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The Determinants of Moonlighting among Lecturers of State Universities in Cameroon: An Evidence from a Log-Linear Model

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Abstract

This study seeks to identify the determinants of moonlighting among lecturers of Cameroonian state universities. To do this, we apply a log-linear model to data from a random sample survey of lecturers from Cameroonian state universities. The results show that in addition to the classical determinants of moonlighting (hours of work in the main job, pay in the primary job, pay in the secondary job) gender and the localization of the university also play major roles. Descriptive statistics also show that moonlighting lowers the quality of lectures. Incentives from the government are therefore proposed as a means of reducing the phenomenon of moonlighting in Cameroonian state universities.

Keywords: Moonlighting, State Universities, Log-linear model, Odds ratios, Cameroon

1. Introduction

Moonlighting is a major characteristic of the labour markets of contemporary economies. It refers to a situation where an individual holds a main job alongside one or more secondary ones. The study of moonlighting is important since it captures the behaviour of rational economic agents who seek to improve their material welfare or to develop survival strategies.

Since the pioneer work of Shishko and Rostker (1976), economic literature considers the hours of work in the main job as the major determinant of moonlighting (O'connell, 1979, Krishnan 1990, Conway and Kimmel 1995, 1998, Theizen 2005). To this major determinant, other determining factors such as the pay in the main job and in the secondary job can be added. This study is in line with these pioneering works but however goes beyond the classical determinants to consider, in the case of moonlighting by lecturers of state universities in Cameroon, other explanatory variables like gender and localisation.

During the 80s and 90s, Cameroon witnessed an economic crisis that touched all sectors of activity. Before 1990, the state had maintained a steady growth in the budget of higher education that reached 2.1% of the state budget in 1990. Thereafter, the university system could not be protected from the effects of this crisis; drastic reductions in the working budget plunged the system into a deep crisis. Within a period of five years, the higher education budget was divided by eight. The 1994 devaluation of the CFA franc came to worsen the situation. It is therefore not a surprise that the university can no longer perform its duty of training and research, in a context where lecturers are not motivated because of the suppression of benefits, drastic salary cuts and poor working conditions. It is in this difficult context that the law of 1993 which restructured higher education and opened new university structures and is still being enforced today was adopted. Despite the growth in their budget allocation observed since 1998, the budget remains at a low level and does not enable a proper functioning of these institutions ; moreover, the growth in enrolment in universities between 2000 and 2004 remains higher than that of the university budgets. The working budget of higher education represented only 0.8% of the state budget in 1999, as against 2.1% in 1990.

These difficult living and working conditions of lecturers of state universities(Note 1) pushed them to explore and perform other activities out of these universities. These lecturers, because of their numerous activities tend to give less time and interest to their primary job, a phenomenon that still exists today and is increasing in spite of a relative increase in the salary level in the civil service(Note 2) and a special quarterly research benefits granted by the head of state to lecturers of state universities.

Contrary to the majority of studies in the literature that use linear constrained optimisation models (Shishko and Rostker) or classical discrete choice models of the tobit, logit or probit (Shishko and Rostker 1976, Foley 1997, Kimmel and Conway 2001) forms to analyse the determinants of moonlighting, this study uses a specific log-linear model to do this analysis. Compared to the other approaches, this model has the advantage of determining the relationship between two or more categorical variables (used in this study) without having to identify the dependent and independent variables beforehand. It is therefore a model of

association and not only of regression. Also, the log-linear models used in this study explain the logarithms of the expected frequencies using the corresponding level of factors and interactions between these levels. This is not possible with the traditional models cited above.

The main objective of this study is therefore to identify the factors that explain moonlighting by lecturers of state universities in Cameroon, and with the help of a statistical model, establish the relationship between moonlighting and a number of variables that affect it. Applied to a sample of 169 lecturers of two state universities, a log-linear analysis reveals that *the hourly constraints in the principal job, the income from secondary employment, and the income from the principal job appear as the main determinants of moonlighting when we control for variables like gender and the localisation of the university.*

To our knowledge, few studies have been carried out on moonlighting in the education sector and more precisely higher education in Africa and the rest of the world. This is quite surprising given the importance of a sector like education or higher education and training. Many studies on moonlighting highlight the effect of work hour constraints in the main job as a major determinant of moonlighting- Does this hold for lecturers of state universities in Cameroon? Does the number of work hours as suggested by the theoretical and empirical literature appear as a major determinant in the quest for a secondary job by lecturers of state universities? Although recent studies have are more rigorous in the study of moonlighting, little is known on the reasons underlying moonlighting in Africa in general and Cameroon in particular. This study therefore seeks to fill this void in the Cameroonian context, particularly in the case of lecturers of the universities of Douala and Dschang.

The second section of this study presents a brief review of the literature on the determinants of moonlighting in general and in the higher education sector in particular. The justification of the log-linear approach used as well as a theoretical presentation of the different forms of the model is done in section three. In section four, we present the econometric estimation of the different log-linear models and the results of the descriptive analysis before concluding the study.

2. Literature Review

Pioneer research on moonlighting recognised the possible existence of many reasons, but empirical studies make the hypothesis that all moonlighters have work hour constraints in their principal job (Shishko and Rostker, 1976; O'Connell, 1979; Krishnan, 1990, 1993). The literature before the study by Shishko and Rostker (1976) treated moonlighting following a demand and supply approach. Certain supply based studies (N. Moses, 1962 and R. Perlman, 1969) explain the individual labour supply of a moonlighter while others based on demand (H.W.Guthrie, 1965, 1969; A.Grossman, 1974; H.R.Hamel, 1967) highlight the demographic characteristics of a typical moonlighter. Shishko and Rostker (1976) have the merit of combining these two approaches to estimate the supply curve of a moonlighter thanks to the TOBIT model.

