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The determinants of moonlighting in the context of falling wages in Cameroon: A bivariate structural Probit model analysis

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Abstract. The aim of this article is to analyse the determinants of moonlighting in the context of falling worker's wages in Cameroon. From a sample of Cameroonian workers with a main job a bivariate structural probit model analysis shows that the participation in moonlight jobs is inversely correlated with the level of education and the female gender. But it is positively correlated with both the wage of the main job and age. Moonlighting seems to play a different role in the transition from working life to retirement in Cameroon compared to developed countries.
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JEL. C44, D70, D81, D91, H12, M51, Q54.

1. Introduction

In developing countries (D.C.) people rely on various sources of financial income. Leibbrand Woolard & Woolard (2000) have empirically shown that it is the case in South Africa. Furthermore, Glick (1999) argues that in the case of Guinea, financial gains are often completed by extensive engagement in domestic production. The situation is likely to be similar in other sub-Saharan African countries and in other developing countries. This suggests that studies on labour market participation and labour supply in developing countries should be initiated from the assumption that the practice of moonlighting is the norm and not the exception. Except the work of Glick (1999) and Jolifle (2004), this is not however the case in the literature of economics. Therefore, the main goal of this paper is to examine the extent of the practice of moonlighting in the Cameroonian context, and to analyse the factors that lead individuals to get moonlight jobs. Our interest in the phenomenon of moonlighting in developing countries stems from the observation that the real wages of Cameroonian workers in the formal sector were cut in January and November 1993. Such a drop in real wages raises a number of questions:

- How do these workers manage to cope on a daily basis?
- Has their financial standard of living deteriorated accordingly way or have the real low wages led workers to increase their working hours in their main job or in the moonlight job?

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- In particular, has the participation of workers with a main job in moonlighting increased?

- Glick (1999) and Joliffe (2004) address some of these questions, but due to lack of data, these authors had to use scale models of the moonlight job models. Conversely, since the publication of the seminal article by Shishko & Rostker (1976), research on moonlight jobs in industrialized countries has largely relied on structural forms of models which are usually more informative than scale forms of models. This methodological difference is mainly due to the problem of observing what individuals earn in developing countries when they work in the informal sector. Deaton (1997) emphasizes the difficulties encountered in measuring income in developing countries. Glick[1] (1999) investigates the determinants of women's labour supply both in domestic production and on the labour market in Conakry, Guinea. His analysis is based on an empirical approach which takes into account the joint effect inherent in the decision to allocate time to domestic production and to the different production activities of the market. Unlike the rural data used in the majority of work, he uses urban data and concludes that individual characteristics and household characteristics have a great influence on women's time allocation in productive activities. "In this research paper, as a continuation of Theisen's research (2005), we suggest, a new orientation to this problem. The suggested method enables the estimation of the reduced form of the multiple-use model. To the best of our knowledge, except for the work of Theisen (2005), scale models of moonlight jobs had not been previously estimated using data from developing countries. While Shishko & Rostker (1976) as well as most work on moonlight jobs rely on data from developing countries to estimate labour supply equations, this paper is limited to the study of participation in moonlight jobs. This limitation is mainly due to the availability of data and is linked to the above-mentioned problem of measuring income.

This study focuses exclusively on workers with a main job and a moonlight job. Previous papers by Gindling (1991), Pradhan & Van Soest (1995) and Funkhauser (1996) have examined the factors that determine the choice of individuals to work in the formal or informal sector in Brazil, Bolivia and Central America. However, these contributions are all based on the assumption that the individual will work exclusively either in the formal sector or in the informal sector.

Consequently, this paper attempts, following the work of Theisen (2005), to complete the spirit of this literature. To the best of our knowledge, apart from this work which analyses the case of Tanzania, the participation functions explaining moonlighting have not been previously estimated in Africa.

This article is organized into four sections. Section I establishes an econometric model consisting of two alternative specifications of the

[1] Glick (1999) uses an empirical approach based on the simultaneous Tobit model discussed by Amemiya (1974).

conditions for participating in moonlighting. The second section contains a presentation of the data used and a descriptive analysis of participation in moonlighting. Section III deals with the main estimated results. Section IV enables to conclude.

2. Econometric model

Assuming that an individual whose behaviour is guided by the utility function U (X, L), where X is the volume of Hicks' aggregate good, and L is leisure. This utility can be maximized under two constraints, that of goods and that of time.

When the single price of the aggregate good is normalized to l, the constraint of the goods takes the following form $X = V + W\overline{N} + ZF(H)$ where V is non-wage income, W the formal wage rate, $\overline{N}$ the hours of work in the formal sector, Z an index of productivity, H the time spent on domestic production and F(H) a function in which we suppose that F(0) = 0 and that F(H) is increasing and concaving in H[2]. In general, consumer goods can be financed from three sources: non-wage income (V), wage income and domestic production (ZF(H)). Domestic production is similar to that of Gronau (1977), and the model implies the assumption that domestic goods and goods purchased on the market are perfect substitutes in consumption. Factors of production other than domestic time such as capital, land, skills, etc. may affect the term Z in the domestic production function, but are not specified in the theoretical model (Theisen, 2005).

