, there is no answer to the question of whether this pattern prevails across African countries and if so, whether the primary culprit is low “mastery” level of observed skills, i.e. low level of usability of skills in the changing environment, as opposed to a shortage of productive job opportunities that puts barriers to their effective utilization (World Bank, 2006). The ambiguity is further aggravated by the fact that more than half of the workers in these countries are not protected by labour legislation and work in small, informal enterprises. At the same time, the literature addressing the functioning of the informal sector in developing countries has failed to adequately resolve the debate between market dualism, which looks at the informal sector as a disadvantaged

sector and sector of exploitation of underprivileged workers (Mazumdar, 1983; Fields, 1990) as opposed to a sector of personal choice or dynamic entrepreneurship that shows few of the characteristics of a stylised dual economy (Maloney, 1999; 2004).

The primary purpose of this paper is to find out whether there is efficient allocation of human capital in the urban West African labour markets, and if not, whether the primary culprit is an inadequate usability of skills required or the absence of appropriate productive opportunities for the effective use of these skills. With the use of a sophisticated econometric technique, we first explore the determinants of the allocation of labour across the formal sector, different modalities of the informal sector and not working in the West African urban markets. To our knowledge, this is the first comparative investigation of the allocation of labour in the informal sector of several African countries based on surveys using identical sampling plans and questionnaires.

The pattern of resource allocation established in the first stage, useful as it is in telling us where people with different levels of education go, tells us little about the usability of resources and their possible misallocation in the labour market. Indeed, both the allocation of people with high and low levels of education out of working and in the informal sector may be a reflection of an efficiently functioning labour market and high levels of mastery of skills. For instance, the allocation of highly educated people out of the labour force may be a reflection of low mastery of skills and skill obsolescence while the allocation of highly educated people into the informal sector could be consistent with the development of productive niches in the informal sector. This scenario can equally be consistent with high institutional barriers to formal employment which precludes the allocation of people with high levels of observed and unobserved skills into the small

formal sector, while the informal sector is a sector of hidden unemployment which absorbs people with high levels of both observed and unobserved skills. At the same time, the allocation of people with low levels of education into the informal sector would not necessarily be a reflection of low levels of productivity of this sector in an environment where observed educational stocks are not an indicator of adequate education quality and unobserved skills like entrepreneurship are rewarded in a flourishing informal sector.

In the second stage of our empirical exercise, we therefore estimate earnings equations for the different employment sectors, after controlling for the influence of unobserved skills on the selection of employment sector. Our methodology will not only help us find whether people are negatively selected in say the informal sector (i.e. earnings in the informal sector are lower than those of a randomly selected average worker due to the allocation of people with better unobserved characteristics in alternative labour market niches), we can provide an answer as to whether these people would have performed better in the formal sector, or whether their unobserved characteristics are highly correlated with (hidden) unemployment. If we find a negative selectivity of people in the formal sector, this could be an indication of high levels of nepotism or barriers to formal sector employment. If, on the other hand, we find no selectivity problem in the formal sector or a positive selection of people in the formal sector together with negative selectivity in the informal sector, this could indicate an absence of entrepreneurship or productive opportunities in the informal sector. High quality comparable data across West African countries allow us to draw a fairly general picture on the pattern of allocation of labour and returns to skills in the sub-continent.



Our results are not inconsistent with the hypothesis of efficient resource allocation. People with high levels of education allocate to the formal sector and receive high returns to their skills, while people with low levels of education allocate to the informal sector. There is no significant evidence of misallocation of resources across the formal and informal sectors. The characteristics of the informal self-employment sector are not inconsistent with the concept of dynamic entrepreneurship, while the informal salaried sector is more consistent with the perception of hidden unemployment, or at least a stepping stone towards better labour market opportunities in the future.

The rest of the paper is organised as follows. Section 2 outlines the empirical methodology. In section 3 we provide some details on the data used. Section 4 comments on the regression results and Section 5 concludes.

## 2. Methodology

Our basic model is given by:

$$Y_s = X_s \beta_s + U_s, \quad [1]$$

and

$$Y_s^* = Z_s \gamma_s + \eta_s, \quad s = 1 \dots M, \quad [2]$$

where  $Y_s$  refers to the earnings associated with a specific sector,  $Y_s^*$  is a discrete choice variable indicating the sector of employment,  $X_s$  and  $Z_s$  are demographic and other explanatory variables and the disturbance  $U_s$  satisfies  $E(U_s | X) = 0$  and  $V(U_s | X, Z)$

=  $\sigma_s^2$ . When using OLS, the earnings equations are run separately. However, if there are unobserved characteristics of individuals that affect both their choice of employment and their earnings, the error terms  $U_s$  and  $\eta_s$  will be correlated and the OLS estimates of  $\beta_s$  will be inconsistent.

To correct for the potential inconsistency, applied research has traditionally employed the bias correction method embedded in Lee's (1983) extension of the Heckman (1979) two-stage selection model to the multinomial logit case. The exact equivalent of the Heckman inverse-Mill's ratio in each sectoral earnings equation is based on the correlation between the disturbance term of each wage equation and the cumulative distribution of  $\varepsilon_s$ , where  $\varepsilon_s = \max_{j \neq s} (y_j^* - \eta_s)$ . The joint distribution of  $U_s$  and  $\varepsilon_s$  depends on all  $Z_j \gamma_j$  and the related bias correction term incorporates all the information from the multinomial logit model. Its sign indicates the direction of the selection bias resulting from the selection of individuals in the sector for which an earnings equation is estimated as opposed to all other sectors taken together.

Bourguignon, Fournier and Gurgand (2007, hereafter BFG) argue that clubbing together all information based on the multinomial logit model makes the selectivity correction mechanism unnecessarily restrictive. They offer an alternative, which takes into account the correlation between the disturbance terms from each earnings equation and the disturbance terms from each multinomial logit equation (namely  $U_s$  and  $\eta_s$ ). This link is incorporated in their model by assuming a linear association between  $U_s$  and  $\eta_s$ ,  $U_i = \sigma_i \sum_s \rho_s \eta_s^* + \omega_i$ , for each  $i$ , i.e., a latent equation. Hence, the conditional expected value of the disturbances from the latent equation is

$E(U_i | Y_i^* > \max_{j \neq i}(y_j^*)) = \sigma_i \sum_s \rho_s E(\eta_s^* | y_i^s > \max_{j \neq i}(y_j^s))$ . After substituting this conditional

expected value into the earnings equation and performing several algebraic manipulations in the spirit of Lee, we are left with the following bias-corrected earnings equation:

$$Y_i = X_i \beta_i + \sigma_i [\rho_1 m(P_1) + \sum_s \rho_s \frac{P_s}{(P_s - 1)} m(P_s)] + v_i, \quad [3]$$

where  $P_s$  is the probability that a category  $s$  is chosen,  $v_i = \eta_i + \log P_1$  and  $m(P_s) = \int J(v - \log P_s) g(v) dv$ . The number of bias correction terms in this equation is equal to the number of multinomial logit choices.

The BFG methodology thus allows us to identify not only the direction of the bias related to the allocation of individuals in a specific sector, but also which choice among any two alternative sectors this bias stems from. For instance, a positive bias correction coefficient related to selection equation 3 in earnings equation 1 highlights higher earnings of individuals in sector 1 compared to individuals taken at random, due to the allocation of people with worse unobserved skills out of sector 1 into sector 3.

The BFG model is appealing. Monte Carlo experiments show that while the Lee (1983) model performs well only in relatively small samples, the BFG method tends to be the universally preferred econometric methodology for selectivity correction based on the multinomial logit, even when flexible (e.g., non-linear) specifications are present and the IIA condition does not hold.<sup>1</sup>

---

<sup>1</sup> For an overview of all known methods for selectivity correction based on the multinomial logit, and justification for the universally preferable qualities of the BFG method, see Bourguignon et al. (2007). Further examples of the use of the BFG methodology in empirical research and discussion of its advantages over all alternative selectivity correction models based on multiple choices can be found in Dimova and Gang (2007), Smith et al. (2004) and Ewoudou and Vencatathellum (2006).

Given the fact that the satisfaction of the IIA condition is often a numerically difficult task, driven by the tolerance levels used, we perform and first report the marginal effects from a multinomial probit analysis of sectoral choice. We then report the results from our BFG estimations, after correcting for potential biases in earnings determination. Note that while the second stage estimates from BFG are consistent, they have inefficient standard errors due to the two-step nature of the procedure. We obtain efficient standard errors with the use of bootstrapping.