However, more recent studies highlight the reasons of moonlighting and answer questions on

the implications of these reasons for economic moonlighting models. As example, Conway and Kimmel (1994) estimate a moonlighter labour supply model for men in their youth using data from the Income and Programme Participation survey (ERPP). In their model, they identify many reasons for moonlighting. They particularly find that the number of hours spent in the principal job become endogenous if the labourer is moonlighting for reasons other than work hour constraints in the principal job.

In line with these studies, Conway and Kimmel (1995) use ERPP data to estimate a duration model of moonlighting. They make the hypothesis that the moonlighter with a work hour constraint in the principal job will hold many jobs for a lesser period than those who exercise moonlighting because both jobs are heterogeneous. Levenson (1995) provides an indirect proof of moonlighting. He notes that during the 25 years preceding his study, moonlighting led to salary and employment benefits by men but that the participation of women in moonlighting is increasing faster than that of men. This may be an indication that female participation in moonlighting is for non-economic reasons. However, Levenson does not test this hypothesis formally.

Paxson and Sicherman (1994) study the dynamics of moonlighting in the United States by jointly using data from the current population survey (ECP) and the Panel Dynamic Income Survey (EPRD).They find that moonlighting is a dynamic process – most workers surveyed practiced moonlighting during their working life. The EPRD data reveals that between 1979 and 1989, almost 65% of men and 43% of women had a second job. They also note that traditional moonlighting models suppose that workers practice moonlighting because of work hour constraints in the main job, ignoring the fact that with time, workers can evade these hour constraints and look for new jobs. The focus of their study is on the reasons why workers join or quit secondary jobs. They specify and estimate a joint decision: to look for a secondary job or to quit the primary one for another that has no hour constraints. Abdukadir (1992) examines the possibilities of moonlighting being the outcome of short run financial constraints.

Ehrlich (1973), Shishko and Rostker (1976), Conway and Kimmel (1998) explain moonlighting using the salary differential between the formal and informal sector, the latter giving more profit opportunities for a given level of risk. Krishnan (1990), Paxson and Sicherman (1996), Ahnand Rica (1997) analyse moonlighting as the result of the degree of under-employment or hour constraints in the main job. From this last point of view, these authors adhere to the views of the empirical works of other economists on the same reasons [O'Connell (1979), Krishnan (1990, 1993), Shishko and Rostker (1976)].

Rose (1994), Kim (2005), Desai and Idson (2000), BraithWaite (1994), Foley (1997) and Kolev (1998) show that moonlighting is for two main reasons: survival and the spirit of enterprise, especially in transition economies, reference being made here to Eastern Europe. Guariglia and Kim (2004) note that the probability of moonlighting increases with the level of training. Commander and Tolstopiatenko (1997) explain moonlighting by individuals using the demand for factors, especially labour. According to them, firms have a choice between informal part time jobs (black market labour) and informal full time ones.

Muhammad Mudabbir (2014) reveals geographical differences in multiple job holding rates in USA. He finds that the rates in some regions of the country are substantially higher than in other regions, and these differences has been persistent over time. He examines correlates of these labor market differences in multiple job holding

Francesco Renna et al (2013) develop a unified model of dual and unitary job holding based on a Stone-Geary utility function that incorporates both constrained and unconstrained labor supply. Using Panel data methods from the British Household Survey (1991- 2008) they find that the income and wage elasticities are much larger for labor supply in the second than in the main employment.

Arturo Martinez Jr et als, (2014), examine the relationship between income mobility and non-standard employment using multiple job holding as a case study based on Indonesia family life survey (IFLS). Using an empirical analysis, they show that multiple job holding is a prominent feature of Indonesia's labour market. However, for a significant bulk of the pluriactive workers, multiple job holding seems to be a necessary labour supply behaviour to make ends meet. Moreover, the data do not provide sufficient evidence that pluriactivity in the country is strongly correlated with long-term income mobility. This seems to be in contrast to findings from developed countries indicating that multiple job holding can be used to improve one's mobility prospects. The study concludes that further investigation is needed to determine whether multiple job holding in Indonesia is correlated with other dimensions of social mobility.

Barry T. Hirsch et als (2016) try to explain why multiple job holding rates differ substantially across U.S regions, states and metropolitan areas. For the authors, in explaining variation in multiple job holding are worker characteristics, commute times, local labor markets (MSA) ancestry shares, and, to a lesser extent, labor market churn. City size accounts for little of the variation once they condition on commute times

In the teaching field, the causes and consequences of moonlighting by lecturers have been highlighted by many authors. These causes and consequences of the phenomenon have led some authors to bring out a typical moonlighter profile, financial need (Janis N. Parham and Stephen P, Gordon, 2011 ; Winans, 2005) being one of the main reasons why lecturers engage in moonlighting and use it as to explore other career options (Winans, 2005).

A study carried out in the State of Texas in the United States (TSTA, 2006) reveals that 67% of lecturers questioned on the phenomenon are of the opinion that moonlighting has had a negative impact on their professional life and performance. Henderson, Darby and Maddux, (1982); McGinley, (1979); Wisniewski and Kleine (1984) show that moonlighting not only reduces the performance of lecturers but is also a threat to the professional status of this job.