The second restriction under which the individual maximizes his utility is the constraint of time, $L + H + \overline{N} = T$, where T is the total time available, with L, H and T not being all negative. Working time in the formal sector is assumed to be determined by labour market demand. Consequently, it is exogenous to the individual and indicated by $\overline{N}$. Moreover, we assume that the individual who wants a job in the formal sector must agree to work full time. This hypothesis is in line with the observation that part-time work in the formal sector is practically non-existent in Cameroon.

The combination of these two constraints of good and time leads to the budget constraint.

The problem of optimizing the consumption of this individual can then be defined as follows: $MaxU(V + W\overline{N} + ZF(H), T - \overline{N} - H$ under the time constraint (H)[3].

The solution[4] to this problem involves a trade-off between labour and leisure Thus, if the utility lost for one leisure hour is offset by the utility of an additional hour of in a moonlight job, the individual renounces leisure

[2] Indeed, the first and second derivatives of this function are respectively positive ($F_H > 0$) and negative ($F_{HH} \leq 0$)

[3] The constraint H is given by $H = f(\widehat{W}\hat{V}) - \overline{N}$ with $\widehat{W} = ZF_H(H)$ with the value of the marginal productivity of a moonlight job and $\tilde{V}$ the income from a moonlight job.

[4] A two-step solution: the first one being the decision to participate in the moonlight job market, while the second is the decision about working time.

in favour of work. This is the case when the marginal productivity of the individual is greater than the expected wage (W * = U_L/U_X).

Let us suppose that the real offer of participation in the moonlighting market is proportional to the hourly time allocated to such a production X_H =ZH. The following equality emerges from this $\widehat{W} = \overline{W} = Z$ in which $\overline{W}$ is the average rate of job wages. This average rate seems to be a restriction but it is in line with the hypothesis of exogeneity of the wage rate made in most studies on labour supply, in particular on moonlighting (Moffrtt, 1984; Ginding, l99l; Averett, 2001; Theisen, 2005).

The utility function used to define the conditions for participation in moonlighting is as follows (Pencavel, 1986; Theisen, 2005):

$$U(X, X+\overline{N}; R, e_u) = \left(\frac{\varepsilon_y(H+\overline{N})-\varepsilon_w}{(\varepsilon_y)^2}\right) exp\left\{\frac{\varepsilon_y(\varepsilon_0+\varepsilon_y X+\varepsilon'_R+R\varepsilon'\varepsilon_Q+\varepsilon_U}{\varepsilon_y(H+\overline{N})-\varepsilon_w}\right\} \quad (1)$$

Where are $\omega, (i = 0, \widehat{W}, \overline{V})$ individual parameters[5], ω'_R, ω'_Q are vectors of parameters and ε_U is the stochastic error term. This error term can be interpreted as a taste known to the worker but unknown to the employer. But we assume that $\varepsilon_U \sim N(0, \sigma_U^2)$. R and Q are column vectors of taste changes known to both the worker and the employer.

The calculation of the partial derivatives enables us to find the marginal rate of substitution of labour for leisure which corresponds to the structural form of participation in moonlight jobs as follows:

$$Ux = \left(\frac{\omega_y(H+\overline{N})-\omega_w}{(w_y)^2}\right)\left(\frac{(\omega_y)^2}{\omega_y(H+\overline{N})-\omega_y}\right) exp\left\{\frac{\omega_y(\omega_0+\omega_y X+\omega'_R R+\omega'_Q Q+\omega_w}{\omega_y(H+\overline{N})-\omega_w}\right\} =$$
$$exp\left\{\frac{\omega_y(\omega_0+\omega_y X+\omega'_R R+\omega'_Q Q+\omega_w}{\omega_y(H+\overline{N})-\omega_w}\right\} = expY \quad (2)$$

Knowing that;

$$(H+\overline{N}) = T - L$$

$$U_L = \left(\frac{-\omega_y}{(w_y)}\right) expY + \left(\frac{\omega_y(H+\overline{N})-\omega_y}{(\omega_y)^2}\right)\left\{\frac{((\omega_y(\omega_0+\omega_w X+\omega'_R R+\omega'_Q Q+\varepsilon_y)-\omega_w)\omega_y}{(\omega_y(H+\overline{N})-\omega_w)^2}\right\} expY$$
$$U_L = -\left\{\frac{(H+\overline{N})-(\omega_0+\omega_V X+\omega'_R R+\omega'_Q Q+\varepsilon_U}{(\omega_V(H+\overline{N})-\omega_w}\right\} expY \quad (3)$$

So,

[5] In fact, $\bar{V} - V + W\overline{N} + ZF(H) - \widehat{W}(\widehat{N}+H) = V + (ZF(H) - \widehat{W}H) + (W-\widehat{W})\overline{N} = V + \left(\frac{ZF(H)}{H} - \widehat{W}\right)H + (W-\widehat{W})\overline{N} = V + \overline{W} - \widehat{W})H + (W-\widehat{W})\overline{N}$ where $\overline{W} = ZF_H(H)/H$ is the moonlight job average rate? With $\widehat{W} = \overline{W}$, the term $(\widehat{W} - \overline{W})H$ disappears from the expression $\bar{V}$which implies some adjustments in the constraint *H*.