### **3. Data**

#### **3.1. The 1-2-3 surveys**

Our empirical analysis uses data from urban household surveys in West Africa (the *1-2-3 Surveys*), conducted in seven major Western African Economic and Monetary Union (WAEMU) capitals – Abidjan, Bamako, Cotonou, Dakar, Lomé, Niamey and Ouagadougou – between 2001 and 2002<sup>2</sup>. They were carried out by the countries' National Statistical Institutes, AFRISTAT and DIAL as part of the PARSTAT Project, the regional statistical assistance project for multilateral monitoring, sponsored by the WAEMU Commission. The project consists of three different phases, collecting three different sets of data: (1) individual socio-demographic and labour market characteristics, (2) firm level informal sector characteristics, and (3) household level consumption and living conditions. Our study is based on data from phase one. To assure consistency with the labour economics literature, we restrict our samples to include only individuals in the formally recognised working age group of 15-65. To avoid getting a wrong impression

---

<sup>2</sup> The survey was not carried out in Guinea-Bissau.

about the pool of not-working people we exclude those that are currently undergoing education.

The survey methodology is aimed at assuring high quality, high degree of representativeness and comparability across countries. It includes data from 2,500 households in each of the seven cities, with the exception of Abidjan where the number of households is 3,000. Overall 17,841 households answered the questionnaire. This corresponds to 93,213 individuals, 69,565 of whom are over the age of 10. Details on the actual data collection can be found in Brilleau, Roubaud and Torelli (2005), Brilleau, Ouedraogo and Roubaud (2005) and Kuepie et al. (2006).

The data allows us to distinguish between people holding different types of employment. Our categorization is based on the sector of employment for the individual's main job.

The definition of our two informal sector categories is based on the ILO standards, described in Maloney (1999, 2004). Specifically, an informal self-employed worker is somebody who owns an individual business that is not formally registered according to the national regulations. An informal salaried worker, on the other hand, is a person employed by an informal firm. The employment of this worker is not regulated by a labour contract, formal pay-slips and social security benefits. The qualitative distinction between these two categories is a priori unclear. It is plausible to assume that the informal self-employment sector in the context of high regulatory barriers develops as a sector of dynamic entrepreneurship, while the informal salaried sector absorbs workers unable to sustain employment in the formal salaried sector. It is equally plausible to assume that in

a dualistic market, both sectors develop as inferior sectors of hidden unemployment, with no obvious qualitative difference between them.

Our formal sector category includes people who are either employed by formal institutions and firms (including public administration) or work for an officially registered business as independent workers. The latter of these formal categories includes less than 1% of the workers in our samples, typically including professions such as doctors or lawyers. The small size of this sample makes it impossible for us to explore it as a sector of its own.

One of the most difficult tasks in our study is the appropriate measurement of earnings. This is due to the fact that workers in the informal sector do not have formal pay slips and are not obliged to disclose their incomes. To overcome these difficulties, the interviewers were asked to help the respondents reconstruct their earnings by recapping their monetary inflows and outflows over the reference period. People who were not able or were unwilling to disclose their exact earnings were asked to give a bracket, defined as a multiple of the minimum wage in the labour force. Nearly half of the employed workers (48%) declared a precise income figure and over one third (36%) gave a bracket<sup>3</sup>. Less than 6% provided no information. For both workers who refused to disclose their earnings and those who gave a bracket, earnings were imputed by an econometric estimation based on an income equation<sup>4</sup>. We use earnings per hour as a

---

<sup>3</sup> Seven brackets were defined by multiples of the minimum wage in force, providing therefore quite thin intervals.

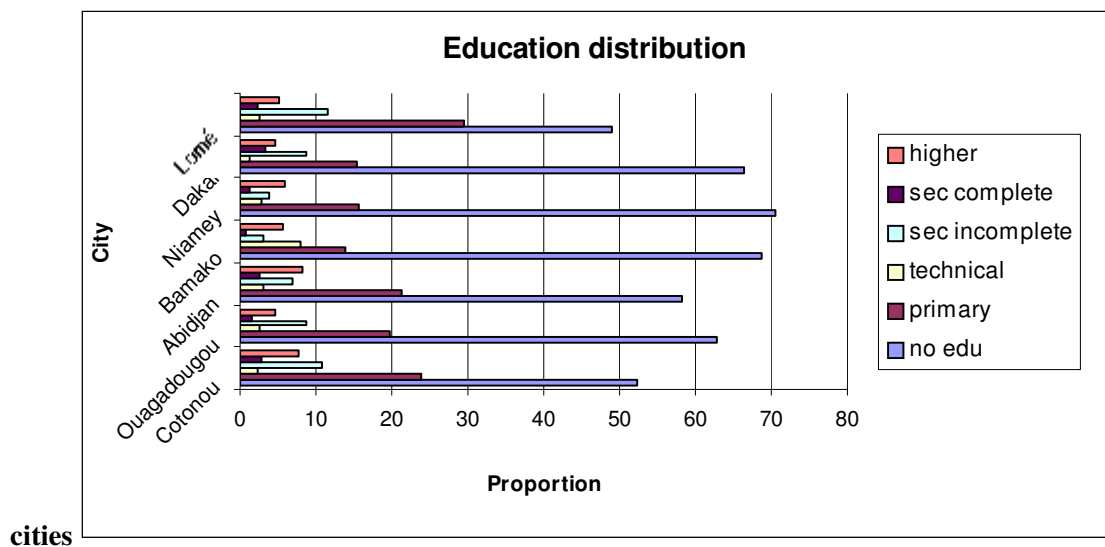
<sup>4</sup> In a first step, an earnings model is estimated for the employed workers who disclosed their precise earnings based on their observed characteristics. In a second step, the predicted values from this model are imputed. For the individuals with income brackets (which hence constitute the overwhelming proportion of workers with imputed incomes), the procedure of imputation includes a third step: uniform random sampling is conducted and the results of this sampling is added to the estimated income until the sum obtained comes within the bracket declared by the interviewee. Sensitivity tests of this methodology over

dependent variable in our earnings regressions. Incomes are synchronized across the different capitals with the use of purchasing power parity indexes.

### 3.2. Descriptive statistics of the samples

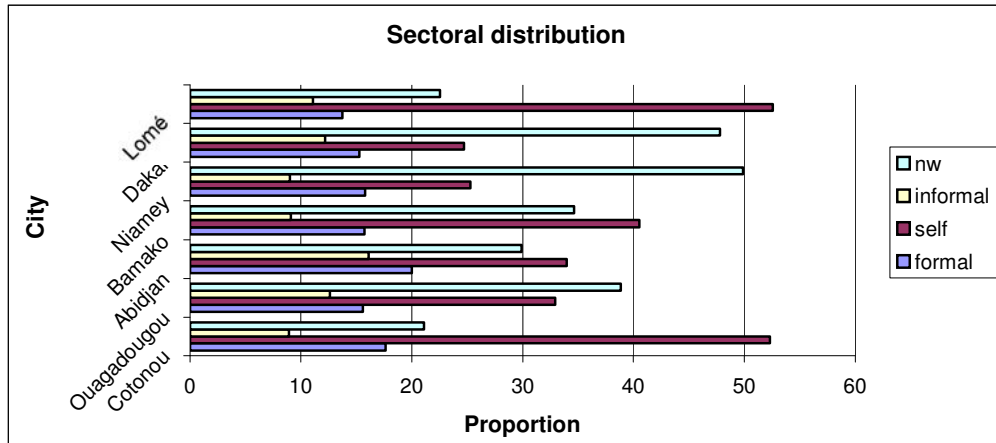
Figures 1 and 2 highlight some preliminary statistics on the allocation of labour and educational distribution across the different capitals. Figure 1 indicates that in virtually all capitals, the proportion of working age people with no education accounts for approximately 50-60% of the samples. It is followed by the proportion of people with completed primary education, while education higher than the basic level is a scarce commodity. Figure 2 highlights that the majority of working age people either do not have permanent employment or work in the informal sector. The formal sector, on the other hand, employs at most 15% of the working age populations in these economies.

**Figure 1. Distribution of education across the West African**



alternative techniques have been conducted in Kuepie et al. (2006) and show that estimates of the earnings equations are only marginally modified and remain qualitatively unchanged.