Parham and Gordon (2011) analyse the negative effects of moonlighting on lecturers through the hour constraints in the secondary job. For these authors, moonlighting does not only affect the professional life of lecturers, but also their family life and their health. However, in the light of growing financial needs, lecturers cannot give up moonlighting in spite of its negative effects. These same authors hold that one of the causes of moonlighting by lecturers

also lies in the fact that these lecturers have for some time developed a complex towards their profession, considering it as a profession at different degrees of their status of lecturer. Is it for this reason that lecturers have began engaging in moonlighting, or do they do this simply for economic survival?

L. Carolyn Pearson, Delos Carroll and Bruce W. Hall (1994) rather lay emphasis on socio demographic characteristics of moonlighters in higher education (gender, highest certificate, wage, age, etc…) to bring out the profile of a typical moonlighter (young, mostly of male sex, and with many certificates). These lecturers are it appears not satisfied with their pay in the principal job. These authors finally reach the conclusion that these lecturers differ only slightly from their colleagues who are reticent as concerns moonlighting in the majority of factors associated to work (job satisfaction, quota and work hour constraint, stress at work) and attitudes (towards the job of lecturer, of students, of parents and the administration). Also, the moonlighter does not seem unsatisfied with his job.

However, although recent research has began studying moonlighting more rigorously, little is known on the reasons underlying this behaviour in Africa in general and Cameroon in particular. This study seeks to fill this literature gap in the Cameroonian context in general and particularly the lecturers of the universities of Douala and Dschang.

3. Methodology and Theoretical Justification of the Model

3.1 Sample Characteristics and Description of Study Variables

In order to identify the determinants of moonlighting by lecturers of state universities in Cameroon, we use six contingency tables of dimension (I * J * K); these six contingency tables are derived from the variables retained for analysis in section 4.1 by a cross analysis of the variables X, Y and Z. The definition of parameters is done by bringing out the principal effects (simple index) and interactive effects (double and triple indices). The general log-linear model for each of the six contingency tables obtained by cross tabulation of the three categorical variables is of the form:

$$\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ} + \lambda_{ijk}^{XYZ} \quad (1)$$

This model is referred to as the saturated or three factor interactive model. We then bring out the sub-models by setting certain parameters equal to zero corresponding to particular independence structures. A classical way of naming such models consists in giving only the most complex interactions considered. The others, as well as the principal effects are contained in the hierarchical structure of the model. If we make the hypothesis of a Poisson or multinomial distribution, only the total number of observations is fixed; necessitating only the presence of a constant λ. In this case, the terms λ_{ijk}^{XYZ} are all null and only interactions of second order are present. This is the second order partial association model that contains interactions of second order used in this study and is presented as follows:

$$\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ} \quad (2)$$

In this precise case, μ_{ijk} represent the expected frequencies of the relationship between two variables when we control for the third variable; this relationship is generally viewed in the form of a triple entry table from which the different odds ratios are calculated. We are therefore in the presence of multiple entry contingency tables and the log-linear model enables us to analyze the different relationships between the variables by modeling the cells of a multiple entry contingency table in the form of an association between the different variables and bring out the interactive effects, whence the specificity of the model with regards to classical approaches generally used in the study of moonlighting (logit, probit or tobit). Another specificity of our model lies in the fact that it doesn't distinguish between dependent and independent variables in the interpretation of its parameters. This is even more important since the addition of variables to the model may completely change the direction of the relationship between the different variables.

4. Presentation of Results and Discussion

4.1 Characteristics of the Sample and Description of Study Variables

This study analysis the determinants of moonlighting by lecturers of Cameroonian state universities by using data on two of the eight state universities in the country; an urban university (university of Douala) and a semi-urban university (university of Dschang). The reasons of the choice of the universities of Douala and Dschang(Note 3) lie in the fact that the first is representative of large metropolitan universities (universities of Yaoundé 1 and Yaoundé 2) where as the second is representative of small metropolitan universities (universities of Buea, Bamenda, Ngaoundéré and Maroua). In fact, the economic and demographic characteristics of the large metropolis are almost similar, just as are those of the small metropolis.

In each university, a survey was carried out and a random sample stratified by zone, gender, income and hour constraint was constituted on the basis of approximately 240 administered questionnaires of which 169 were returned, giving a rate of return of almost 70%. On the 169 received questionnaires, 138 were administered on men and 31 on women, 94 respondents being of Douala and 75 of Dschang. The Table below summarises the distribution of the lecturers questioned by gender, rank and university of origin.