$$\frac{U_L}{U_X} = \frac{-\left\{\frac{(H+\bar{N})-(\omega_0+\omega_V X+\omega'_R R+\omega'_Q Q+\varepsilon_U}{(\omega_V(H+\bar{N})-\omega_w}\right\}expY}{expY} = \left\{\frac{(H+\bar{N})-(\omega_0+\omega_V X+\omega'_R R+\omega'_Q Q+\varepsilon_U}{(\omega_V(H+\bar{N})-\omega_w}\right\} \quad (4)$$

However, the linear equation of domestic production enables us to write: $Z = \widehat{W} = \bar{W}$

$$X = V + W\bar{N} + ZH = V + W\bar{N} + \bar{W}N + \widehat{W}H - \widehat{W}H + \widehat{W}\bar{N} + Z = V + H(\bar{W} - \widehat{W}) + \bar{N}(W - \widehat{W}) + \widehat{W}H + \widehat{W}\bar{N} \quad (5)$$

By replacing (5) in (4) we get:

$$\frac{U_L}{U_X} = -\left\{\frac{(H+\bar{N})-(\omega_0+\omega_V(\hat{V}+\widehat{W}H+\widehat{W}\bar{N})+\omega'_R R+\omega'_Q Q+\varepsilon_U}{(\omega_V(H+\bar{N})-\omega_w}\right\} = \left\{\frac{(\omega_0+\omega_V\hat{V}+\omega_V\widehat{W}H+\omega_V\widehat{W}H+\omega_V\widehat{W}\bar{N}+\omega'_R R+\omega'_Q Q+\varepsilon_U-H-\bar{N}}{(\omega_V(H+\bar{N})-\omega_w}\right\} \quad (6)$$

But the first order condition of participation in the moonlight labour market gives us,

$$\frac{U_L}{U_X} = \widehat{W} = ZF_H(H)$$

Which enables us to write:

$$\left\{\frac{(\omega_0 + \omega_V\hat{V} + \omega_V\widehat{W}H + \omega_V\widehat{W}\bar{N} + \omega'_R R + \omega'_Q Q + \varepsilon_U - H - \bar{N}}{(\omega_V(H+\bar{N}) - \omega_w}\right\} = \widehat{W};$$

$$\omega_0 + \omega_V\hat{V} + \omega_V\widehat{W}H + \omega_V\widehat{W}\bar{N} + \omega'_R R + \omega'_Q Q + \varepsilon_U - H - \bar{N} = \omega_V\widehat{W}H + \omega_V\widehat{W}\bar{N} - \omega_V\widehat{W}H + \omega_V\widehat{W}$$

Hence the following moonlight employment participation function:

$$H^* = \omega_0 + \omega_V\hat{V} + \omega_V\widehat{W} + \omega'_R R + \omega'_Q Q - \bar{N} + \varepsilon_U \quad (7)$$

For non-participants in moonlight jobs, $H^* \leq 0, \widehat{W} = ZF_H(0)$.

Knowing that the marginal rate of substitution of moonlight work for leisure must be positive for participants and negative or zero for non-participants, we can write the condition below:

$$\left\{\frac{\omega_0 + \omega_V\hat{V} + \omega_V\widehat{W}H + \omega_V\widehat{W}\bar{N} + \omega'_R R + \omega'_Q Q - H - \bar{N} + \varepsilon_U}{(\omega_V(H+\bar{N}) - \omega_w}\right\}\left\{\begin{matrix}\leq (non\ participation\ H = 0 \\ > (participation\ H > 0)\end{matrix}\right\}$$

For an individual k in the structural form of participation in a moonlight job, it is:

$$\omega_0 + \omega_V \hat{V}^k + \omega_V \widehat{W}^k + \omega_R \hat{R}^k + \omega'_Q Q^k - \overline{N^k} + \varepsilon_u^k \begin{cases} \leq 0 & for\ H=0 \\ >0 & for\ H>0 \end{cases} \quad (8)$$

It is assumed that the error term ε_u^k is distributed according to a reduced centred normal distribution rule and therefore relationship (8) constitutes a variant of the probit model.

To derive the reduced form of participation in moonlight employment, we first specify the earnings function of the moonlight job sector of the type introduced by Mincer (1974) as follows:

$$Ln\widehat{W}^k = \eta + \rho'_s S^k + \rho'_s Q^k + \varepsilon_E^k \quad (9)$$

Where $\widehat{W}^k$ is the hourly wage rate for moonlight jobs, η the constant, P'_S and P'_Q are the column vectors of parameters, S^k is a column vector of the explanatory variables included in the earnings function but not in the utility function and Q^k the column vector of the explanatory variables included in both the earnings function and in changes in the taste of the earnings function. ε_E^k is the stochastic error term assumed to follow a reduced centred normal law ($\varepsilon_E^k \sim N(0, \sigma_E^2)$) and that ε_E^k is not correlated to the error term of the condition of participation in moonlight jobs, i.e.

