Duration of Unemployment and Salary in Cameroon

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

The purpose of this study is to assess the effect of unemployment duration on the wages in Cameroon. In this light; the study used data from the Survey of Employment and Informal Sector (EESI 2). A control function approach is used to correct the endogeneity of the unemployment duration and selection in paid work is considered. The results indicate that an extra month of job search decreases hourly wage in Cameroon up to 4.1%. The highlighted wage penalty is higher in urban areas, varies by age group, and does not show significant gender disparity.

Keywords: Salary; unemployment; endogeneity; control function; Cameroon.

JEL Codes: J31, J64, O12.

1. INTRODUCTION

The economic crisis witnessed in Cameroon in the mid-1980s had a significant impact on the labour market. During that period, Cameroon registered high unemployment rates of 24.6% and 18.2% in 1993 and 1994 respectively.

Equally during this same period, the structure of unemployment changed. Unemployment among individuals with higher education level[1] (1.5% in

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[1]*It is the same situation for individuals with primary education (5.2% in 1983 and 26.7% in 1993) or secondary education (8.4% in 1983 and 23.8% in 1993).*

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1983 and then 30.9% in 1993) became greater than that of those without education, which had even decreased (9.4% in 1983 as against 6,5% in 1993). To remedy that situation, the government and labour suppliers had different reactions.

For labour suppliers, in the absence of social safety nets [2], the reaction consisted of the development of informal sector activities characterized by the predominance of individual production units with precarious working conditions. Estimated at less than 50% in 1987, the proportion of informal sector employment in Cameroon has increased significantly and has fluctuated around 90% since 2001.

During that period, in addition to various restrictive [3] measures, government has implemented two important actions to tackle the unemployment crisis. Firstly, various labour market flexibility reforms (Act N° 92/007 of the Labour Code of 1992) were adopted to reduce labour market frictions and promote non-standard form of employment. Secondly, the government launched active employment policies, characterized by the development of job assistance, training and self- employment assistance programs within the National Employment Fund and the sector-based ministries (agriculture, youth, women empowerment, etc.). These different programs aim at facilitating labour market transitions and / or improving in working conditions.

Since the economic recovery started in the early 2000s, there is a decline in the overall unemployment rate (less than 5% since 2005) which contrasts with an increase in job search duration (more than 30 months since 2001); a near stagnation of poverty (around 40% since 2001), underemployment and the share of jobs in the informal sector [4]. This situation shows that, as in the labour markets of Sub-Saharan Africa, working conditions constitute the major stakes in Cameroon. As a result, an analysis of the factors that influence working conditions is crucial. For this reason, does an increase in unemployment duration guarantee better working conditions in Cameroon?

This question has received two opposite answers in the literature. According to the human capital theory, unemployment duration is associated with a depreciation of human capital that negatively affects the post-unemployment wage. This result is supported by the argument developed by the screening theory [1] which suggests that unemployment duration is the only negative signal sent to the employer and favours a loss of bargaining power of the employee. The empirical work of [2] in China, [3] in Great Britain, [4] in the United States or [5] in Holland also support this finding. On the other hand, the job search theory suggests that increasing the duration of unemployment allows the employee to obtain more and better information on job offers and therefore leads to a higher post-unemployment wage. The relationship suggested by this theory has been obtained by [6] for men in the United States. Existing empirical evidence focuses on developed or emerging countries [5] which show that the unemployment duration has an influence on wages. However, studies that estimated wage equations in Sub-Saharan Africa did not consider unemployment duration as a key explanatory factor [6] [7,8,9,10].

This article contributes to the existing literature in three points. Firstly, to the best of our knowledge this study is the first to provide empirical evidence on the effect of unemployment duration on wages in a country in Sub-Saharan Africa. Secondly, this study addresses the issue of possible endogeneity of unemployment duration in the wage equation and sample selectivity bias regarding paid-work participation. Finally, this study extends the existing literature by testing the relevance of this relationship for all employees (workers who have never been retrenched and the re- employed) of the labour market.

The rest of the article is organized as follows. Section 2 presents the data and the empirical strategy of the study. Section 3 discusses the results obtained and Section 4 concludes.

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[2] *Social protection in Cameroon does not cover unemployment.*
[3]*The suspension of recruitment and lowering of salaries in the civil services, privatization of companies accompanied with staff reduction or reduction of public expenditure, including the areas of health and education.*
[4]*Between 2001 and 2010 the unemployment rate went from 7.9% to 3.8%. The incidence of poverty increased from 40.2% in 2001 to 37.5% in 2014 (NIS, 2015). The overall underemployment rate has been above 75% since 2005 (79% in 2014). The share of employment in the informal sector has turned around 90% since 2001 (88.6% in 2014).*

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[5] *[2] for China, [5] in Holland, [4] in the United States.*
[6]*Very often because the databases used do not capture information on unemployment duration of employees.*

2. DATA AND ECONOMETRIC STRATEGY

2.1 The Employment and Informal Sector Survey (EESI)

The data used by this study come from the Employment and the Informal Sector Survey which is a national collection of labour market data by the National Institute of Statistics in 2010 in Cameroon. This survey is specifically devoted to the analysis of labour market issues and is organized in three phases.