**Figure 2. Allocation of labour across the formal and informal sectors in the West African cities**



Source: 1-2-3 surveys, Phase 1, 2001-2002 (National Institutes of Statistics, AFRISTAT, DIAL); Authors' calculations.

Some additional descriptive statistics are reported in Tables 1a and 1b. The statistics indicate that in all countries formal sector earnings exceed informal sector earnings and there is no significant difference between earnings in the informal self-employment and the informal salaried sectors.

We define six different categorical education variables which help us identify differences in returns to specific types of education (e.g. vocational versus general training). These differences are difficult to explore with the use of a continuous education variable. Unfortunately, high levels of school drop-out in the African context decreases the rationale for defining these variables along the lines of completed degrees of education. We therefore define the following education variables. Education\_1 includes people with complete primary school or incomplete middle school education. Education\_2 includes individuals with secondary vocational training. Education\_3 includes people with complete middle school and incomplete secondary education.



Education\_4 includes individuals with complete secondary education and Education\_5 includes people with education higher than the secondary level. The omitted category includes people with no education or incomplete primary education.

Our descriptive statistics indicate that while there is a slightly non-linear link between educational attainment and formal sector employment in that in most countries the proportion of people with complete primary education exceeds that of people with vocational training or people with complete secondary education, while people with tertiary education are in general more likely to be allocated to the formal sector than either not work or be in the informal sector. Interestingly, the proportion of non-working people with all types of education higher than the omitted category is slightly higher than the proportion of such people allocated to the informal sector.

Female labourers are more likely to either not work or work for the informal self-employment sector than male labourers. The higher levels of non-employment and lower levels of formal employment among women are consistent with gender discrimination patterns around the world, while the higher levels of informal self-employment perhaps indicate a higher willingness of women to opt for second best jobs in that sector more as a complement to family income than in pursuing a career track (Hundley, 2000).

In our empirical analysis we follow a version of the classical Mincer-type of wage equation, which includes education variables, potential experience variable, defined as age minus years of education minus 6 (the age at school entry), and a female dummy variable. However, it is much more difficult to find exogenous determinants of sector choice correlated with the sector, but uncorrelated with the error terms of the earnings equation.

In keeping with the literature, we give preference to parental occupation categories as an excluding condition in our two stage analysis (Evans and Leighton, 1989; Earle and Sakova, 2000). Specifically, we define a dummy variable taking the value of one if the respondent's father was an informal sector employee during the respondent's childhood, and a dummy variable taking the value of one if the respondent's father was a formal sector employee<sup>5</sup>. The omitted category is a father who did not have permanent employment during the respondent's childhood. We find that, as expected, the children of informal sector workers are more likely to work for the informal sector themselves, but the link between the occupation of the father and formal employment of the child is not as straightforward.

#### 4. Specification and Econometrical Results

Following our preceding discussion, our empirical specification is:

$$\begin{aligned} \text{Sector} = & \beta_0 + \beta_1 \text{Experience} + \beta_2 \text{Experience squared} + \sum \beta_{3i} \text{Education} + \beta_4 \text{Female} \\ & + \beta_6 \text{Dad Formal} + \beta_7 \text{Dad Informal} + v \end{aligned} \quad [4]$$

$$\begin{aligned} \text{Ln Hourly Earnings} = & \alpha_0 + \sum \alpha_{1i} \text{Education} + \alpha_2 \text{Experience} + \alpha_3 \text{Experience} \\ & \text{squared} + \alpha_4 \text{Female} + u \end{aligned} \quad [5]$$

where [4] is the selection equation and [5] is the earnings equation.

---

<sup>5</sup> Note that due to its distributional properties, the model is identified even without excluding conditions (Bourguignon et al, 2007). Indeed, omitting the excluded variables from the first stage equation does not change our results.

Our results are reported in Tables 2-8. Tables 2-5 report the marginal effects from our multinomial probit analysis of sectoral choice, separately for the formal sector, informal self-employment sector, informal salaried sector and not working. Tables 6-8 highlight the results from our earnings equations with the use of the BFG methodology, with each of these tables highlighting the results from our earnings estimations for the formal sector, informal self-employment sector and informal salaried sector, respectively.

#### **4.1. Multinomial probit results**

By and large, the marginal effects from our multinomial probit analysis confirm our assumptions from the analytical framework and descriptive statistics. The formal sector results, reported in Table 2, indicate that higher education increases the probability of working for the formal sector. In all the seven capitals, the positive marginal effect of the tertiary education variable (Education\_5), in the range of 0.51-0.78 exceeds the positive marginal effects of all education variables higher than the omitted category of no education or incomplete primary education. Furthermore, we see that in the majority of the cities the marginal effect of vocational education (Education\_2) is higher than those of the general secondary schooling variables.

We also observe that potential experience has the expected concave influence on working for the formal sector, and female labourers in general face a lower probability of working for the formal sector than male workers. Finally, respondents whose fathers had consistent employment during their childhoods face a higher probability of working for the formal sector and that probability is typically higher for respondents whose fathers worked for the formal sector.

The marginal effects on allocation into the informal sector, reported in Tables 3 and 4, respectively, reveal a strikingly different pattern. Higher levels of education have a negative impact on choosing either the informal self-employment sector or the informal salaried sector. However, the negative marginal effects of education are typically higher in the informal self-employment equations. This confirms our descriptive statistics results whereby the more educated labourers allocate to the formal sector and the least educated labourers allocate to the informal sector. Once again the link between experience and employment is concave in the informal self-employment equation indicating a lower probability of working for that sector with the increase in age, but the experience-employment relationship in the informal salaried equations is convex. This explanation is consistent with the Maloney (1999) finding that the informal salaried sector is a stepping stone for other types of employment in the future.

Female workers face a lower probability of working for the informal salaried sector than male workers, a pattern consistent with that observed in our descriptive statistics. However, there are some gender differences in informal self-employment across the different countries with women in Cotonou and Lomé facing a higher probability of working for the informal self-employment sector, women in Abidjan, Niamey and Dakar facing a lower probability than males of working for that sector and women in Ouagadougou and Bamako facing the same probabilities as males of allocating to the informal self-employment sector. These patterns perhaps reflect ethnic differences across the different countries<sup>6</sup>. Finally, the children of informal sector workers typically

---

<sup>6</sup> For ethnic and gender issues using this data, see Nordman, Robilliard and Roubaud (2008), “Ethnic and Gender Wage Gaps in Seven West African Cities”, mimeo DIAL, Paris.

face a higher probability of working for the informal sector and children of formal sector workers typically face a lower probability of working for the informal salaried sector.

The pattern of resource allocation into not working is consistent with conventional wisdom (Table 5). Higher levels of education have a negative impact on the probability of not working, the experience-not working relationship is convex, and females face a higher probability of not working than males. Interestingly, the probability of not working is lower among the children of informal sector employees. This observation is consistent with the high level of inter-generational transmission of employment status and the shrinking formal sector in the aftermath of the structural reform.

#### **4.2. Earnings estimations**

We now turn to the estimation of our earnings equations, after accounting for the self-selection of individuals into the four sectors. The BFG estimates for the formal sector for each of the seven capitals are reported in Table 6. The estimates for the informal self-employment sector are shown in Table 7, and the estimates for the informal salaried sector are reported in Table 8.

For each sector-based earnings estimation, a negative (positive) selectivity coefficient related to any of the alternative sectors indicates lower (higher) earnings than those of randomly chosen individuals on account of the allocation of individuals with better (worse) unobserved characteristics out of the given sector and into the respective alternative sector. For instance, if we observe a negative selectivity correction coefficient associated with self-employment in the formal sector equation, this indicates lower than

randomly chosen rewards to the skills of individuals working for the formal sector due to the allocation of individuals with better unobserved characteristics out of the formal sector into self-employment.

The results reported in Table 6 show that in general there is no selection bias in the formal sector, with the exception of Ouagadougou and Dakar, where there is negative selectivity into formal sector employment, and Lomé, where formal sector earnings are negatively biased due to the allocation of people with better unobserved characteristics out of the formal sector into the informal salaried sector.

The rest of the formal sector earnings estimates are consistent with conventional wisdom in that, in general, high levels of education lead to higher earnings. For all but one of the capitals (Lomé) the tertiary education coefficients are positive and highly significant. The same is true for the rest of the education variables in Cotonou, Abidjan and Niamey, while in Dakar and Ouagadougou only tertiary education provides significant returns vis-à-vis the omitted category of no education. In Bamako, both tertiary and completed general secondary education provide higher returns while, in Togo, there are not significant returns to skills higher than the omitted category.