The reduced form is therefore the following:

$$\omega_0 + \omega_V \hat{V}^k + \omega_R \hat{R}^k + \omega\ \ {}_S S^k - \omega_Q Q^k + \bar{\varepsilon}^k \begin{cases} \leq 0 & \leq 0\ for\ non-paticipation\ \ (H=0) \\ >0 & >0\ for\ participation\ \ (H>0) \end{cases} \quad (10)$$

With k = 1,2…, K

Where $\bar{V}^k = (V^k + W^k \bar{N}^k$ is the exogenous income $\hat{w}_0 = (\omega_0 + ((\omega_w - \omega_{\bar{v}})\eta - 1)\bar{N}^k$,

$\bar{\omega}'_s = ((\omega_w - \omega_{\bar{v}})\rho'_s \bar{N}^k)$,
$\bar{\omega}'_Q = ((\omega_w - \omega_{\bar{v}})\rho'_Q \bar{N}^k + \omega'_Q)$, and
$\bar{\varepsilon}_Q^k = ((\omega_w - \omega_{\bar{v}})\bar{N}^k \varepsilon_E^k + \varepsilon_U^k$

As the expressions $\bar{\omega}_0, \bar{\omega}'_s$ and $\bar{\omega}'_Q$ are functions of $\bar{N}^k$, it is obvious that the participation condition given by equation 10 contains explanatory variables correlated with the error term $\bar{\varepsilon}^k$. Consequently, a good estimate of the parameters of the scale form of the equation would not be possible.

Note, however, that in principle part-time work is not practiced in the formal sector in Cameroon. For this purpose, it is reasonable to impose the restriction $\bar{N}^k = \bar{N}\ \forall k$. The terms $\bar{\omega}_0, \bar{\omega}'_s$ and $\bar{\omega}'_Q$ thus become constants and the correlation between the error term and the other terms given in the condition of the equation l0 no longer exist. In addition, the term and the constant $\bar{\omega}_0$ which appear separately in equation 8 are included in the constant $\bar{N}^k$ of equation 10. This fusion of the constant and the original constant enable to avoid multicollinearity.

As in the work of Theisen (2005), our solution to the absence of data on virtual wages leads to a cost. Indeed, in the estimation of our model, we can only identify the parameters of the scale form $(\widehat{\omega}_0, \omega_v, \omega_R^{'}, \omega_S^{'}, \omega_Q^{'})$ and $(\omega_v, \omega_R^{'})$. Only two of these parameters $\bar{N}^k = \bar{N}\ \forall k$ are those of the structural function of participation in moonlighting and of the utility function. Overall, the restriction $\bar{N}^k = \bar{N}\ \forall k$ enables us to make a coherent estimate of the parameters of the scale equation for participation in moonlighting, just as it makes it possible for us to identify the impact of hourly time on participation in the main job.

For those not participating in moonlight jobs, the labour supply given by equation 10 is negative and can be interpreted as a latent supply (H_1) while it is positive for the participants. The variable (H_1) enables us to define a binary indicator $(\widehat{H}_{.}^{k})$ which takes the value 1 if the individual k participates in a secondary job and 0 in the opposite case.

Which leads to the participation model:

$$\widehat{H}_{.}^{k} = \begin{cases} 0 \ \ if \ \ H_{.}^{k} \leq 0 \\ 1 \ \ if \ \ H_{.}^{k} > 0 \end{cases} \quad k = 1,2,\dots,K \tag{11}$$

Because the error terms of Equations 8 and 9 follow a scale centred normal law,

With $E\left[\varepsilon_U^k \varepsilon_E^k\right] = 0\ \ \forall k$ the error term in Equation 10 also follows a scale centred normal law. Moreover, the restriction $\bar{N}^k = \bar{N}\ \forall k$ makes it possible to conclude that the statistical distribution of the error term will be identical for all workers. The binary indicator of equation 11 therefore represents a standard probit model for which the error term is assumed to follow a scale centred normal law $\varepsilon_E^k \sim N(0,1)k$.

The phenomenon of endogenization of the salary of the main job can be specified as follows:

$$Ln\widehat{W}^k = \eta + \rho_s^{'} S^k + \rho_s^{'} Q^k + \varepsilon_E^k \tag{12}$$

But participation in a moonlighting is influenced by the characteristics of the main job and particularly the wages in the main job[6]. We can thus write:

$$LnS^k = X_{i1}\beta_1 + \delta_i$$

Where X_{i1} is a vector of instruments, β_1 the vector of associated parameters to estimate and δ_i the error term. The error terms ε_E^k, δ are assumed to follow a bivariate normal law with 0 as an average and as a variance– covariance matrix:

$$LnS^k = X_{i1}\beta_1 + \delta_i \tag{13}$$

[6] As a rule, the higher the salary of the main job, the more reluctant the individual will be to engage in moonlighting in favor of leisure; and the lower this salary, the more he invests himself in moonlighting to the detriment of leisure...

We set $E(\delta^2) = 1$ to ensure the identity of the model while p is the correlation coefficient of the error terms.

The control vector X_0 includes all the variables likely to influence the moonlight job wage (education, professional experience, sex, parents' education, marital status, age, sector of activities…). The vector X_1 includes the determinants of the main job (wage).