Table 1. Gender and Academic Rank According to the University of Origin (n=169)

University of origine	Academic rank	Gender		Total
		Male	Female	
Douala	ATER(Note 4)	2 (40%)	3 (60%)	5 (33.33%)
	Assistant Lecturer	52 (88%)	7 (12%)	59 (65.56%)
	Senior Lecturer	18 (69.2%)	8 (30.8%)	26 (50%)
	Associate Professor	4 (100%)	0	4 (36.36%)
	Professor	0	0	0
	Sub Total 1	76 (80.85%)	18 (19.15%)	94 (55%)
Dschang	ATER	6 (60%)	4 (40%)	10 (63.67%)
	Assistant Lecturer	24 (77.4%)	7 (22.6%)	31 (35.44%)
	Senior Lecturer	25 (96.2%)	1 (3.8%)	26 (50%)
	Associate Professor	6 (85.7%)	1 (14.3%)	7 (63.64%)
	Professor	1 (100%)	0	1 (100%)
	Sub Total 2	62 (82,6%)	13 (17,4%)	75 (45%)
	Total	138 (81,65%)	31 (19,35%)	169 (100%)

Source: Authors' estimates using the survey data

The first column of the table represents the variables rank and university of origin; the second column which represents gender is divided into two columns namely male and female; the last column presents the total number of lecturers surveyed by rank and this according to the university of origin and gender; the figures below the frequencies represent the corresponding proportions; for example, we will say that the sample comprises 52 senior lecturers (which accounts for approximately 30,8% of the total of the sample) distributed in an equitable way in the two universities (50% in each institution) that is to say 18 men (69,2%) and 8 women (30,8%) senior lecturers in Douala and 25 men (96,2%) and a woman (3,8%) senior lecturers in Dschang.

The explanatory variables used within the framework of this study are those resulting from the traditional literature on moonlighting. The majority of them enable us to capture the socio-economic characteristics of the lecturers and to simplify the analysis were each classified in two categories: the current wage condition (CSA) with two modalities (adequate, inadequate) taken as a proxy for the wages in principal employment, the weekly workload of courses (CHC) with two modalities (less than 10 hours, greater than 10 hours) taken as proxy for time constraint in principal employment, the income earned in the secondary employment (RDU) with two modalities (consistent, inconsistent), the sex (male, female), the zone of localisation of the University (UO) with two modalities (Douala, Dschang). Lastly, for the explained variable we asked the surveyed a question to which it was necessary to answer by yes or no: Do you exercise other activities apart from your activities of teaching and research at the university? This was retained as a proxy of the variable moonlighting (pluri).

4.2 Some Descriptive Statistics

Firstly, when we ask the university lecturers surveyed their point of view concerning their

present wage situation, whatever their gender or university of origin, a high proportion answers that it is *inadequate* (see tables below).

Table 2. Current Wage Condition According to Gender (n=169)

			How do you appreciate your current wage condition			Total
			Adequate	Inadequate	Without opinion	
Gender	Male	Frequency	25	90	23	138
			18,1%	65,2%	16,7%	81,65%
	Female	Frequency	5	12	14	31
			16,1%	38,7%	45,2%	19,35%
Total			30	102	37	169
			17,8%	60,4%	21,9%	100,0%

Source: Authors' estimates using survey data

From this table, we see that on the 169 surveyed lecturers, 102 find their current wage situation is inadequate, giving approximately 60% of the sample size and of the 138 questioned men, 90 are of the same opinion, giving a percentage of approximately 65%. 38. 7% of the 31 women are of the same opinion. However, we note that a rather considerable percentage (nearly 22% of the sample) of surveyed had no opinion about the question. When we set aside this percentage in our estimates and even when we incorporate the first two columns, we note a high increase in the proportion of the people who believe that their current wage condition is inadequate at the global level (approximately 77%) and at the level of the gender (approximately 78% of the men and 70% of the women). This same reasoning holds when we consider the table below on the zone of localisation of the university.

Table 3. Current Wage Condition According to University of Origin (n=169)

			Your current wage condition seems			Total
			Adequate	Inadequate	Without opinion	
University of origin	Douala	frequency	13	63	18	94
			13,8%	67,0%	19,1%	55,62%
	Dschang	frequency	17	39	19	75
			22,7%	52,0%	25,3%	54,38%
Total			30	102	37	169
			17,8%	60,4%	21,9%	100,0%

Source: Authors' estimates using the survey data

In fact, by ignoring the last column and by incorporating the first two, 77% of lecturers surveyed find their current wage situation inadequate and at the level of the universities, we

obtain the same result for almost 70% of the lecturers of the University of Dschang and 83% for those of Douala.

Having in mind these statistics, can one conclude that the wages in principal employment are one of the key factors in the explanation of multiple job-holding of lecturers of state universities in Cameroon? The survey data in the following tables present a more or less unclear view on the issue: this is revealed in the fact that these tables give us a descriptive variation of the labour supply after a secondary employment as a function of the work hour constraints in the main employment, the wage in the main employment and the income from the secondary employment (Shishko and Rostker 1976).

Table 4. Current Wage Situation and Moonlighting (n=169)

		Your current wage situation is			Total
		Satisfactory	Unsatisfactory	No opinion	
Do you regularly carry out different activities besides your teaching and research job at the university?	*yes*	11	48	9	68
		16,2%	70,6%	13,2%	40,23%
	no	19	54	28	101
		18,8%	53,5%	27,7%	59,77%
Total		30	102	37	169
		17,8%	60,4%	21,9%	100,0%

Source: Authors' estimates using survey data

In fact, of the 169 people surveyed, 101 (60%) do not exercise moonlighting. More than half of the 60% (53.5%) find their wage situation unsatisfactory; this table studies the direction of variation of labour supply in the secondary employment in terms of the wage situation in the main employment. According to Shishko and Rostker (1976), the supply of labour in the secondary employment reduces with a wage increase in the main employment: we read from this table that when the wage situation is satisfactory (increase in wages in the main employment), the ratio of lecturers who don't hold a secondary job is larger than those that hold a secondary job, thus confirming economic theory. When we consider only those that effectively answered the questionnaire in our calculations, this ratio increases and we find that a reduction in the level of wages in the principal employment increases the proportion of those who hold a secondary employment.