The first phase registers information on socio-demographic characteristics (sex, age, marital status, relation with the head of the household, location, household size, etc.) of the members of the various households selected for the survey, and identifies informal business owners who will be surveyed in phase 3. The second phase is dedicated to labour market status of individuals (unemployed, employed, self-employed, and inactive), on working conditions and the third phase focuses on informal production units.

During the first two phases, 8,160 households and 34,500 individuals were surveyed across the country. The study focuses on the active population aged between 15 and 65 and assesses the effect of unemployment duration on wages of employees. Descriptive statistics for all the variables used for the econometric strategy are presented in the appendix (Table A.1).

2.2 Descriptive Analysis of Variables of Interest

Despite the fall in the unemployment rate, since 2001 (8% in 2001, 4.4% in 2005 and 3.8% in 2010), the average duration of unemployment has increased from an average of 32 months in 2001 to more than 38 months in 2010. This global analysis conceals some disparities related to age, level of education and place of residence.

Job search duration is higher than the overall average for individuals aged 26 to 45 and for the unemployed living in rural areas. Also, for those who have been to school, the duration of unemployment generally tends to decrease with the level of education. When the analysis is performed on wage earners, it appears that it takes an individual 12.52 months to transit from unemployment to employment. This figure should be further assessed, such as the period during which the workers or employees surveyed were available for employment or were unemployed or

were more generally without employment[7]. This duration decreases with the level of education and increases with age up to 55 years. Compared to employees, individuals who opt for self- employment take on average less time to transit from unemployment to employment[8]. This difference is due to the predominance of informal self-employment activities that require small investment. However, the average transition time for the self-employed is more important in urban areas, for the men and for individuals with a higher-level of education.

In this study, the analysis of the effect of unemployment duration is reduced or limited to employees. This is justified by the fact that engagement as wage earner is subject to matching constraints between the employer and the employee which has an impact on unemployment duration. However, the constraints related to investment mainly determine the duration of transition for the self-employed.

The informal nature of the Cameroonian labour market, as in a majority of developing countries, makes it difficult to measure wages because of the low usage of pay slips. However, in the survey on employment and informal sector a multi stage strategy was used by the National Institute of Statistics to obtain monthly wage information in the main job. The use of the information on the number of hours of work makes it possible to obtain the hourly wage from the [11][9] formula. In order to minimize the effect of outliers the 1% of the lowest and highest wages are not selected for econometric analysis.

The analysis on the evolution of wages according to unemployment duration shows that the average hourly wage is about 509 FCFA. Globally, it appears the hourly wage decreases with unemployment in the entire population. But the gender analysis shows that the wage

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[7]*Indeed, as part of the EESI survey (2010) respondents who have an occupation are asked the length of time they spent unemployed before taking up their current job. However, for the unemployed, the question is how long has the individual been looking for a job? For the employed, the definition of unemployment is not necessarily reminded to the respondent, this duration corresponds more to the duration without employment. However, it remains subjected to the recall bias as the duration of unemployment is collected from employed individuals.*
[8]*The difference in means test leads to a significant difference (Student's Statistics 75, 72) in average unemployment duration between employees and self-employed.*
[9]*Hourly wage = (Monthly_wage * 12) / (Weekly number of working hours * 52).*

eventually decreases and increases with unemployment duration. This raw result suggests a non-linear relationship between wages and unemployment duration.

2.3 Econometric Strategy

In order to assess the impact of unemployment duration on wages, the strategy adopted consists in estimating several Mincer equations augmented with variables like unemployment duration and demand side factors. The non-linearity of the relationship between wages and

unemployment duration is taken into account via the introduction of the square of unemployment duration. The estimated equation is as follows:

$$lwage_j = x'_j\beta_j + \alpha_1 d + \alpha_2 d^2 + \varepsilon_j \tag{1}$$

In this equation *lwage* is the hourly wage, *x* is the matrix of exogenous variables, *d* is the duration of unemployment in months and *ε* is the error term. *x* includes place of residence, number of years of education, marital status, indicator variables for

Table 1. Average unemployment duration of the active population in the labour market*