We can use the following multinomial probit model for estimating the parameter vector β_{ij}:

$$P_j = \frac{\exp(\beta_j Z)}{1+\sum_{J=1,2}\exp(\beta_j Z)} \quad (J = 1,2) \tag{14}$$

Where P_j is the probability that a worker is in sector j, Z is a vector of covariances and where the private sector coefficient vector β_0 is normalized to 0 (Green, 2000).

The output of this multinomial probit model is used to estimate the following selection term for the moonlight job earnings function:

$$\hat{T} = \frac{\varphi[J(\beta_j Z)]}{\varphi(\beta_j Z)} \tag{15}$$

Where φ is the normal distribution density function *N(0,1)* and φ is the cumulative function of the normal law.

Introducing this selection term into equation (12) gives us the following gain function:

$$Ln\widehat{W}^k = \eta + \rho_s^{'} S^k + \gamma T^k + \rho_Q^{'} Q^k + \varepsilon_E^{'} \tag{16}$$

Where γ is a parameter to be estimated and the error term is $\varepsilon_E^k \sim N(0,1)k$.

3. Data and descriptive analysis of participation in secondary employment

The second Cameroonian Household Survey (ECAM2), carried out in 2001 among 10,992 households, about 56,924 individuals, made it possible to collect information relating not only to main employment but also and above all to moonlighting. Taking into account the sensitivity of the field of wages and the reluctance of individuals to give reliable information on their earnings, our sample is 3,387 workers with a main job and a moonlight job, and whose age is between 15 and 65 years.

Data relating to the practice of moonlighting in Cameroon can be characterized by essential variables including the salary of the main job, the salary of the moonlight job, age, professional experience in the main job, the individual's working time in both jobs (taking into account that there is

no part-time work in the main job) and the level of education. The statistics for these variables are presented in Table 1 below.

Table 1. *Average characteristics of workers in moonlight jobs*

Variables	Average
Age	37.567 (0.201)
Professional experience	12.639 (0.191)
Education	11.070 (0.077)
Main job salary	45891.68 (1785.255)
Moonlight job wages	25546.76 (2.832)
Number of working hours	162.201 (1.348)

Source: ECAM 2, 2001.

We can notice that workers in moonlight jobs have fairly low average wage levels both in the main job and in the secondary job. "An average of FCFA 45,891.68 for the main job with a very high standard deviation which reflects a non-homogeneity of these wages, and an average of FCFA 25,546.76 for moonlight job. These average low wages are accompanied by a fairly low average level of education (11.070 years of study) which pushes to infer that the individuals who get involved in moonlighting are overwhelmingly secondary school graduates. However, it should be noted that the average professional experience (12.639 years), age (37.567 years) is rather high; this is also the case of working time whose average weekly number of hours is 40.5. The following matrix shows the correlations between the different variables.

Table 2. *Correlation matrix*

	EXP	AGE	EDUC	NHT	SPA	SPR	SEP	SES
EXP	1							
AGE	0.628	1						
EDUC	-0.312	-0.148	1					
NHT	-0.024	-0.014	0.055	1				
SPA	-0.024	0.030	0.108	4.072	1			
SPR	-0.013	-0.074	-0.380	-0.037	-0.414	1		
SEP	0.049	0.071	0.235	0.099	0.075	-0.187	1	
SES	0.048	0.051	-0.033	0.062	0.018	-0.074	0.122	1

Source: ECAM 2, 2001.

This table shows that the correlation between education and professional experience on the one hand, working time and professional experience on the other hand is negative. This reflects the fact that the more educated individuals have little professional experience compared to those of workers whose level of education is less and less high; the more experienced they are, the more they work for a very limited time in the moonlight job site. The correlation between the salary of the moonlight job and professional experience, age, working time, the practice of this job in the para-public sector and the salary of the main job is positive while it is negative both for education and moonlight job in the private sector. The

salary of the main job shows a positive correlation with all the variables, except the one which shows holding a moonlight job in the private sector.

3. Empirical results

We believe it is possible to present the results of the incidence of variables linked to education, professional experience, age, marital status and sector of activity on the main job salary of workers who practice multiactivity before dealing with their influence on the wages of moonlight jobs. Table 3 below gives the results of the estimates in the formal and informal sectors and in general.

Table 3. *Estimates of earnings functions of the main job depending on the formal and informal sectors*