In Cotonou, Bamako and Niamey, there is a positive association between higher levels of experience and earnings in the formal sector, the experience-earnings profile in Abidjan is concave, and there is no significant association between experience and earnings in Ouagadougou, Dakar and Lomé. Finally, the selectivity corrected female coefficient is insignificant in all but one of the cities (Abidjan).

The association between education and earnings in the informal self-employment sector is less straightforward (Table 7). Only in Ouagadougou, Abidjan and Lomé, there

are significant returns to higher levels of education, especially for tertiary education. The estimates for Cotonou highlight significantly higher returns to general secondary and primary education vis-à-vis the omitted category, while in Niamey and Dakar this is true only for primary education. There are no significant returns to any education higher than the omitted category in the informal self-employment in Bamako.

This configuration may reflect differences in the schooling dynamics in these African countries. At one end of the scale, there are the cities with a long tradition of schooling. The first group comprises Lomé, Abidjan and Cotonou where, even among the individuals aged 45 to 59, a non-negligible proportion (at least 45 percent) has the minimum level of schooling. At the other end of the spectrum are those where the development of schooling has been stepped up more recently (Bamako, Niamey and, to a certain extent, Ouagadougou). In this landscape, Dakar stands out for its stagnation (at around 60 percent) in the proportion of individuals without the minimum grounding in education across all generations. As far as our results are concerned, Ouagadougou then provides the exception with greater returns than those found in similar cities in terms of educational dynamics.

Similarly to results for the formal sector equations, there is significant association between self-employment earnings and experience only in the case of Cotonou and Abidjan, where the relationship between the two variables is concave. Interestingly, in all cities, females face lower earnings than males in the informal self-employment sector, which is consistent with the perception of females as secondary household earners.

The selectivity pattern in the informal self-employment sector differs across the cities. However, the most consistent finding, with five significant coefficients out of

seven, is that of upward biased earnings due to the allocation of people with inferior unobserved skills out of the informal self-employed sector into the informal salaried sector. Once again this is consistent with the perception of the informal salaried sector as a stepping stone to better jobs and as a sector of hidden unemployment.

Interestingly, the pattern of returns to skills in the informal salaried sector (Table 8) is more consistent with the pattern in the formal sector than that in the informal self-employed sector. In all countries, there are high returns to tertiary education vis-à-vis the omitted category, and in general high returns to skills other than tertiary education and the omitted category. In four out of the seven cities there is a concave earnings-experience relationship. At the same time, females tend to earn significantly less than males everywhere. Finally, there is no significant evidence of selection bias, except in the case of Cotonou and Abidjan where earnings in the informal salaried sector are downward biased due to the allocation of people with better unobserved skills out of the labour force. This finding may reflect the existence of queuing for the formal sector in these two countries as returns to participation in the formal sector may far outweigh the monetary wage in the salaried informal sector (recall that returns to human capital are particularly significant and high in the formal sectors of Cotonou and Abidjan, see Table 6). Then, the existence of significant rents in the formal sector (especially in the dominant public sector) may be so high that it would become perfectly rational for individuals to "queue", and discount the returns to be accrued in the informal sector.

Overall, we do not observe significant evidence against an efficiently functioning labour market. There is no evidence of selection bias in the formal and informal salaried sectors, while the positive selection in the informal self-employment sector vis-à-vis the



informal salaried sector can be interpreted as an indication of the allocation of people with lower entrepreneurial skills out of self-employment into informal salaried employment. There is also a clear differentiation between the formal and informal sector in terms of the human capital allocated into these two sectors. Specifically, people with higher education allocate to the formal sector, while people with lower levels of education allocate in the informal sector.

## **5. Concluding remarks**

The development of high levels of human capital, and in particular, high levels of education has long been seen as a panacea for the developmental problems of lower income economies. This perception has found expression in policy making and has led to prolific body of academic literature on the quality of education and the success of individual programs in assuring high school enrollment levels. Significantly less attention has been attributed to the rentability of the education obtained, and in particular, the allocation and adequate use of observed and unobserved skills across formal, informal sectors and not working in the labour markets of these economies. The literature on allocation of resources across the different sectors of urban Sub-Saharan Africa has been particularly scarce.

The main purpose of this paper is to fill the gap in the literature and provide a comprehensive description of the link between allocation of resources and returns to skills across the Western Sub-Saharan African urban labour markets. Specifically, we relate the allocation of labour across the formal sector, informal self-employment sector,

informal salaried sector and not working to the returns to observed and unobserved characteristics in each of these sectors.

Overall, we do not observe very strong evidence against an efficiently functioning labour market. There is no evidence of misallocation of resources between the formal and informal salaried sectors, while the positive selection in the informal self-employment sector vis-à-vis the informal salaried sector can be interpreted as an indication of the allocation of people with lower entrepreneurial skills out of self-employment into informal salaried employment. There is also a clear differentiation between the formal and informal sector in terms of the human capital allocated into these two sectors. Specifically, people with higher education allocate to the formal sector, while people with lower levels of education allocate in the informal sector.

While our results do not provide evidence in favour of misallocation of resources in the West African urban labor market and are not inconsistent with those in even developed economies, more research is needed to assess their broader economic implications. For instance, one needs to probe deeply into the characteristics of both the formal and informal sectors, to study their technological structures and to try to answer the question as to whether any entrepreneurial capital that may be present in the current informal self-employed sector could be used more productively in the formal sector should its private sector portion expand. The appropriate education policies should be adjusted accordingly.

## References

- Barro, R. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, 106(1): 407-443.
- Bennel, P. (1996). Rates of return to education: does the conventional pattern prevail in Sub-Saharan Africa? *World Development*, 24: 183-199.
- Blanchflower, D. and Oswald, A. (1998). What makes an entrepreneur? *Journal of Labor Economics*, 16(1): 26-60.
- Bourguignon, F., Fournier, M. and Gurgand, M. (2007). Selection bias correction based on the multinomial logit model: Monte-Carlo comparisons. *Journal of Economic Surveys*, 21(1): 174-205.
- Brilleau, A., Ouedraogo, E., Roubaud, F. (2005). L'enquête 1-2-3 dans les principales agglomérations de l'UEMOA : la consolidation d'une méthode. *Statéco*, No. 99.
- Brilleau, A., Roubaud, F. and Torelli, C. (2005). L'emploi, le chômage et les conditions d'activité, enquête 1-2-3 Phase 1, *Statéco*, No. 99: 43-69.
- Calvès, A.-E. and Schoumaker, B. (2004), Deteriorating economic context and changing patterns of youth employment in urban Burkina Faso: 1980–2000. *World Development*, 32: 1341-1354.
- Dimova, R. and Gang, I. (2007). Self-selection and wages during volatile transition. *Journal of Comparative Economics*, forthcoming.
- Earle, J. and Sakova, Z. (2000). Business start-ups or disguised unemployment? Evidence on the character of self-employment from transition economies. *Labour Economics*, 7(5): 575-601.
- EFA Global Monitoring Report (2005).  
<http://unesdoc.unesco.org/images/0013/001373/137333e.pdf>
- Evans, D. and Leighton, L. (1989). Some empirical aspects of entrepreneurship. *American Economic Review*, 79(3): 519-535.
- Ewoudou, J. and Vencatachellum, D. (2006). An empirical analysis of the rates of return to education in Cameroon. Mimeo. University of Montreal and African Development Bank.