Characteristics	2001	2005	2010		
	Unemployed	Unemployed	Unemployed	Emloployees	Self-employed
Sex					
Male	33,1 (1,26)	37,56 (3,01)	38,72 (4,32)	13.38 (1.29)	14,87 (1,05)
Female	31,45 (1,26)	38,61 (1,86)	38,42 (2,6)		8,24 (0,70)
Age group				12.21 (0.85)	
				8.72 (1.57)	
15-25	24,74 (0,78)	26,22 (1,46)	26,65 (2,09)		7,16 (0,67)
26-35	38,29 (1,85)	44,86 (3,33)	41,25 (4,05)	11.80 (0.82)	12,04 (0,91)
36-45	46,18 (4,72)	51,41 (7,12)	72,43 (11,68)	16.60 (1.67)	15,22 (1,63)
46-55	51,59 (5,22)	72,08 (10,74)	62,3 (11,18)	15.43 (2.84)	13,83 (2,40)
Above 55 years	60,83 (8,46)	101,77 (11,03)	91,93 (17,3)	9.88 (2.74)	8,22 (1,54)
Level of education				16.14 (3.97)	
No Education	27,55 (3.94)	40,75 (7,38)	48,04 (5,95)		7,64 (1,15)
Primary	34,18 (1,8)	48,06 (4,19)	41,52 (4,38)	13.22 (1.58)	11,92 (1,07)
Secondary	32,87 (1,2)	35,43 (1,72)	38,39 (3,67)	12.73 (0.99)	13,62 (1,03)
Higher	28,81 (2,39)	24,72 (1,91)	31,96 (3,28)		19,46 (4,47)
Place of residence				10.51 (1.38)	
Urban	33,94 (1,00)	37,69 (1,34)	37,91 (2,25)	12.94 (0.75)	17,23 (1,11)
Rural	26,15 (1,8)	39,29 (4,49)	40,24 (5,88)	11.53 (1.61)	9,07 (0,71)
Average duration	**32,39 (0.90)**	**32,18 (1,66)**	**38,52 (2,26)**	**12,52 (0,71)**	**11,50 (0,63)**

Source: Author' calculation using ECAM (2001) and EESI (2005 and 2010) Note: * For the years 2001 and 2005 the information on the duration of unemployment was collected only from the unemployed. Standard deviations are in parenthesis

Table 2. Average wages by unemployment duration

Unemployment duration	Average wage_female	Average wage_male	Average wage_population
Lessthan 12 months	548.58 (31.89)	550.08 (25.70)	549.71 (20.83)
[12 months-23 months]	412.51 (51.61)	419.02 (50.55)	416.89 (37.99)
[24 months-47 months]	468.23 (60.57)	381.11 (38.62)	403.04 (32.88)
[48 months-95 months]	387.40 (66.54)	406.65 (35.97)	400.10 (32.79)
More than 95 months	397.23 (155.41)	360.41 (42.66)	367.61 (45.96)

Source: Author' calculation from EESI (2010). Note: standard deviations are in parentheses

sectors (public, formal private and informal private sectors), one indicator variable for job displacement, tenure and potential experience[10].

The estimation of equation (1) by ordinary least squares (OLS) is compromised by the potential violation of some fundamental hypothesis.

Wage is only observable if the individual has chosen a paid job. Also, earning comes from the choice of being employed. Consequently, there are unobserved characteristics (ability, motivation, etc.) that determine the choice of being in paid employment and which are positively or negatively correlated with the observed wage. In order to correct these possible selection biases, a generalization of Heckman's two-step method [12] is used. Specifically, the following specification is considered:

$$y_j^* = z_j' \gamma_j + v_j \qquad (2)$$

Equation (2) represents the model to be estimated in the first step. In this expression, *y** is a latent variable indicating an individual's labour market status *j* (*j* = employee, self-employed, active but not paid[11] and inactive). *zj* is a vector of explanatory variables, γ_j are parameters to be estimated and v_j is an error term.

In accordance with [12] method, the first step leads to the estimation of a multinomial model of labour market status *j* and makes it possible to calculate the correction terms λ_{ij} from the predicted probabilities of the choice of labour market status, *j* by the *i* individual (*pij*). The use of these correction terms as an explanatory variable in the wage equation (second step) makes it possible to tackles the selection bias issue.

In practice, the estimation of a multinomial model raises the problem of the independence of irrelevant alternatives. On this point, the [13] tests show that in 8 out of 9 cases the assumption of independence of irrelevant alternatives is verified.

The identification of the coefficients in the two-step method requires the use of exclusion

restrictions in the first step. On this point, studies on wages in Sub-Saharan Africa generally make use of household characteristics [14,15]. In this study, the number of children under 10 in the household and the status of household land ownership are used as exclusion variables. The usual checks from joint significance tests of these variables are conclusive[12]. However, given the structural debate that exists on the choice of exclusion variables, the study presents the results of the wage equations with and without selection bias correction.