Variables	Formal sector	Informal sector	General
Constant	8.377*	9.252*	9.852*
	(0.416)	(0.292)	(0.228)
Education	0.038*	0.008*	0.014***
	(0.013)	(0.008)	(0.007)
Age	0.073*	0.017**	0.025*
	(0.016)	(0.008)	(0.007)
Age square	-0.0009*	-0.0001***	-0.0002*
	(0.0002)	(0.0001)	(0.00009)
Professional experience	0.025*	0.001	0.004
	(0.018)	(0.004)	(0.003)
Square of professional experience	-0.0004	-0.00003	-0.00004
	(0.0002)	(0.0001)	(0.00009)
Working time	0.0007*	0.001*	0.001*
	(0.0002)	0.0001)	(0.0001)
Public sector	0.185	-	0.255**
	0.126		(0.136)
Para-public sector	0.161***	-	0.206***
	(0.083)		(0.105)
Private sector	0.255*	-0.389*	0.557*
	(0.052)	(0.122)	(0.053)
No diploma	0.060	0.095	0.342**
	(0.210)	(0.217)	(0.140)
CEP / FSLC	0.111	0.014	0.269**
	(0.152)	(0.195)	(0.112)
BEPC/CAP/GCEOL	0.254**	0.166	0.018
	(0.120)	(0.194)	(0.102)
Probatoire/BP	0.309**	0.098	0.042
	(0.132)	(0.237)	(0.126)
BAC/GCEAL/BEP	0.222**	0.360***	0.149
	(0.104)	(0.210)	(0.10.3)
Higher education diploma	0.614*	1.118*	0.831*
	(0.150)	(0.278)	(0.149)
Single	-0.057	-0.155**	-0.072
	(0.099)	(0.073)	(0.061)
Monogamous	0.051	0.038	0.007
	(0.094)	(0.066)	(0.056)
Polygamous	0.076	0.075	0.086
	(0.108)	(0.072)	(0.061)
Religion	-0.014	0.039*	0.028*

	(0.016)	(0.011)	(0.009)
R^2 adjusted	0.696	0.396	0.051
Number of observations	773	2614	3387

Source: ECAM 2, 2001.

Notes: Standard deviations are in parentheses; * coefficient significant at the 100% threshold, ** significant coefficient at the 50% threshold, *** significant coefficient at the 10% threshold.

The results presented above enable us to make several essential remarks. Education has a positive influence on the salary of the main job in both the formal and informal sectors and in general. This influence is more important and significant in the formal sector while it is not significant in the informal sector. Likewise, the older the worker, the more his wages increase, but at a decreasing rate. However, it should be noted that the influence of age on wages is also more significant in the formal sector. Professional experience contributes to account for the increase in the salary of the main job in both sectors but also at a decreasing rate.

The business sector does not have the same influence on wages in the formal and informal sectors. This influence is more significant in the private sector and particularly in the informal sector which offers a greater contribution to account for wages than that of the formal sector. The level of the diploma is on average positively correlated with the salary of the main job. In other words, as the level of the diploma increases, its contribution to account for the salary increases on average. The influence of marital status on the salary of the main job is positive depending on whether the worker is monogamous or polygamous, but negative depending on whether he is single. On the other hand, religion positively and significantly influences the salary of the main job in the informal sector but negatively in the formal sector.

Before examining the interpretation of the results of our estimates, note that our model predicts a negative coefficient of the wage income variable of the main job, given the assumption that leisure is a normal good. An estimate of the results of the participation equation based on Equation 10 is given by Table 4 below. The estimate of the participation equation shows that ten variables (main job salary, education, working time, no diploma, CEP/FSLC, BAC/GCEAL/BEP, single, monogamous, polygamous and religion) are significantly different from zero to 5% or more.

In the same light, before giving the interpretation of our results in detail, we intend to return to the restriction $\bar{N}^k = \bar{N}\ \forall k$ and the assumptions made about the motivations for participation in moonlight job.

Speaking of the restriction $\bar{N}^k = \bar{N}\ \forall k$ it must be said that if it is not valid, the results of our estimations could not be consistent. A careful look at our data reveals that 76.67% of individuals in our sample have a working time different from the normal time of 8 hours per day[7]. This deviation is too high, which is evidence that the estimates A, B and C are not weak enough. However, to assess the effect of the variation in working time on

[7] 443 people work 5 hours a day, 480 work 6 hours, 232 work 9 hours, 354 work 10 hours.

the results of our estimates, we proceed to a new estimate of the participation equation using only the sub-sample of 790 individuals working for exactly 8 hours and therefore respecting the restriction. The results of this estimate are presented in column D of Table 4 below. A Student's test comparing the respective coefficients of the variables in columns C and D shows that some coefficients (Age, BEPC / CAP / GCEOL, Probatoire/BP and higher education diploma) are statistically different at the conventional significance thresholds. We can therefore conclude that failure to comply with the restriction on the number of normal working hours $\bar{N}^k = \bar{N}\ \forall k$ has major consequences on the results of our estimates.

Statistics from our sample reveal that 50.66% of workers are under-employed (less than 8 working hours per day) in their main job while 26% are over-employed (more than 8 working hours per day). In this sense, we can estimate anew the specific moonlight job participation equation using a sub-sample of under-employed workers on the one hand and a sub-sample of over-employed workers on the other in their main job. The respective results are presented in columns C and D. The Student test comparing the coefficients of columns A and C of Table 4 shows that four coefficients (Age, square of age, BEPC / CAP / GCEOL, Probatoire / BP) are statistically different at the conventional significance thresholds. On the other hand, the application of the same test of the coefficients between the coefficients in columns A and D shows that no coefficient is statistically different from the conventional significance thresholds. So, we can conclude that those workers who are under-employed have obvious motivations to participate in moonlight jobs while some who are over-employed have no obvious motivation to participate in moonlight jobs. Consequently, we can say that Cameroonians seem to participate in moonlight jobs mainly because they are partly rational (especially those who are under-employed) and partly irrational in their choices (especially those who are over-employed). While it is true that a working day in Cameroon lasts approximately as long as that of developed countries, we can think that it is obvious that workers are more motivated to participate in secondary jobs compared to industrialized countries. It is somewhat paradoxical that the number of working hours per day differs very little between countries with extremely different per capita incomes. In practice in Cameroon, a large majority of workers (50.66%) work fewer hours than the norm against a minority (26%) who work beyond the daily hourly norm. Only 23.34% of individuals work for a normal duration, that is to say 8 hours per day. All these estimates are summarized in Table 4 below:

Table 4. *Estimates of the bivariate structural probit model of moonlight jobs decision-making*

Variables	A	B	C	D
Constant	-2.673*	-0.163	1.105*	-0.301
	(0.675)	(0.584)	0.491	‘0.483)
Main job salary	0.331*	0.000001*	0.0000005*	0.0000001
	(0.065)	(0.0000003)	(0.000002)	(0.0000001)
Education	-0.022*	-0.042*	-0.024*	-0.007
	(0.006)	(0.014)	(0.008)	(0.012)
Age	0.010	0.025***	0.016**	0.012
	(0.006)	(0.015)	(0.008)	(0.013)
Age square	-0.0001	-0.0002	-0.0002**	-0.0009
	(0.00008)	(0.0001)	(0.0001)	(0.0001)
Professional experience	-0.001	0.008	0.003	0.001
	(0.003)	(0.007)	(0.004)	(0.006)
Square of professional experience	0.0001	-0.0002	-0.0008	-0.0004
	(0.00007)	(0.0001)	(0.0001)	(0.0001)
Woman	-0.017**	-0.003*	0.026**	-0.031
	(0.006)	(0.004)	(0.008)	(0.003)
Working time	0.000001*	0.001	0.0009*	0.0001
	(0.0000003)	(0.0006)	(0.0003)	(0.0002)
Para-public sector	-0.036	0.063	-0.154	-0.003
	(0.025)	(0.123)	(0.239)	(0.187)
Private sector	0.073	-0.081	-0.175	0.144
	(0.086)	(0.121)	(0.234)	(0.122)
No diploma	-0.210***	-0.461	-0.575*	*0.131
	(0.123)	(0.093)	(0.175)	(1.002)
CEP/FSLC	-0.241**	0.151***	-0.612*	-0.004
	(0.098)	(0.093)	(0.144)	(0.077)
BEPC/CAP/GCEOL	-0.114	0.461*	-0.406*	0.074
	(0.088)	(0.150)	(0.134)	(0.132)
Probatoire/BP	-0.122	0.353***	-0.328***	0.318
	(0.108)	(0.199)	(0.170)	(0.212)
BAC/GCEAL/BEP	-0.203**	0.285	-0.405*	0.309
	(0.089)	(0.194)	(0.136)	(0.182)
Higher education diploma	0.045	0.432***	0.051	0.141
	(0.141)	(0.250)	(0.957)	(0.226)
Single	0.167*	0.290**	0.124***	0.077
	(0.053)	(0.117)	(0.071)	(0.101)
Monogamous	0.103**	0.188***	0.131**	0.012
	(0.048)	(0.106)	(0.064)	(0.095)
Polygamous	0.156*	0.328*	0.182*	0.153
	(0.053)	(0.114)	(0.069)	(0.105)
Religion	0.026*	0.033**	0.042*	0.029**
	(0.008)	(0.017)	(0.011)	(0.016)
Formal sector	0.184	0.116	-0.105	0.600
	(0.221)	(0.450)	(0.350)	(0.377)
Informal sector	0.078	0.130	-0.195	0.416
	(0.221)	(0.453)	(0.349)	(0.378)
R^2 adjusted	0.044	0.028	0.050	0.044
Number of observations	3387	790	1716	881

Source: ECAM 2.2041.

Notes: Standard deviations are in parentheses; * coefficient significant at the level of l%; ** significant coefficient at the 5% level; *** coefficient significant at the 10% level.

A: Together; **B** = Individuals working 8 hours in the main job and having a moonlight job; **C**: individuals working for less than 8 hours in the main job and having a moonlight job; **D**: Individuals working for more than 8 hours in the main job and having a moonlight job.

In all the estimates of the equations given in Table 4 above, all the coefficients of the main job wage variable are statistically significant and positive except that of the category of individuals working more than eight hours per day which is positive but not significant (column D). The latter case has the lowest coefficient, which is evidence that such individuals who spend less time in their moonlight job earn less than workers in estimates B and C.

The education variable, which is a component of human capital, shows a weak negative link with participation in moonlight job, but statistically significant in the estimates A, B and C. The nature of the coefficient of the estimate D shows that the more the worker is educated, the less he works for more than eight hours in the main job and participates less in the secondary job.

In all the estimates of our participation equations, all the coefficients of the age variable are positive but only those of the estimates B and C are statistically significant. All things being equal, this relationship shows that individuals are likely to participate in moonlight jobs as their age increases. This positive relationship between participation in moonlight job and age is confirmed by the positive relationship between participation and work experience. This last relationship is in agreement with the interpretation that age is a measure of human capital acquired through experience. This is also in line with the results obtained by Pradhan & Van Soest (1995) in Bolivia, Dasgupta (2003) in India & Theisen (2005) in Tanzania.