- Fields, G. (1990). Labor market modeling and the urban informal sector: theory and Evidence. in Turnham, D., Salomé, B. and Schwarz, A. (eds). *The Informal Sector Revisited*. Paris: OECD.
- Harris, J. and Todaro, M. (1970). Migration, unemployment and development: a two-sector analysis. *American Economic Review*, 60(1): 126-142.
- Heckman, J. (1979). Sample selection bias as specification error. *Econometrica*, 47:153-161.
- Hundley, G. (2000). Male/female differences in self-employment: the effects of marriage, children and the household division of labor. *Industrial and Labor Relations Review*, 54 (1): 95-114.
- Kuepie, M., Nordman, C. and Roubaud, F. (2006). Education and labor market outcomes in Sub-Saharan West Africa. *DIAL working paper*, DT2006-16.
- Lee, L.-F. (1983). Generalized econometric models with selectivity. *Econometrica*, 51(2): 507-512.
- Maloney, W. (1999). Does informality imply segmentation in urban labor markets? Evidence from sectoral transitions in Mexico. *World Bank Economic Review*, 13(2): 275-302.
- Maloney, W. (2004). Informality revisited. *World Development*, 32(7): 1159-1178.
- Mankiw, G., Romer, D. and Weil, D. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 107: 407-437.
- Mazumdar, D. (1983). Segmented labor markets in LDCs. *American Economic Review*, 73(2): 254-259.
- Nordman, C.J., Robilliard, A-S., and Roubaud, F. (2008). Decomposing gender and ethnic earnings gaps in seven West African cities, DIAL mimeo, Presented at the CSAE Annual Conference 2008, University of Oxford:  
[www.csae.ox.ac.uk/conferences/2008-EdiA/papers/176-Robilliard.pdf](http://www.csae.ox.ac.uk/conferences/2008-EdiA/papers/176-Robilliard.pdf)
- Pritchett, L. (2001). Where has all the education gone? *The World Bank Economic Review*, 15(3): 367-391.
- Psacharopoulos, G. and Patrinos, H.A. (2002). Returns to investment in education: a further update. *World Bank Research Working Paper*, 2881, Washington, DC: The World Bank.

- Rama, M. (1998). Wage misalignment in CFA countries. Are labor market policies to blame? *Policy Research Working Paper 1873*, The World Bank, Washington D.C.
- Söderbom, M., F. Teal, A. Wambugu and G. Kahyarara (2006). Dynamics of returns to education in Kenyan and Tanzanian manufacturing. *Oxford Bulletin of Economics and Statistics*, 68(3): 261-288.
- Schultz, T. P. (2004). Evidence of returns to schooling in Africa from household surveys: monitoring and restructuring the market for education. *Journal of African Economies*, 13: 95-148.
- Serneels, P. (2004). The nature of unemployment in urban Ethiopia. *CSAE Working Paper, 2004-18*, Oxford, Centre for the Study of African Economies.
- Smith, V. K., Evans, M., Kin H. and Taylor, D. (2004). Do the near-elderly value mortality risks differently? *The Review of Economics and Statistics*, 86(1): 423-429.
- UNESCO (2007): [http://portal.unesco.org/education/en/ev.php?URL\\_ID=31032&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/education/en/ev.php?URL_ID=31032&URL_DO=DO_TOPIC&URL_SECTION=201.html)
- World Bank (2004). *World Development Indicators*. CD-ROM, Washington, D.C.
- World Bank (2006). *Development and the New Generation*, World Development Report 2007, Washington D.C.

**Table 1a: Descriptive statistics**

	Cotonou	Ouagadougou	Abidjan	Bamako	Niamey	Dakar	Lomé
<b>Formal Sector</b>							
<b>Experience</b>	20.93 (10.16)	21.71(10.77)	21.29(10.04)	23.48 (9.99)	21.80 (11.10)	23.28(10.96)	21.71(9.89)
<b>Education_1</b>	0.20 (0.40)	0.19(0.39)	0.24 (0.43)	0.13 (0.33)	0.19 (0.39)	0.18(0.38)	0.27(0.45)
<b>Education_2</b>	0.06 (0.24)	0.08(0.28)	0.06 (0.23)	0.26 (0.44)	0.11 (0.31)	0.04(0.20)	0.08(0.28)
<b>Education_3</b>	0.21(0.41)	0.25(0.43)	0.14 (0.35)	0.07 (0.25)	0.11 (0.31)	0.20(0.40)	0.22(0.41)
<b>Education_4</b>	0.08 (0.28)	0.06(0.23)	0.07 (0.25)	0.02 (0.14)	0.05 (0.22)	0.09(0.29)	0.08(0.27)
<b>Education_5</b>	0.31 (0.46)	0.21(0.41)	0.25 (0.43)	0.23 (0.42)	0.27 (0.44)	0.18(0.39)	0.18(0.39)
<b>Female</b>	0.27 (0.45)	0.30(0.46)	0.22 (0.42)	0.22 (0.41)	0.26 (0.44)	0.27(0.44)	0.23(0.42)
<b>Dad formal</b>	0.43 (0.50)	0.37(0.48)	0.35 (0.48)	0.36 (0.48)	0.31 (0.46)	0.42(0.49)	0.39(0.49)
<b>Dad informal</b>	0.33 (0.47)	0.38(0.48)	0.51 (0.50)	0.41 (0.49)	0.41 (0.49)	0.29(0.45)	0.42(0.49)
<b>Hourly wages</b>	0.54 (0.60)	0.64(0.96)	0.93 (1.23)	0.66 (1.38)	0.67 (1.46)	0.76(1.01)	0.52(0.95)
<b>N Obs</b>	907	920	1126	881	981	1377	591
<b>Informal Self-employed Sector</b>							
<b>Experience</b>	24.86(11.69)	26.85(12.20)	24.68 (11.38)	26.28( 11.9)	29.18 (13. 18)	27.19(12.94)	22.94(10.87)
<b>Education_1</b>	0.24(0.43)	0.15(0.36)	0.18 (0.39)	0.14 (0.35)	0.11 (0.31)	0.14(0.35)	0.30(0.46)
<b>Education_2</b>	0.01 (0.12)	0.01 (0.11)	0.02 (0.14)	0.03 (0.17)	0.01 (0.09)	0.01(0.08)	0.01(0.12)
<b>Education_3</b>	0.08 (0.27)	0.02 (0.16)	0.04 (0.20)	0.02 (0.14)	0.02 (0.13)	0.05(0.21)	0.08(0.28)
<b>Education_4</b>	0.01 (0.11)	0.0 (0.06)	0.01 (0.10)	0.0 (0.06)	0.0 (0.07)	0.02(0.12)	0.01(0.10)
<b>Education_5</b>	0.02 (0.12)	0.01 (0.09)	0.02 (0.14)	0.01 (0.11)	0.01 (0.11)	0.01(0.11)	0.01(0.12)
<b>Female</b>	0.61 (0.49)	0.53 (0.50)	0.59 (0.49)	0.55 (0.50)	0.50 (0.50)	0.54(0.50)	0.64(0.48)
<b>Dad formal</b>	0.25 (0.43)	0.15 (0.36)	0.21 (0.41)	0.18 (0.38)	0.14 (0.35)	0.28(0.45)	0.26(0.44)
<b>Dad informal</b>	0.51 (0.50)	0.61 (0.49)	0.60 (0.49)	0.59 (0.49)	0.61 (0.49)	0.43(0.49)	0.54(0.50)
<b>Hourly wages</b>	0.23 (0.40)	0.19 (0.83)	0.30 (0.65)	0.30 (0.98)	0.23 (0.36)	0.43(1.65)	0.16(0.31)
<b>N Obs</b>	2688	1943	1913	2270	1570	2225	2260

Note: the figures in brackets are standard deviations. Education\_1 includes people with complete primary school or incomplete middle school education. Education\_2 counts individuals with secondary vocational training. Education\_3 includes people with complete middle school and incomplete secondary education. Education\_4 includes individuals with complete secondary education and Education\_5 includes people with education higher than the secondary level.