Table 5. Hours Constraints and Moonlighting (n=169)

		Your average weekly lecture hours are equal to			Total
		No answer	< 10 Hours	> 10 Hours	
Do you regularly exercise different activities besides your teaching and research in the university?	*yes*	5	17	46	68
		7,4%	25,0%	67,6%	40,23%
	no	13	38	50	101
		12,9%	37,6%	49,5%	59,77%
Total		18	55	96	169
		10,7%	32,5%	56,8%	100,0%

Source: Authors' estimates using survey data

According to the theoretical framework exposed in section 2, the supply of labour in the secondary employment varies inversely with the work hour constraints in the main employment. Table five above shows that if we consider only those that answered the question on whether they practiced other activities, about 57% of the respondents with weekly lecturing hours greater than 10 hours said no; numerous weekly hours are therefore a deterrent to the exercise of other activities. However, for those who said yes, 73% have a weekly lecturing time greater than ten hours. What could explain this contrast given that the number of hours on the principal employment should decrease with the exercise of a secondary employment? The table below shows that whatever the rank of the lecturer, the general average number of lecturing hours is high.

Table 6. Hour Constraints and Academic Rank (n=169)

		Your weekly number of lecturing hours is			Total
		No answer	<10 Hours	> 10 Hours	
Academic Rank	None		1		1
			100,0%		0,59%
	Graduate assistant (ATER)	3	7	4	14
		21,4%	50,0%	28,6%	8,28%
	Assistant lecturer	9	29	52	90
		10,0%	32,2%	57,8%	53,25%
	Senior lecturer	4	16	32	52
		7,7%	30,8%	61,5%	30,76%
	Associate professor	2	2	7	11
		18,2%	18,2%	63,6%	6,5%
	Professor			1	1
				100,0%	0,59%
	Total	18	55	96	169
		10,7%	32,5%	56,8%	100,0%

Source: Authors' estimates using the survey data

The table above shows that in the case of university lecturers in Cameroon, the supply of labour in a secondary employment (moonlighting) varies with the income from this secondary employment and the weekly hour constraint in the main employment.

Table 7. Secondary Income, Income from the Main Employment and Hour Constraints (n=169)

Wages for your activities out of the university are :			Your weekly lecture hours are :			Total
			No answer	< 10 Hours	> 10 Hours	
Consistent	Your present wage condition is	Adequate		1 (33%)	2 (66%)	3 (1,77%)
		Inadequate	1 (10%)	4 (40%)	5 (50%)	10 (5,91%)
		No opinion		1 (33%)	2(66%)	3 (1,77%)
	Total					
			1 (6,25%)	6 (37,5%)	9 (56,25%)	16 (9,46%)
Average	Your present wage condition is	Adequate		4 (50%)	4 (50%)	8 (4,73%)
		Inadequate	1 (3,33%)	5 (16,67%)	24 (80%)	30 (17,75%)
		No opinion	1 (25%)	1 (25%)	2 (50%)	4 (2,36%)
	Total					
			2 (4,76%)	10 (23,8%)	30(71,4%)	42 (24,85%)
Insufficient	Your present wage condition is	Adequate		3 (60%)	2 (40%)	5 (2,95%)
		Inadequate	1 (5,26%)	4 (21,05%)	14 (73,7%)	19 (11,24%)
		No opinion		2 (66%)	1 (33%)	3 (1,77%)
	Total					
			1 (3,70%)	9 (33,33%)	17 (63%)	27 (16%)
No opinion	Your present wage condition is	Adequate		4 (28,57%)	10 (71,4%)	14 (8,28%)
		Inadequate	5 (11,62%)	18 (41,8%)	20 (46,5%)	43 (25,44%)
		No opinion	9 (33%)	8 (29,62%)	10(37%)	27 (16%)
	Total					
			14 (16,6%)	30 (37,7%)	40 (47,6%)	84 (49,70%)
Total			18(10,65%)	55(32,54%)	96 (56,8%)	169 (100%)

Source: Authors' estimates using survey data

The numbers in brackets represent percentages

The table above explains the contrast previously noticed: in fact, wages from the second employment is a determining factor at the level of variations in the quantity of labour hours supplied (second employment); as such, when the wages from the second employment is consistent, lecturers are attracted to the second employment no matter the workload in the hour constraints in the main one. This means that lecturers in Cameroonian state universities spend more time on the second employment at the detriment of their activities in the main job. The table below clearly shows that, labour hours supply in the main job increases with the

level of wages in the second employment. As such, when the wages in the second employment is consistent, the proportion of lecturers practicing moonlighting is higher than that of those who do not, no matter the hour constraint (about 67% for weekly hour constraints < 10h and 56% for weekly hour constraints > 10h)

Table 8. Secondary Income, Secondary Employment and Hour Constraint in the Principal Job (n=169)