Unemployment duration used as an explanatory variable in the wage equation is a potential source of endogeneity for several reasons. Firstly, as a signal, the duration of unemployment is potentially correlated with an unobservable factor that accounts for productivity, such as ability. On this last point, the negative correlation postulated by the signal theory makes it possible to anticipate a substantial underestimation bias of the effect of the period devoted to job search. Secondly, another source of mitigation bias is measurement errors linked to individuals declaring their unemployment durations. Finally, according to the job search theory, there is a positive correlation between unemployment duration and reservation wage. This relationship is a source of a substantial overestimation bias. The interaction between all the possible forms of endogeneity highlighted here can lead to a total inflationary or deflationary effect on the estimated impact of unemployment duration obtained through ordinary least squares.

The control function approach [16] is used in this study to correct the endogeneity of unemployment duration. We use the father's main occupation (father has a job and father is a senior executive) as instrument.

3. RESULTS AND DISCUSSION

The results recorded in Table 3 show that wage equations are globally significant with a measure of goodness of fit fluctuating around 54%. This value is similar to those obtained by other authors during the estimation of wage equations in Sub-Saharan Africa in general [17,15] and Cameroon in particular [10]. Most of the coefficients have the expected signs.

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[10]*Descriptive statistics on these variables are presented in Appendix Table A.1.*
[11]*These are mainly family workers and apprentices.*

[12]*In fact, the Wald tests are significant at 5% in all 9 estimations of labour market status (for the entire sample, on the men and women group) on which we have performed the test. Also, the tests reveal that these variables are irrelevant in the various estimated wage equations.*

Panel 1 of Table 3 highlights the results obtained through OLS without correction of the endogeneity bias discussed above. From the analysis, it appears that the unemployment duration has a negative and significant effect on the logarithm of wages. Specifically, the extension of the period of unemployment by one month reduces the post-unemployment hourly wage by 0.33%. An individual experiencing the sample average duration unemployment (12.8 months) will suffer a penalty of almost 4.22% of the logarithm of the hourly wage.

Table 3. Effects of duration of unemployment on salary

Dep Var: Log hourly wage	OLS (1)	Lee (2)	CF (3)	Lee and CF (4)
Sex (Male=1)	0.1264***	0.1323***	0.1300***	0.1377***
	(0.024)	(0.036)	(0.025)	(0.038)
Education	0.1043***	0.1053***	0.1031***	0.1043***
	(0.003)	(0.006)	(0.003)	(0.005)
Couple	0.0805***	0.0792***	0.0808***	0.0791***
	(0.028)	(0.025)	(0.025)	(0.028)
Experience	0.0385***	0.0385***	0.0385***	0.0386***
	(0.005)	(0.006)	(0.005)	(0.006)
Experience^2/100	-0.0457***	-0.0460***	-0.0457***	-0.0461***
	(0.011)	(0.011)	(0.010)	(0.011)
Tenure	0.0289***	0.0289***	0.0286***	0.0286***
	(0.005)	(0.005)	(0.005)	(0.005)
Tenure^2/100	-0.0480**	-0.0479***	-0.0461**	-0.0461**
	(0.019)	(0.018)	(0.018)	(0.018)
Industry	0.1286*	0.1286*	0.1272*	0.1271*
	(0.069)	(0.069)	(0.072)	(0.067)
Trade	-0.0678	-0.0679	-0.0726	-0.0727
	(0.072)	(0.073)	(0.077)	(0.072)
Services	-0.0151	-0.0148	-0.0146	-0.0143
	(0.066)	(0.068)	(0.071)	(0.064)
Formal private sector	-0.3290***	-0.3289***	-0.3282***	-0.3281***
	(0.038)	(0.037)	(0.035)	(0.037)
Informal private sector	-0.6995***	-0.6995***	-0.6958***	-0.6958***
	(0.033)	(0.036)	(0.034)	(0.033)
Urban area	0.1563***	0.1617***	0.1615***	0.1686***
	(0.030)	(0.039)	(0.029)	(0.037)
Re-employed	-0.0235	-0.0233	-0.0262	-0.0259
	(0.026)	(0.026)	(0.025)	(0.028)
Unemployment duration	-0.0033***	-0.0033***	-0.0203***	-0.0203***
	(0.001)	(0.001)	(0.005)	(0.005)
Uneployment duration^2/100	0.0008*	0.0009*	0.0008	0.0008
	(0.000)	(0.000)	(0.001)	(0.001)
Residual			0.0171***	0.0172***
			(0.005)	(0.005)
Inverse Mills ratio		-0.0150		-0.0196
		(0.070)		(0.069)
Constant	4.2415***	4.2132***	4.4644***	4.4279***
	(0.099)	(0.172)	(0.122)	(0.167)
N	3,508	3,508	3,508	3,508
Ajusted R^2	0.541	0.541	0.542	0.542
χ2	4983***	4795***	4981***	4430***
Joint significance test of unemployment duration	29.93***	28.80***	17.17***	17.02***