**Table 1b: Descriptive statistics**

	<b>Cotonou</b>	<b>Ouagadougou</b>	<b>Abidjan</b>	<b>Bamako</b>	<b>Niamey</b>	<b>Dakar</b>	<b>Lomé</b>
<b>Informal Salaried Sector</b>							
<b>Experience</b>	16.64 (9.07)	16.30(10.49)	17.40(9.76)	17.25 (9.73)	20.69(11.59)	16.83(9.78)	16.81(9.43)
<b>Education_1</b>	0.27(0.44)	0.24(0.43)	0.21(0.41)	0.11 (0.31)	0.16(0.36)	0.12(0.33)	0.32(0.47)
<b>Education_2</b>	0.01(0.12)	0.04 (0.15)	0.01(0.11)	0.04 (0.20)	0.01(0.10)	0.00(0.05)	0.02(0.14)
<b>Education_3</b>	0.08(0.27)	0.08 (0.27)	0.05(0.21)	0.03 (0.17)	0.02(0.14)	0.04(0.19)	0.13(0.33)
<b>Education_4</b>	0.01 (0.11)	0.02 (0.13)	0.01(0.09)	0.01 (0.10)	0.01(0.09)	0.01(0.11)	0.02(0.14)
<b>Education_5</b>	0.02 (0.12)	0.04 (0.17)	0.02(0.14)	0.03 (0.17)	0.04(0.19)	0.01(0.11)	0.04(0.19)
<b>Female</b>	0.61 (0.49)	0.29 (0.45)	0.44(0.50)	0.40 (0.49)	0.24(0.42)	0.47(0.50)	0.38(0.49)
<b>Dad formal</b>	0.25 (0.43)	0.24 (0.43)	0.24(0.43)	0.20 (0.40)	0.21(0.41)	0.27(0.44)	0.26(0.44)
<b>Dad informal</b>	0.51 (0.50)	0.50 (0.50)	0.55(0.50)	0.59 (0.49)	0.54(0.50)	0.41(0.49)	0.49(0.50)
<b>Hourly wages</b>	0.23 (0.40)	0.17 (0.00)	0.21(0.29)	0.15 (0.24)	0.20(0.38)	0.18(0.38)	0.15(0.23)
<b>N Obs</b>	459	744	907	510	561	1100	477
<b>Not working Sector</b>							
<b>Experience</b>	22.51 (14.68)	20.88 (14.08)	18.73 (12.99)	22.95 (13.44)	20.36(13.25)	21.08(13.83)	21.03(14.14)
<b>Education_1</b>	0.26 (0.44)	0.22 (0.42)	0.23 (0.42)	0.15 (0.36)	0.17(0.37)	0.16(0.37)	0.29(0.45)
<b>Education_2</b>	0.02 (0.15)	0.02 (0.13)	0.01 (0.18)	0.07 (0.25)	0.02(0.13)	0.01(0.10)	0.03(0.16)
<b>Education_3</b>	0.11 (0.32)	0.07 (0.26)	0.07 (0.25)	0.02 (0.16)	0.03(0.17)	0.09(0.28)	0.12(0.33)
<b>Education_4</b>	0.02 (0.16)	0.01 (0.11)	0.02 (0.14)	0.0 (0.07)	0.01(0.07)	0.03(0.16)	0.02(0.14)
<b>Education_5</b>	0.06 (0.24)	0.01 (0.11)	0.08 (0.27)	0.04 0.18)	0.02(0.13)	0.03(0.17)	0.06(0.24)
<b>Female</b>	0.67 (0.47)	0.68 (0.47)	0.67 (0.47)	0.71 (0.46)	0.71(0.45)	0.71(0.46)	0.60(0.49)
<b>Dad formal</b>	0.33 (0.47)	0.22 (0.41)	0.31 (0.46)	0.20 (0.40)	0.21(0.41)	0.33(0.47)	0.34(0.48)
<b>Dad informal</b>	0.44 (0.50)	0.48 (0.50)	0.48 (0.50)	0.45 (0.50)	0.50(0.50)	0.29(0.45)	0.40(0.49)
<b>N Obs</b>	1085	2294	1684	1941	3098	4306	969

Note: the figures in brackets are standard deviations.

**Table 2: Determinants of the allocation of people to the formal sector (Marginal effects from multinomial probit model on sectoral choice)**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Experience</b>	0.0108*** (0.0018)	0.0173*** (0.0014)	0.0199*** (0.0019)	0.0143*** (0.0015)	0.0111*** (0.0013)	0.0144*** (0.0011)	0.0109*** (0.0017)
<b>Experience<sup>2</sup></b>	-0.0178*** (0.0034)	-0.0252*** (0.0026)	-0.0321*** (0.0036)	-0.0224*** (0.0027)	-0.0160*** (0.0024)	-0.0223*** (0.0021)	-0.0165*** (0.0033)
<b>Education_1</b>	0.1359*** (0.0173)	0.1891*** (0.0185)	0.1740*** (0.0175)	0.0809*** (0.0171)	0.1736*** (0.0181)	0.1124*** (0.0133)	0.0867*** (0.0151)
<b>Education_2</b>	0.4757*** (0.0467)	0.5663*** (0.0398)	0.3147*** (0.0414)	0.4840*** (0.0269)	0.6115*** (0.0343)	0.4399*** (0.0467)	0.4099*** (0.0506)
<b>Education_3</b>	0.3598*** (0.0261)	0.5555*** (0.0260)	0.3626*** (0.0294)	0.3151*** (0.0426)	0.4632*** (0.0345)	0.2759*** (0.0195)	0.2316*** (0.0271)
<b>Education_4</b>	0.5355*** (0.0426)	0.6515*** (0.0437)	0.4988*** (0.0435)	0.3925*** (0.0834)	0.5900*** (0.0540)	0.3809*** (0.0323)	0.4792*** (0.0538)
<b>Education_5</b>	0.6914*** (0.0238)	0.7832*** (0.0211)	0.5806*** (0.0248)	0.5645*** (0.0312)	0.6834*** (0.0239)	0.5168*** (0.0259)	0.5231*** (0.0394)
<b>Female</b>	-0.1139*** (0.0106)	-0.0882*** (0.0089)	-0.1822*** (0.0107)	-0.1476*** (0.0097)	-0.1309*** (0.0092)	-0.1481*** (0.0078)	-0.1079*** (0.0107)
<b>Father formal</b>	0.0256* (0.0139)	0.0147 (0.0126)	0.0810*** (0.0184)	0.0909*** (0.0162)	0.0317** (0.0136)	0.0413*** (0.0095)	0.0195 (0.0140)
<b>Father informal</b>	-0.0091 (0.0129)	-0.0124 (0.0106)	0.0370** (0.0146)	0.0451*** (0.0110)	-0.0053 (0.0103)	0.0199** (0.0093)	0.0015 (0.0125)

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are standard errors. The sample sizes for the different country-based multinomial probit models can be inferred from Table 1. The Wald and Log-likelihood tests indicate that the model specifications are appropriate.



**Table 3: Determinants of the allocation of individuals to the informal self-employment sector (Marginal effects from multinomial probit model on sectoral choice)**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Experience</b>	0.0297*** (0.0026)	0.0301*** (0.0022)	0.0295*** (0.0024)	0.0248*** (0.0024)	0.0218*** (0.0019)	0.0211*** (0.0015)	0.0291*** (0.0028)
<b>Experience<sup>2</sup></b>	-0.0453*** (0.0046)	-0.0424*** (0.0038)	-0.0404*** (0.0043)	-0.0343*** (0.0041)	-0.0243*** (0.0032)	-0.0258*** (0.0027)	-0.0484*** (0.0051)
<b>Education_1</b>	-0.1016*** (0.0189)	-0.0807*** (0.0175)	-0.0837*** (0.0168)	-0.0354* (0.0206)	-0.0605*** (0.0163)	-0.0450*** (0.0130)	-0.0612*** (0.0194)
<b>Education_2</b>	-0.3655*** (0.0357)	-0.2557*** (0.0232)	-0.2187*** (0.0267)	-0.3106*** (0.0194)	-0.2171*** (0.0165)	-0.1595*** (0.0256)	-0.3395*** (0.0399)
<b>Education_3</b>	-0.2753*** (0.0229)	-0.2803*** (0.0153)	-0.1857*** (0.0220)	-0.1647*** (0.0371)	-0.1609*** (0.0211)	-0.1421*** (0.0132)	-0.1811*** (0.0269)
<b>Education_4</b>	-0.3916*** (0.0326)	-0.3019*** (0.0214)	-0.2379*** (0.0286)	-0.2577*** (0.0638)	-0.1774*** (0.0321)	-0.1462*** (0.0196)	-0.3326*** (0.0439)
<b>Education_5</b>	-0.5101*** (0.0167)	-0.3109*** (0.0139)	-0.3029*** (0.0153)	-0.3668*** (0.0191)	-0.2152*** (0.0139)	-0.2079*** (0.0124)	-0.4161*** (0.0285)
<b>Female</b>	0.0591*** (0.0153)	-0.0119 (0.0134)	-0.0813*** (0.0138)	-0.0081 (0.0144)	-0.0678*** (0.0119)	-0.0649*** (0.0099)	0.1433*** (0.0167)
<b>Father formal</b>	-0.0321 (0.0204)	0.0279 (0.0211)	-0.0288 (0.0210)	0.0436** (0.0215)	0.0357* (0.0196)	0.0381*** (0.0128)	0.0118 (0.0226)
<b>Father informal</b>	0.0306* (0.0184)	0.0787*** (0.0159)	0.0049 (0.0183)	0.1015*** (0.0168)	0.0591*** (0.0141)	0.0843*** (0.0123)	0.0733*** (0.0204)

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are standard errors. The sample sizes for the different country-based multinomial probit models can be inferred from Table 1. The Wald and Log-likelihood tests indicate that the model specifications are appropriate.