Wages for your activities out of the university are			Do you regularly carry out other activities apart from those of teaching and research at the university?		
			Yes	No	Total
Consistent	What is your average weekly workload (no of hours)?	No answer	1 (100%)		1 (0.59%)
		<10 Hours	4 (66.67%)	2 (33.33%)	6 (3.55%)
		>10 Hours	5 (55.55%)	4 (44.45%)	9 (5.32%)
	Total		10(55.56%)	6 (44.44%)	18 (10.65%
Average	What is your average weekly workload (no of hours)?:	No answer	2 (100%)		2 (1.18%)
		<10 Hours	6 (60%)	4 (40%)	10 (5.91%)
		>10 Hours	25(83.33%)	5 (16.67%)	30(17.75%)
	Total		33(78.57%)	9 (21.43%)	42(24.85%)
Insufficient	What is your average weekly workload (no of hours)?:	No answer		1 (100%)	1 (0.59%)
		<10 Hours	7 (77.78%)	2 (22.28%)	9 (5.32%)
		>10 Hours	13(76.47%)	4 (23.53%)	17(10.05%)
	Total		20 (74%)	7 (26%)	27(15.97%)
No opinion	What is your average weekly workload (no of hours)?:	No answer	2 (14.28%)	12 (85.72%)	14 (8.28%)
		<10 Hours		30 (100%)	30(17.75%)
		>10 Hours	3 (7,5%)	37 (92.5%)	40(23.66%)
	Total		5 (6%)	79 (94%)	84 (49.7%)
Total			68(40.23%)	101 (59.77%)	169 (100%)

Source: Authors' estimates using survey data

The numbers in brackets represent percentages

Many determinants of moonlighting were retained in this study. The six tables below that result from the different cross tabulations each has eight models by crossing the variables. The preferred models retained are those that present non-significant probabilities (p-values) with the smallest likelihood (G^2) ratios. The different simulations with the SAS software show that the homogeneous association models are the best (see appendices).

4.3 Presentation and Empirical Justification of the Retained Models: Analysis of Variance Tables

The analysis of variance (ANOVA) tables below are drawn from the different homogeneous association models.

These ANOVA tables, through the tests on partial effects give us the significant interactions.

Table 9. Model *(csa*sex, csa*pluri, uo*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
Csa	2	17,52	0.0002
sex	1	52,23	<.0001
pluri	1	15,38	<.0001
(csa)*(sex)	2	8,47	0.0145
(csa)*(pluri)	2	3,66	0.1601
(sex)*(pluri)	1	4,85	0.0277
Likelihood Ratio	**2**	**1 ,54**	**0,46**

Source: Authors' estimates using survey data

We find that the significant interactions are *(csa)*(sex)* and *(sex)*(pluri).* In fact, the tests on the partial effects show a large interdependence between gender and the wage category of lecturers on the one hand and between gender and moonlighting on the other. However, this interdependence disappears between the salary condition and moonlighting. In other words, moonlighting does not depend on the salary category of the lecturer.

Table 10. Model *(csa*uo, csa*pluri, uo*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
Csa	2	51.05	<.0001
Uo	1	1.79	0.1810
Pluri	1	12.23	0.0005
(csa)*(uo)	2	2.45	0.2933
(csa)*(pluri)	2	4.60	0.1004
(uo)*(pluri)	1	16.22	<.0001
Likelihood Ratio	**2**	**2 ,06**	**0,35**

Source: Authors' estimates using the survey data

When we control for the salary category (csa), only the effect *(uo)*(pluri)* is highly significant, showing that moonlighting largely depends on the localisation of the university of origin of moonlighters. The universities being state universities, the partial effect *(csa)*(uo)* cannot be significant since whatever the university in which we teach, the salary treatment remains the same. The partial effect *(csa)*(pluri)* less significant but shows that moonlighting also depends on the salary condition of the lecturers.

Table 11. Model *(rdu*uo, rdu*pluri, uo*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
Rdu	3	9.50	0.0233
Uo	1	0.41	0.5240
Pluri	1	4.00	0.0454
(rdu)*(uo)	3	5.67	0.1286
(rdu)*(pluri)	3	66.75	<.0001
(uo)*(pluri)	1	16.90	<.0001
Likelihood Ratio	**3**	**1 ,33**	**0,72**

Source: Authors' estimates using survey data

When we control for the variable income received from moonlighting, we find that the interaction between the variables *(uo)*(pluri)* and *(rdu)*(pluri)* are highly significant for the homogeneous association model *(rdu*uo, rdu*pluri, uo*pluri).* In fact and according to the interactions, moonlighting highly depends on the income from the different jobs (*(rdu)*(pluri)* effect) and also of the localization of the university (*(uo)*(pluri)* effect). However, lecturers' income from secondary employments do not depend on the region of localization of the university (*(rdu)*(uo)* effect).

Table 12. Model *(rdu*sex, rdu*pluri, sex*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
Rdu	2	12.50	0.0019
Sex	1	47.50	<.0001
Pluri	1	0.24	0.6242
(rdu)*(sex)	2	2.21	0.3305
(rdu)*(pluri)	2	39.95	<.0001
(sex)*(pluri)	1	3.48	0.0622
Likelihood Ratio	**2**	**1 ,74**	**0,41**

Source: Authors' estimates using survey data

In this model, only the *(rdu)*(pluri)* effect is highly significant as in the former *((rdu*uo, rdu*pluri, uo*pluri)*) model. There is therefore a high association between moonlighting and

the income from secondary incomes. The interaction between the *(sex)*(pluri)* effect is also significant and shows the association between gender and moonlighting. We however note the insignificance of the *(rdu)*(sex)* effect in this model showing that income from secondary jobs do not depend on the gender of the lecturer.