Another explanation for the positive relationship between age and participation in moonlight jobs may be that Cameroonians have a strong incentive to engage in moonlight jobs as they approach retirement age due to the fact that retirement pensions are very insufficient to cover the cost of living during retirement.

The female gender weakly and negatively accounts for participation in a moonlight job on the whole (estimate A) but its coefficient is significantly negative. The same is true for the estimate of individuals working eight hours per day in the main job. But, for those individuals working more than eight hours a day, the effect on participation is negative and statistically insignificant. Having a positive coefficient for the female variable for individuals working for less than eight hours seems to reflect the fact that the participation of women in moonlight jobs is only possible when they work for a relatively short time in their main job.

Working time is a weak but positive explanation for participation in moonlight jobs. Its coefficients are significant overall and in the estimate C for individuals working less than eight hours per day.

The survey shows that the practice of multiple jobs does not exist in the public sector but rather in the para-public and especially the private

sectors. The coefficients of the para-public sector variable are all negative and not significant except that of individuals working for eight hours per day which is positive. This seems to reflect the fact that workers are subject to a discipline of scrupulous respect for working time. The private sector, for its part, although presenting a non-significant coefficient, shows that individuals participate in moonlight jobs although they probably work more than eight hours a day, as shown by the importance of the coefficient of the estimate D (0.144).

The effect of a diploma on participation in moonlight jobs is varied. Our estimates show that the more the individual is educated, the more he participates in moonlight jobs. One explanation for this result is certainly to be found in the relatively low levels of remuneration of workers in their main job according to their diplomas, as shown by Manga Engama (2006).

Marital status accounts for almost participation in moonlight jobs in an almost identical way. Whether one is single, monogamous or polygamous, the participation coefficients are all positive and statistically significant for those who work eight hours and less than eight hours per day. Although positive, these coefficients are quite low and not significant, relevant for those who work more than eight hours a day.

In our estimates, all the coefficients of the religion variable are positive and statistically significant, which is evidence that religion is a determinant of participation in a moonlight job.

Participation in moonlight jobs in the formal or informal sector has a negative correlation with working less than eight hours a day, but the coefficients are positive and quite high for those who work for eight hours and especially those who work for more than eight hours (0.600 and 0.4l6 respectively for the formal and informal sectors).

4. Conclusion

To the best of our knowledge, apart from sectorial work by Yamb & Bikoue (2016, 2019), no study has ever been carried out in Cameroon on the estimation of the functions of participation in moonlighting. Our study thus aims at analysing the phenomenon of moonlighting and broadening the scope of the literature on the issue, especially in the African context. This article focuses on individuals who have two jobs, including a main job and a moonlight job, the latter falling within the para-public sector or the private sector (formal or informal) since the survey does not reveal any moonlight job in the public sector.

Our empirical results imply that leisure is a normal good insofar as the fall in the salary of an individual's main job despite his experience can be compensated by participation in a moonlight job. Like the informal sector in Fields (1975), moonlight jobs play a role of buffer employment.

Our estimates show that the main job wage, age, working time, higher education qualification, marital status, religion, formal sector and informal sector have a positive effect on participation in moonlight jobs while education, the para-public sector and the female gender have the opposite

effect. We can notice that participation in a moonlight job increases with the salary of the main job and with age, contrary to what is traditionally postulated by economic theory (Averret, 2001; Lacroix & Fortin, 1992; Shiskho & Rostker, 1976).

The positive correlation between the salary of the main job and participation in the moonlight job, apparently contradictory, seems to be explained by the low levels of wages resulting from the salary drop of January and November 1993 in Cameroon, aggravated by the devaluation of January 1994. In order to maintain their standard of living, workers are therefore inclined to find additional income through secondary jobs.

While in developed countries, particularly in the United States, age negatively affects participation in moonlighting (Rostker & Sishko, 1977; Conway & Kimmel, 1998; Averett, 2001), in Cameroon as well as in Tanzania (Theisen, 2005 it is the opposite effect that has been noticed. One possible explanation for these results may probably be related to differences in retirement pension systems. In the case of Cameroon and probably other developing countries participation in moonlight jobs appears to be a "substitute "to the failures of the retirement pension system. Indeed, the salary being low and the pension being only a fraction of this salary, the level of retirement pension also remains very low, hence the need for the individual to find additional income to meet their needs. Conversely, in developed countries such as the United States, the negative impact of age on participation in moonlighting suggests that the worker, when approaching retirement age, withdraws first from the moonlight job, and then from the main job. Research subsequent to this article may place particular emphasis on employment during retirement in developing countries in general and in the African context in particular.

In view of the rampant unemployment which is gaining ground in the Cameroonian economy, it would be important to set up an incentive framework for work in the jobs (health insurance, aid for the education of workers' children, performance bonuses, attendance bonuses, punctuality...) in order to limit the participation of workers in moonlighting and give job-seekers a better chance of finding a job.

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