**Table 4: Determinants of the allocation of individuals to the informal salaried sector (Marginal effects from multinomial probit model on sectoral choice)**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Experience</b>	-0.0090*** (0.0015)	-0.0108*** (0.0015)	-0.0108*** (0.0018)	-0.0108*** (0.0013)	0.0024** (0.0012)	-0.0044*** (0.0012)	-0.0091*** (0.0018)
<b>Experience<sup>2</sup></b>	0.0072*** (0.0028)	0.0076*** (0.0028)	0.0063* (0.0036)	0.0094*** (0.0024)	-0.0084*** (0.0022)	-0.0025 (0.0022)	0.0077** (0.0035)
<b>Education_1</b>	-0.0389*** (0.0080)	-0.0539*** (0.0096)	-0.0850*** (0.0105)	-0.0540*** (0.0073)	-0.0325*** (0.0086)	-0.0661*** (0.0071)	-0.0262** (0.0109)
<b>Education_2</b>	-0.0672*** (0.0092)	-0.0749*** (0.0146)	-0.1326*** (0.0132)	-0.0716*** (0.0059)	-0.0709*** (0.0090)	-0.1033*** (0.0086)	-0.0568*** (0.0199)
<b>Education_3</b>	-0.0642*** (0.0070)	-0.0888*** (0.0082)	-0.1270*** (0.0104)	-0.0579*** (0.0092)	-0.0710*** (0.0080)	-0.0975*** (0.0062)	-0.0487*** (0.0119)
<b>Education_4</b>	-0.0719*** (0.0073)	-0.0856*** (0.0135)	-0.1460*** (0.0104)	-0.0431* (0.0224)	-0.0661*** (0.0125)	-0.0997*** (0.0068)	-0.0691*** (0.0163)
<b>Education_5</b>	-0.0809*** (0.0052)	-0.1033*** (0.0015)	-0.1722*** (0.0068)	-0.0710*** (0.0059)	-0.0636*** (0.0074)	-0.1048*** (0.0057)	-0.0836*** (0.0099)
<b>Female</b>	-0.0683*** (0.0086)	-0.1492*** (0.0096)	-0.0959*** (0.0106)	-0.0875*** (0.0083)	-0.1375*** (0.0085)	-0.0675*** (0.0073)	-0.0932*** (0.0109)
<b>Father formal</b>	-0.0129 (0.0104)	0.0019 (0.0133)	-0.0366** (0.0147)	0.0098 (0.0121)	0.0094 (0.0119)	-0.0164* (0.0086)	-0.0349*** (0.0124)
<b>Father informal</b>	-0.0130 (0.0098)	0.0180* (0.0109)	-0.0043 (0.0138)	0.0244*** (0.0092)	0.0143 (0.0091)	0.0342*** (0.0089)	-0.0121 (0.0122)

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are standard errors. The sample sizes for the different country-based multinomial probit models can be inferred from Table 1. The Wald and Log-likelihood tests indicate that the model specifications are appropriate.

**Table 5: Determinants of the allocation of individuals to not working (Marginal effects from multinomial probit model on sectoral choice)**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Experience</b>	-0.0389*** (0.0080)	-0.0366*** (0.0022)	-0.0387*** (0.0022)	-0.0283*** (0.0023)	-0.0353*** (0.0021)	-0.0310*** (0.0017)	-0.0309*** (0.0022)
<b>Experience<sup>2</sup></b>	0.0559*** (0.0036)	0.0600*** (0.0038)	0.0661*** (0.0040)	0.0472*** (0.0039)	0.0487*** (0.0037)	0.0506*** (0.0031)	0.0572*** (0.0040)
<b>Education_1</b>	0.0046 (0.0161)	-0.0544*** (0.0192)	-0.0053 (0.0176)	0.0084 (0.0210)	-0.0806*** (0.0202)	-0.0012 (0.0161)	0.0007 (0.0167)
<b>Education_2</b>	-0.0430 (0.0365)	-0.2357*** (0.0327)	0.0367 (0.0396)	-0.1018*** (0.0243)	-0.3234*** (0.0316)	-0.1772*** (0.0447)	-0.0136 (0.0417)
<b>Education_3</b>	-0.0204 (0.0204)	-0.1864*** (0.0227)	-0.0499* (0.0262)	-0.0925** (0.0390)	-0.2312*** (0.0321)	-0.0363* (0.0204)	-0.0019 (0.0234)
<b>Education_4</b>	-0.0720** (0.0324)	-0.2640*** (0.0367)	-0.1149*** (0.0373)	-0.0917 (0.0772)	-0.3465*** (0.0475)	-0.1350*** (0.0316)	-0.0775** (0.0384)
<b>Education_5</b>	-0.1003*** (0.0191)	-0.3689*** (0.0165)	-0.1054*** (0.0222)	-0.1267*** (0.0290)	-0.4045*** (0.0212)	-0.2041*** (0.0253)	-0.0234 (0.0311)
<b>Female</b>	0.1231*** (0.0126)	0.2494*** (0.0134)	0.1968*** (0.0133)	0.2432*** (0.0135)	0.3361*** (0.0129)	0.2804*** (0.0108)	0.0578*** (0.0142)
<b>Father formal</b>	0.0194 (0.0175)	-0.0445** (0.0203)	-0.0156 (0.0199)	-0.1443*** (0.0182)	-0.0769*** (0.0207)	-0.0630*** (0.0139)	0.0036 (0.0189)
<b>Father informal</b>	-0.0085 (0.0158)	-0.0843*** (0.0165)	-0.0376** (0.0180)	-0.1710*** (0.0161)	-0.0681*** (0.0162)	-0.1385*** (0.0134)	-0.0626*** (0.0173)

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are standard errors. The sample sizes for the different country-based multinomial probit models can be inferred from Table 1. The Wald and Log-likelihood tests indicate that the model specifications are appropriate.

**Table 6: Earnings equation estimates for the formal sector**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Constant</b>	-3.6991*** (1.3473)	-1.0228 (1.0329)	-3.0835*** (0.8492)	-1.9976*** (0.7360)	-3.2702*** (0.7811)	-0.7581 (0.6978)	-2.8617 (3.54227)
<b>Experience</b>	0.0794* (0.0463)	0.0229 (0.0317)	0.0984** (0.0387)	0.0352* (0.0217)	0.0757*** (0.0187)	0.0166 (0.0195)	0.0924 (0.1045)
<b>Experience<sup>2</sup></b>	-0.0815 (0.0791)	-0.0189 (0.0466)	-0.1259* (0.0653)	-0.0341 (0.0343)	-0.0919*** (0.0311)	0.0103 (0.0334)	-0.0982 (0.1719)
<b>Education_1</b>	0.4305* (0.2564)	0.1035 (0.2105)	0.4161** (0.1753)	0.1938 (0.2008)	0.6417*** (0.2293)	0.1251 (0.1505)	0.0716 (0.5365)
<b>Education_2</b>	1.2043** (0.5662)	0.3397 (0.4422)	0.8010** (0.3328)	0.5682 (0.5155)	1.5237*** (0.4988)	0.3225 (0.3481)	0.4775 (1.4476)
<b>Education_3</b>	0.9704** (0.4672)	0.2444 (0.4559)	0.9336*** (0.2880)	0.4649 (0.3714)	1.0752** (0.4162)	0.2196 (0.2646)	0.5489 (1.0264)
<b>Education_4</b>	1.4295** (0.6090)	0.5808 (0.4954)	1.3681*** (0.3645)	1.0334** (0.4913)	1.7021*** (0.4819)	0.4625 (0.3099)	0.8318 (1.6093)
<b>Education_5</b>	2.0339*** (0.7515)	0.9655* (0.5778)	2.0207*** (0.4289)	1.2029** (0.5644)	2.1521*** (0.5071)	0.8128** (0.3836)	1.5308 (1.7273)
<b>Female</b>	-0.1847 (0.2479)	0.0015 (0.1605)	-0.4304* (0.2577)	-0.1642 (0.1334)	-0.3473 (0.2249)	0.1379 (0.1802)	0.6166 (0.7224)
<b>BFG formal sector</b>	0.1908 (0.3998)	-0.5567** (0.2523)	0.1387 (0.2583)	-0.3975 (0.3465)	0.1270 (0.3033)	-0.4676* (0.2551)	-0.1571 (1.2635)
<b>BFG informal self-employed</b>	0.2737 (0.6659)	-0.1179 (0.4989)	0.2678 (0.6076)	-0.5090 (0.8135)	-0.2683 (0.7386)	0.5515 (0.4962)	1.4886 (1.2319)
<b>BFG informal salaried</b>	-0.9702 (1.3979)	0.8139 (0.6871)	0.0171 (0.7442)	1.0270 (0.9432)	0.6042 (1.1480)	-0.4006 (0.5720)	-2.9110* (01.7673)
<b>BFG not working</b>	-0.9702 (1.3979)	-0.0888 (0.7666)	-1.1161 (0.9810)	-0.7899 (0.7502)	-0.5543 (0.7259)	0.31767 (0.4677)	0.2556 (1.5713)
<b>Adj Rsq</b>	0.3995	0.5384	0.4946	0.3587	0.4682	0.3657	0.3841

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are bootstrapped standard errors.