Table 13. Model *(chc*sex, chc*pluri, sex*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
Chc	2	30.07	<.0001
Sex	1	29.68	<.0001
Pluri	1	5.40	0.0201
(chc)*(sex)	2	5.21	0.0738
(chc)*(pluri)	1	1.64	0.2001
(sex)*(pluri)	1	1.87	0.1711
Likelihood Ratio	**2**	**2 ,46**	**0,29**

Source: Authors' estimates using survey data

The homogeneous association model *(chc*sex, chcpluri, sex*pluri)* has only one significant effect *((chc)*(sex))* which is at the limit when the variable hour constraint in the main employment is controlled for. In fact, the hour constraint in the main job, here represented by the average number of lecture hours a week is used differently, depending on the gender of the lecturer. However, whatever the number of work hours a week on the main job, lecturers will always have the tendency to practice moonlighting leading to the non significance of the *(chc)*(pluri) and (sex)*(pluri)* effects, the latter showing no interaction between moonlighting and gender.

Table 14. Model *(chc*uo, chc*pluri, uo*pluri)*

Source	DF	Chi- Square	Pr >ChiSq
chc	2	62.42	<.0001
uo	1	7.12	0.0076
pluri	1	16.41	<.0001
(chc)*(uo)	2	1.40	0.4957
(chc)*(pluri)	2	8.85	0.0120
(uo)*(pluri)	1	23.06	<.0001
Likelihood Ratio	**1**	**0 ,01**	**0,91**

Source: Authors' estimates using survey data

Two interactive effects are significant in the *(chc*uo, chc*pluri, uo*pluri)* model. These are the *(chc)*(pluri)* and *(uo)*(pluri)* effects. In fact, following these effects, the model shows that moonlighting highly depends on the weekly work load in the state universities and *((chc)*(pluri))* and also on the localization of the university *((uo)(pluri)).* However, the weekly work load does not depend on the region or localization of the university.

4.4. Log-linear model and discussion

The table below summarizes the estimated parameters of all the homogeneous association models of the form:

$$\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ} \quad (3)$$

Table 15. Homogeneous Association Models

model	Models of type : $\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ}$		
	Parameter	value	Pr > ChiSq
Model 1 (csa*sex, csa*pluri, sex*pluri)	$\lambda_{11}^{(csa)(sexe)}$	1.0349	0.0872
	$\lambda_{21}^{(csa)(sexe)}$	1.3520	0.0038
	$\lambda_{11}^{(csa)(pluri)}$	0.4094	0.4583
	$\lambda_{21}^{(csa)(pluri)}$	0.8027	0.0721
	$\lambda_{11}^{(sexe)(pluri)}$	1.0366	0.0377
Model 2 (csa*uo, csa*pluri, uo*pluri)	$\lambda_{11}^{(csa)(pluri)}$	0.7234	0.2018
	$\lambda_{21}^{(csa)(pluri)}$	0.9333	0.0381
	$\lambda_{11}^{(uo)(pluri)}$	1.3624	0.0001
	$\lambda_{11}^{(csa)(uo)}$	-0.4139	0.4273
	$\lambda_{21}^{(csa)(uo)}$	0.2677	0.5122
Model 3	$\lambda_{11}^{(rdu)(uo)}$	-1.0492	0.0842
	$\lambda_{21}^{(rdu)(uo)}$	0.3625	0.4357
	$\lambda_{31}^{(rdu)(uo)}$	-0.1078	0.8313

(rdu*uo, rdu*pluri, uo*pluri)	$\lambda_{11}^{(rdu)(pluri)}$	3.1903	0.0001
	$\lambda_{21}^{(rdu)(pluri)}$	3.4372	0.0001
	$\lambda_{31}^{(rdu)(pluri)}$	3.3380	0.0001
	$\lambda_{11}^{(uo)(pluri)}$	1.6806	0.0001
Model 4 (rdu*sex, rdu*pluri, sex*pluri)	$\lambda_{11}^{(rdu)(sexe)}$	-0.2164	0.7492
	$\lambda_{21}^{(rdu)(sexe)}$	0.8797	0.2042
	$\lambda_{11}^{(rdu)(pluri)}$	1.6845	0.0028
	$\lambda_{21}^{(rdu)(pluri)}$	2.4285	0.0001
	$\lambda_{11}^{(sexe)(pluri)}$	0.9274	0.0751
Model 5 (chc*sex, chc*pluri, sex*pluri)	$\lambda_{11}^{(chc)(sexe)}$	0.4702	0.5165
	$\lambda_{21}^{(chc)(sexe)}$	1.2024	0.0358
	$\lambda_{21}^{(chc)(pluri)}$	0.7214	0.2125
	$\lambda_{11}^{(sexe)(pluri)}$	0.7191	0.1817
Model 6 (chc*uo, chc*pluri, uo*pluri)	$\lambda_{11}^{(chc)(uo)}$	0.1111	0.8489
	$\lambda_{21}^{(chc)(uo)}$	-0.3248	0.5593
	$\lambda_{11}^{(chc)(pluri)}$	-0.0829	0.8982
	$\lambda_{21}^{(chc)(pluri)}$	0.9951	0.0985
	$\lambda_{11}^{(uo)(pluri)}$	1.6920	0.0001

Source: Authors' estimates using the survey data

The table only presents the parameters from the various interaction effects between the variables in order to illustrate the different associations between these variables and the variable moonlighting after controlling for some of the variables. For example, for the association model of the form (csa*sex, csa*pluri, sex*pluri), the positive value of $\lambda_{11}^{(sexe)(pluri)}$ which is 1.0366 simply shows that if the variables sex and moonlighting had been

independent, a male lecturer would always be more willing to practice moonlighting given the present wage situation.