Source: Author' calculation from EESI (2010).
*Notes: (1) The results are obtained after a Bootstrap of 500 replications. (2) The standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0.1. The reference groups are: women, agriculture, public sector. The joint significance tests allow the square of unemployment duration to be maintained in the wage estimation*

Table 4. Effects of duration of unemployment on salary by sex

Dep Var: Log hourly wage	Male				Female			
	OLS (5)	Lee (6)	CF (7)	CF and Lee (8)	OLS (9)	Lee (10)	CF (11)	CF and Lee (12)
Unemployment duration	-0.0032***	-0.0032***	-0.0295***	-0.0295***	-0.0032**	-0.0031**	-0.0030	-0.0029
	(0.001)	(0.001)	(0.007)	(0.007)	(0.001)	(0.001)	(0.006)	(0.006)
Unemployment duration^2/100	0.0008	0.0008	0.0008	0.0008	0.0010	0.0011	0.0010	0.0011
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mills ratios		0.0593		0.0533		-0.2364**		-0.2364**
		(0.079)		(0.078)		(0.103)		(0.106)
Residuals			0.0264***	0.0263***			-0.0002	-0.0003
			(0.007)	(0.007)			(0.006)	(0.006)
N	2,559	2,559	2,559	2,559	949	949	949	949
AjustedR^2	0.513	0.508	0.515	0.515	0.625	0.626	0.624	0.625
χ2	3133***	3443***	3123***	3375***	2062***	2013***	2001***	2054***

Source: Author' calculation from EESI (2010).

Notes: (1) The results are obtained after a Bootstrap of 500 replications. (2) The standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0. 1. (3) The variables included in the specification [1] are repeated here except for sex. The joint significance tests allow the square of unemployment duration to be maintained in the estimates

Table 5. Effects of duration of unemployment on salary by place of residence

Dep Var: Log hourly wage	Urban				Rural			
	OLS (13)	Lee (14)	CF (15)	CF and Lee (16)	OLS (17)	Lee (18)	CF (19)	CF and Lee (20)
Unemployment duration	-0.0032***	-0.0032***	-0.0247***	-0.0249***	-0.0043**	-0.0047**	0.0032	0.0035
	(0.001)	(0.001)	(0.006)	(0.006)	(0.002)	(0.002)	(0.012)	(0.012)
Unemployment duration^2/100	0.0006	0.0007	0.0006	0.0006	0.0026	0.0029*	0.0026*	0.0029*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Mills ratios		-0.2201**		-0.2231***		0.2445**		0.2462**
		(0.086)		(0.086)		(0.106)		(0.097)
Residuals			0.0217***	0.0218***			-0.0076	-0.0083
			(0.006)	(0.005)			(0.012)	(0.012)
N	2,764	2,764	2,764	2,764	744	744	744	744
AjustedR^2	0.558	0.557	0.561	0.562	0.464	0.468	0.464	0.468
χ2	4224***	4519***	4544***	4034***	713.3***	702.8***	723.0***	739.8***

Source: Author' calculation from EESI (2010).
Notes: (1) The results are obtained after a Bootstrap of 500 replications. (2) The standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0. 1. (3) The variables included in the specification [1] are repeated here except for place of residence. The joint significance tests allow the square of the duration of unemployment to be maintained in the estimates

Table 6. Effects of duration of unemployment on salary by age group and tenure

Dep Var: Log hourly wage	15-34 (21)	35-54 (22)	55-65 (23)	15-34 (24)	35-54 (25)	55-65 (26)	Salaried employee with at mo (27)	St 5 years in his job (28)
	OLS	OLS	OLS	CF	CF	CF	OLS	CF
Unemployment duration	-0.0025**	-0.0037***	-0.0025**	-0.0179**	-0.0189**	-0.0419	-0.0018*	- 0.0182***
	(0.001)	(0.001)	(0.001)	(0.007)	(0.008)	(0.026)	(0.001)	(0.006)
Unemployment duration^2/100	0.0004	0.0013*	0.0004	0.0004	0.0013*	0.0006	-0.0001	-0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.006)	(0.000)	(0.000)
Residuals				0.0156**	0.0153*	0.0361		0.0165***
				(0.007)	(0.008)	(0.026)		(0.006)
N	2,057	1,328	123	2,057	1,328	123	2,363	2,363
Ajusted R^2	0.431	0.542	0.572	0.432	0.543	0.574	0.488	0.490
χ^2	1551***	2023***	216.5***	1606***	2066***	205.3***	2113***	2288.61***

Source: Author' calculation from EESI (2010).
*Notes: (1) The results are obtained after a Bootstrap of 500 replications. (2) The standard deviations are in parentheses. (3) *** p<0.01, ** p <0.05, * p <0. 1.*
(3) The variables included in the specification [1] are repeated here

However, the penalty highlighted is not constant, but changes at an increasing rate owing to the positive and significant sign of the square of the period spent unemployed. This result represents almost half of the effect highlighted by [2] for individuals in re-employment. Column (2) takes into account the selection bias by including correction factors in specifying the salary equation. This variable appears insignificant, indicating that the selection bias in paid employment is not relevant. The impact coefficient of unemployment duration remains constant.