**Table 7: Earnings equation estimates for the informal self-employment sector**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Constant</b>	-2.7335*** (0.7703)	-0.9444 (0.9795)	-3.7393** (1.5480)	-1.0812 (0.7846)	-1.8755** (0.8328)	-1.0942 (0.7523)	-1.3941* (0.8319)
<b>Experience</b>	0.0792** (0.0388)	-0.0400 (0.0446)	0.1217** (0.0590)	-0.0071 (0.0207)	0.0178 (0.0301)	0.0180 (0.0215)	-0.0059 (0.0351)
<b>Experience<sup>2</sup></b>	-0.1329** (0.0655)	0.0422 (0.0652)	-0.1745* (0.0892)	0.0025 (0.0283)	-0.0165 (0.0407)	-0.0434 (0.0290)	0.0060 (0.0351)
<b>Education_1</b>	0.1964* (0.1096)	0.1765 (0.1738)	0.3220** (0.1395)	0.1268 (0.0966)	0.2970* (0.1829)	0.2357* (0.1221)	0.1788* (0.0925)
<b>Education_2</b>	0.2317 (0.3176)	1.0474** (0.4671)	0.4146 (0.3638)	0.3768 (0.2924)	0.3896 (0.5675)	0.5829 (0.4599)	0.5278 (0.3659)
<b>Education_3</b>	0.3048 (0.2199)	0.7259* (0.3903)	0.6069** (0.2446)	0.1122 (0.2212)	0.4554 (0.5139)	0.2363 (0.2234)	0.4911** (0.1928)
<b>Education_4</b>	0.6214* (0.3514)	0.9114* (0.5315)	1.0257*** (0.3592)	-0.1484 (0.4649)	0.5502 (0.5506)	0.3793 (0.3150)	0.7257* (0.3725)
<b>Education_5</b>	0.7128 (0.4921)	1.8098*** (0.6597)	1.0205** (0.4168)	0.4048 (0.3754)	0.7387 (0.6181)	0.7655 (0.4920)	1.0915** (0.4671)
<b>Female</b>	-1.0435*** (0.1628)	-1.0877*** (0.2034)	-0.6976*** (0.2041)	-0.7214*** (0.1279)	-0.7220** (0.3069)	-0.5814*** (0.1340)	-0.8801*** (0.1929)
<b>BFG formal sector</b>	0.8408 (1.1071)	-1.9384 (1.3631)	1.1577 (1.0591)	-0.8545 (1.0394)	-0.0469 (1.0893)	0.0401 (1.0382)	0.0033 (0.9912)
<b>BFG informal self-employed</b>	0.6934 (0.5923)	-1.0341* (0.5474)	0.8767* (0.5250)	-0.2866 (0.3259)	0.07432 (0.3556)	-0.2042 (0.3507)	-0.1888 (0.5664)
<b>BFG informal salaried</b>	1.8206* (0.9723)	1.9999** (1.0151)	0.2581 (1.0572)	-0.2866 (0.3259)	1.5408* (0.8706)	1.6932* (0.8632)	2.6132** (1.1660)
<b>BFG not working</b>	-1.4817 (1.1448)	-1.4021 (0.9492)	-0.5751 (1.2899)	-0.1850 (0.9465)	-0.0221 (0.9456)	-0.4197 (0.9376)	-0.1780 (0.8541)
<b>Adj Rsq</b>	0.2352	0.2422	0.1655	0.1673	0.1163	0.0918	0.1723

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are bootstrapped standard errors.

**Table 8: Earnings equation estimates for the informal salaried sector**

	<b>Cotonou (Benin)</b>	<b>Ouagadougou (Burkina Faso)</b>	<b>Abidjan (Côte d'Ivoire)</b>	<b>Bamako (Mali)</b>	<b>Niamey (Niger)</b>	<b>Dakar (Senegal)</b>	<b>Lomé (Togo)</b>
<b>Constant</b>	-6.0322*** (1.1872)	-4.1952*** (0.74632)	-4.8326*** (0.9454)	-3.9419*** (0.7316)	-7.0662*** (2.6750)	-3.8319*** (0.7363)	-5.3858*** (1.3533)
<b>Experience</b>	0.2404*** (0.0879)	0.0309 (0.0536)	0.1492** (0.0604)	0.0768 (0.1405)	0.0569 (0.0436)	0.0314 (0.0296)	0.0177 (0.0706)
<b>Experience<sup>2</sup></b>	-0.3585*** (0.1252)	-0.0472 (0.0644)	-0.2095** (0.0910)	-0.1052 (0.1529)	-0.1557** (0.0690)	-0.0603* (0.0370)	-0.0350 (0.0706)
<b>Education_1</b>	0.5370* (0.2828)	0.5617*** (0.1405)	0.2852* (0.1692)	0.6036 (0.4759)	0.3240 (0.3269)	0.1928 (0.1562)	0.3322* (0.1921)
<b>Education_2</b>	1.6542** (0.7782)	1.3029*** (0.3303)	0.6680 (0.4479)	2.6734*** (0.5641)	1.4979* (0.8157)	-0.1529 (0.3582)	1.4912** (0.7590)
<b>Education_3</b>	1.4678** (0.5697)	1.2683*** (0.2887)	0.5815** (0.2776)	1.7834*** (0.5294)	0.4533 (0.7802)	0.3340 (0.2851)	0.8342*** (0.3114)
<b>Education_4</b>	2.3379** (0.9247)	1.8438*** (0.3977)	1.3768*** (0.4403)	2.1791*** (0.6287)	1.3686 (0.8854)	0.9807** (0.3957)	1.4995** (0.6233)
<b>Education_5</b>	3.5909*** (0.9547)	2.5756*** (0.4726)	1.7468*** (0.5111)	3.2240*** (0.6324)	2.8233*** (0.7500)	1.7405*** (0.5707)	2.1877*** (0.7342)
<b>Female</b>	-0.8152* (0.5074)	-0.7086* (0.3893)	-0.9525*** (0.3356)	-1.0193* (0.6304)	-1.6187* (0.8687)	-0.5368*** (0.1560)	-1.0618** (0.4801)
<b>BFG formal sector</b>	0.2075 (1.3926)	-0.6478 (0.8952)	-0.7908 (1.1861)	2.6224 (1.9898)	-0.6608 (1.8627)	-0.3845 (1.0839)	0.1081 (1.4126)
<b>BFG informal self-employed</b>	-1.2157 (1.8085)	-1.5835 (1.1183)	-0.0391 (1.4061)	-1.3801 (1.9481)	-4.2988 (2.8233)	-1.7115 (1.3868)	-2.4612 (1.8385)
<b>BFG informal salaried</b>	-1.0813 (1.0273)	0.3490 (0.5916)	-0.2930 (0.5770)	0.2897 (1.5601)	1.5099 (1.0686)	0.4718 (0.3518)	0.7565 (0.9089)
<b>BFG not working</b>	-6.2529*** (1.7992)	-0.5972 (1.1835)	-3.9396*** (1.5144)	-0.1295 (1.9940)	-2.0565 (1.7204)	-0.6329 (1.0190)	-1.8094 (1.7508)
<b>Adj Rsq</b>	0.3930	0.4827	0.3310	0.4359	0.3528	0.3003	0.3746

Note: \*\*\*, \*\* and \* indicate significance at the 1%, 5% and 10% level. The figures in brackets are bootstrapped standard errors.