Panels 3 and 4 of Table 3 show the results of the regressions with the control function approach[13]. For these results, the significance of the estimated residuals (control variable) shows the relevance of the endogeneity of unemployment duration. Thus, the unexplained change in the unemployment duration negatively and significantly affects wage variations. The analysis of the coefficient of job search duration suggests that an additional month of unemployment leads to a decrease of about 4.1% in hourly wage. As a result, the bias of the OLS method underestimates the wage penalty.

This is consistent with the predictions of the human capital theory and strengthens the findings on the wage penalty associated with job displacement in developed countries' [18,19].

In order to test the robustness of the results and to highlight the heterogeneous effects of unemployment duration on wages, estimations are performed on different sub-samples.

Table 4 highlights the effect of unemployment duration by sex. From the analysis of the results, it appears that the negative effect of unemployment duration differs slightly according to gender. For men, the endogeneity of unemployment duration remains relevant due to the significance of the estimated residuals (Panels 7 and 8) and the selection in paid employment is random, because the null hypothesis of the inverse *Mills* ratios for this group cannot be rejected with confidence. On the other hand, for women, selection in paid employment is relevant. Specifically, the negative and significant coefficient of correction factors (Panels 10 and 12) suggests that factors that favour women's engagement in paid employment

also contribute in reducing their wages. The analysis by place of residence reveals that the wage penalty associated with unemployment duration is more important in the urban labour market. Indeed, according to the most reliable results (Panels 15, 16, 19 and 20 of Table 5), an additional month unemployment reduces the hourly wage by 2.44% in urban areas but has no significant effect in rural areas. This result can be explained by the structure of Cameroon's rural labour market in which employees are mainly engaged in agriculture and thus long periods of joblessness because of the cyclical nature of the main activity in this area.

The negative effect of unemployment duration on wages is heterogeneous with age group. Specifically, the highlighted wage penalty has a bell-shaped profile (inverted U) according to the results recorded in Panels 21 to 26 of Table 6.

Since the estimation results may suffer from recall bias due to the time lapse between the last unemployment period and the time spent in the current job, an estimation is carried out on individuals with at most 5 years working experience in their current job. The results of this analysis (Panels 27 and 28) confirm those already established and thus strengthen the robustness of the latter.

4. CONCLUSION

This study uses Cameroon's Employment and Informal Sector Survey, which is the only national database that measures unemployment duration among the unemployed and the employed, to assess the effect of unemployment duration on the wages of workers. Theoretical arguments and empirical evidences, which respectively support a positive or negative relationship between the duration of unemployment and the post-unemployment wage, are taken into account through the non-linearity of job search duration.

This study tackles econometric issues associated with estimating this type of relationship. First, the selection bias, which is only relevant for employed women, is corrected using [12] method. On this point, the ownership of a house or land title and the number of children less than 10 years old are used as exclusion variables. Furthermore, the endogeneity bias of the unemployment duration variable in the wage equation is tackled through a control function approach which uses the father's characteristics as instruments and shed

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[13] *The results of the estimation of unemployment duration show that the model is globally significant at the 1% level (see Table A.2 in the annex).*

light on an underestimation bias of the effect of the duration unemployment. Finally, the sensitiveness and robustness of the results are drawn from different sub-samples of the employee population.

The results of the econometric analysis bring out some salient results. Firstly, there is a negative relationship between unemployment duration and wages in Cameroon. The sign of the square of unemployment duration suggests that this effect changes at a decreasing rate. Our results suggest that an additional month of unemployment leads to a wage penalty of up to 4.1% of hourly wage. Secondly, the wage penalty associated to job search duration varies slightly according to sex; it is more important in urban areas and has a bell-shaped effect depending on the age group. Finally, the significant effect of unemployment duration on wages of employees with not more than five years of working experience in their current job, sheds light on the relative impact of the recall bias vis-à-vis job search duration.

Findings from this research contribute to the literature on the determinants of wages in Sub-Saharan African labour markets. In addition, the results obtained make it possible to establish the effect of unemployment duration on the wages of workers who never suffered retrenchment. Finally, this study sheds light on the underestimating bias that should be considered when analyzing potential impact of unemployment duration on working conditions.

As far as labour market policies are concerned, the findings of this study support the strengthening of training programs for job seekers.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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ANNEX

Table A.1. Descriptive statistics of the sample

Variables	Global Average (Standard Deviation)	Male Average (Standard Deviation)	Female Average (Standard Deviation)
Logarithm of hourly wage	5.694 (0.97)	5.689 (0.95)	5.706 (1.00)
Urban area	0.788 (0.41)	0.764 (0.42)	0.852 (0.35)
Years of education	9.750 (4.31)	9.349 (4.45)	10.837 (3.70)
Industry	0.188 (0.39)	0.226 (0.42)	0.084 (0.28)
Trade	0.094 (0.29)	0.100 (0.30)	0.078 (0.27)
Services	0.684 (0.46)	0.632 (0.48)	0.826 (0.38)
Couple	0.540 (0.50)	0.570 (0.50)	0.460 (0.50)
Experience	19.986 (10.25)	20.347 (10.31)	19.006 (10.04)
Tenure	5.465 (6.48)	5.622 (6.46)	5.040 (6.54)
Formal Private sector	0.171 (0.38)	0.183 (0.39)	0.137 (0.34)
Informal Private sector	0.558 (0.50)	0.569 (0.50)	0.526 (0.50)
Unemployment duration	12.818 (29.06)	12.238 (28.17)	14.390 (31.30)
Re-employed	0.647 (0.70)	0.683 (0.76)	0.550 (0.50)
Male	0.730 (0.44)		
N	3,508	2,559	949

Source: Authors' calculations from EESI (2010)

Table A.2. Estimated unemployment Duration

Variables	Global	Male	Female
Father_senior executive	-2.130 (1.432)	-2.712 (1.768)	-1.924 (2.550)
Father_has a job	-5.161*** (1.282)	-4.153*** (1.441)	-7.971*** (2.730)
Constant	17.33*** (1.136)	15.93*** (1.279)	21.36*** (2.404)
N	3,508	2,559	949
R2	0.006	0.005	0.011
F	10.77***	6.281**	5.387*

Source: Authors' calculations from EESI (2010).
*Notes: (1) The results are obtained after a Bootstrap of 500 replications. (2) The standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0. 1*

Table A.3. Result of the logit multinomial model over the entire sample

Variables	Self-employed	Employee	Unemployed
Age	0.476***	0.558***	0.234***
	(0.0128)	(0.0158)	(0.0133)
Age2	-0.577***	-0.690***	-0.331***
	(0.0163)	(0.0206)	(0.0181)
Male	0.382***	1.208***	0.0128
	(0.0626)	(0.0688)	(0.0581)
Education	-0.141***	0.0128*	-0.107***
	(0.00706)	(0.00764)	(0.00753)
Urban area	-0.409***	0.282***	-0.491***
	(0.0610)	(0.0726)	(0.0600)
Couple	0.853***	0.749***	0.381***
	(0.0917)	(0.0975)	(0.111)
Handicap	-0.983***	-1.044***	-0.923***
	(0.133)	(0.161)	(0.152)
Children les than 10 years	0.0166*	0.0420***	0.0581***
	(0.00853)	(0.0104)	(0.00799)
Inverse dependency ratio	-0.360***	-0.290***	-0.383***
	(0.0144)	(0.0165)	(0.0155)
Spouse	-1.803***	-1.978***	-0.0722
	(0.100)	(0.115)	(0.117)
Family	-1.389***	-0.892***	0.429***
	(0.0872)	(0.0950)	(0.100)
Other	-1.295***	0.0286	0.196
	(0.207)	(0.192)	(0.197)
Christian	-0.0839	-0.190	0.363***
	(0.120)	(0.138)	(0.116)
Muslim	-1.053***	-0.729***	-0.996***
	(0.0679)	(0.0798)	(0.0689)
Regional unemployment rate	-9.787***	-4.685***	-12.05***
	(1.206)	(1.295)	(1.211)
Owner of local residence	0.359***	-0.402***	0.184***
	(0.0586)	(0.0641)	(0.0584)
Constant	-4.603***	-8.998***	-1.445***
	(0.230)	(0.289)	(0.230)
N	18,718		
Pseudo-R^2	0.279		
χ2	14092***		
Joint significance tests on excluded variables	46,11***	50,16***	76,22***
Hausman IIA Test	306,34	-157,19 (For H0)[a]	-110,18 (For H0)[a]

Source: Authors' calculations from EESI (2010).
Notes: (1) Robust standard deviations are in parentheses. (3) *** p<0.01, ** p <0.05, * p <0.1. The reference groups are: Head of household, other religion. For Haussman and McFadden (1984) a negative statistic of the IIA test is obvious in favour of no violation of this hypothesis

Table A.4. Result of the multinomial logit model on the sample of men

Variables	Self-employed	Employee	Unemployed
Age	0.606***	0.653***	0.313***
	(0.0229)	(0.0232)	(0.0234)
Age2	-0.758***	-0.828***	-0.426***
	(0.0288)	(0.0297)	(0.0315)
Education	-0.272***	-0.149***	-0.172***
	(0.0124)	(0.0121)	(0.0133)
Urban area	-0.542***	0.213**	-0.327***
	(0.103)	(0.105)	(0.0987)
Couple	1.253***	1.210***	0.895***
	(0.160)	(0.158)	(0.193)
Handicap	-1.187***	-1.290***	-1.140***
	(0.205)	(0.210)	(0.242)
Children less than 10 years	0.00417	0.0409***	0.0537***
	(0.0145)	(0.0145)	(0.0129)
Inverse dependency ratio	-0.303***	-0.266***	-0.374***
	(0.0257)	(0.0247)	(0.0275)
Spouse	-3.298***	-1.022	0.145
	(0.777)	(0.634)	(0.703)
Family	-1.434***	-0.836***	0.607***
	(0.142)	(0.135)	(0.157)
Other	-1.491***	-0.286	0.0657
	(0.318)	(0.263)	(0.311)
Christian	0.307	0.0647	0.374**
	(0.191)	(0.193)	(0.189)
Muslim	-0.214*	-0.0215	-0.225*
	(0.117)	(0.116)	(0.116)
Regional unemployment rate	-5.240***	-1.438	-12.21***
	(1.991)	(1.886)	(1.994)
Owner of local residence	0.614***	-0.324***	0.305***
	(0.100)	(0.0959)	(0.0990)
Constant	-5.616***	-8.091***	-2.516***
	(0.381)	(0.386)	(0.376)
N	9,014		
Pseudo-R^2	0.304		
χ2	7237***		
Joint significance tests on excluded variables	15.59***	30,56***	34,88***
Hausman IIA Test	56.044	-721.76(For H0)[a]	-0.816 (For H0)[a]

Source: Authors' calculations from EESI (2010).
Notes: (1) Robust standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0.1. The reference groups are: Inactive, head of household, other religion. For Haussman and McFadden (1984) a negative statistic of the IIA test is obvious in favour of no violation of this hypothesis

Table A.5. Result of the multinomial logit model on the sample of men

Variables	Self-employed	Employee	Unemployed
Age	0.431***	0.550***	0.216***
	(0.0162)	(0.0269)	(0.0167)
Age2	-0.513***	-0.658***	-0.311***
	(0.0208)	(0.0354)	(0.0229)
Education	-0.0904***	0.182***	-0.0895***
	(0.00945)	(0.0128)	(0.00980)
Urban area	-0.367***	0.280**	-0.584***
	(0.0786)	(0.126)	(0.0773)
Couple	0.231*	-0.149	-0.101
	(0.134)	(0.171)	(0.151)
Handicap	-0.992***	-0.939***	-0.900***
	(0.184)	(0.277)	(0.199)
Children less than 10 years	0.0196*	0.0363**	0.0532***
	(0.0109)	(0.0182)	(0.0104)
Inverse dependency ratio	-0.398***	-0.297***	-0.387***
	(0.0189)	(0.0264)	(0.0192)
Spouse	-0.924***	-0.919***	0.497***
	(0.140)	(0.178)	(0.172)
Family	-1.331***	-0.908***	0.398***
	(0.116)	(0.150)	(0.137)
Other	-0.839***	0.945***	0.536**
	(0.280)	(0.300)	(0.264)
Christian	-0.320**	-0.249	0.319**
	(0.159)	(0.245)	(0.151)
Muslim	-1.522***	-1.538***	-1.402***
	(0.0887)	(0.182)	(0.0883)
Regionalunemployment rate	-13.41***	-8.552***	-12.59***
	(1.555)	(1.985)	(1.551)
Owner of local residence	0.286***	-0.188*	0.160**
	(0.0751)	(0.100)	(0.0740)
Constant	-3.945***	-10.38***	-1.044***
	(0.291)	(0.494)	(0.293)
N	9,704		
Pseudo-R^2	0.252		
$\chi 2$	6386***		
Joint significance tests on excluded variables	6.07**	27.13***	37.19***
Hausman IIA Test	- 83.044(For H0)[a]	-63.512(For H0)[a]	288.223

Source: Authors' calculations from EESI (2010).
Notes: (1) Robust standard deviations are in parentheses. (3) *** p <0.01, ** p <0.05, * p <0.1. The reference groups are: Inactive, head of household, other religion. For Haussman and McFadden (1984) a negative statistic of the IIA test is obvious in favour of no violation of this hypothesis

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