4.4.1 Estimated conditional odds ratios and interactions

In order to better illustrate the interaction effects, we use the conditional (or partial) odds ratios obtained from the estimated parameters in the table above. The table below presents the estimated probabilities of the different homogenous association models:

Table 16. Partial odds ratios

Model	Models of the following type : $\log(\mu_{ijk}) = \lambda + \lambda_i^X + \lambda_j^Y + \lambda_k^Z + \lambda_{ij}^{XY} + \lambda_{ik}^{XZ} + \lambda_{jk}^{YZ}$		
(csa*sex, csa*pluri, sex*pluri)	(csa)(sex)	(csa)(pluri)	(sex)(pluri)
	0.72	0.67	2.81
(csa*uo, csa*pluri, uo*pluri)	(csa)(uo)	(csa)(pluri)	(uo)(pluri)
	0.50	0.81	3.90
(rdu*uo, rdu*pluri, uo*pluri)	(rdu)(uo)	(rdu)(pluri)	(uo)(pluri)
	0.27	0.027	5.36
(rdu*sex, rdu*pluri, sex*pluri)	(rdu)(sex)	(rdu)(pluri)	(sex)(pluri)
	0.23	0.47	2.52
(chc*sex,chc*pluri,sex*pluri)	(chc)(sex)	(chc)(pluri)	(sex)(pluri)
	0.48	0.48	2.05
(chc*uo, chc*pluri, uo*pluri)	(chc)(uo)	(chc)(pluri)	(uo)(pluri)
	1.54	0.34	5.43
Columns	1	2	3

Source: Authors' estimates using the survey data

From the table, we see for example for the model *(csa*sex, csa*pluri, sex*pluri),* the odd ratio of the *(sexe)(pluri)* effect given the wage condition is :

$$e^{(\lambda_{11}^{(sexe)(pluri)} + \lambda_{22}^{(sexe)(pluri)} - \lambda_{12}^{(sexe)(pluri)} - \lambda_{21}^{(sexe)(pluri)})} = e^{(\lambda_{11}^{(sexe)(pluri)})} = e^{(1.0366)} = 2.081.$$

In other words, male lecturers have about 2.081 times more chances of practicing moonlighting than their female counterparts, whatever the current wage situation in their main job. We also notice that whatever the wage situation in the main job, lecturers of the University of Douala have about 3.90 times more chances of practicing moonlighting than those of Dschang. The homogenous association model *(csa*sex, csa*pluri, sex*pluri)* therefore reveals two very important components in the understanding of the moonlighting of lecturers of Cameroonian state universities which are gender and the region of localization of the university when we control for wages in the main job. These results are in line with those of Foley (1997) according to which men and residents of urban areas are more likely to

practice moonlighting. In fact, moonlighting is more justified in Douala than in Dschang because Douala is the economic capital of Cameroon where we find the highest number of private university institutions (more than 40% of private universities are found in the town of Douala alone) and the highest number of companies: about 80% of the country's economic activities are found in this town.

However, according to Levenson (1995), women practice moonlighting more than men. Our results show the contrary and confirm those of Carolyn Pearson, Delos Carroll and Bruce W. Hall (1994), and Foley (1997) on the typical moonlighter according to gender. In fact, the socio-economic context makes the woman the manager of the domestic activities and educator of the children. This reduces the time she can give to secondary activities besides her main job, confirming the result that men have 2.81 times more chances of moonlighting more than women.

A specificity of homogenous association models lies in the fact that the estimated odds ratios are the same at all levels of the control variable.

When we control for the variables income from secondary activities [*models (rdu*uo, rdu*pluri, sex*pluri)* and *(rdu*uo, rdu*pluri, uo*pluri)*], we still find that whatever the income of lecturers, gender and the region of localization of the university remain the main determinants of moonlighting with respective odds ratios of 2.52 and 5.36. In other words, independently of the income from secondary activities, male lecturers have about 2.52 times more chances of moonlighting more than their female counterparts on the one hand and on the other, lecturers of the university of Douala have about 5,36 times more chances of moonlighting than those from the university of Dschang, thus confirming the previous results. The interaction effects (sex)(pluri) and (uo)(pluri) being significant (see tables 11 and 12 of the analysis of variance), we can conclude that whatever the level of income from secondary activities, the region of localization and gender of the lecturer are the main determinants of moonlighting.

Lastly, when we control with respect to work hour constraints on the main job, [*model (chc*sex, chc*pluri, sex*pluri)* and *(chc*uo, chc*pluri, uo*pluri*)], we still find a strong propensity for men and lecturers in Douala to practice moonlighting compared to women and lecturers from the university of Dschang. Note that the interaction effect (genre)(pluri) in the *(chc*sex, chc*pluri, sex*pluri*) model is not significant. In other words, when we control for the variable hour constraints on the main job, moonlighting is no longer determined by gender but instead by the localization of the university (see tables 13 and 14 on the analysis of variance). With respect to gender, this effect is this is all the more relevant that the annual work load independently of the sex is distributed as follows:

Table 17. Annual Lecturing Hours by Rank

Rank	Annual lecturing hours	Activities
Assistant lecturer	200	Tutorials
Senior lecturer	180	Tutorials and lectures
Associate professor	150	Lectures
Professor	80	lectures

Source: Authors' estimates using the survey data

We see from this table that the annual lecturing hours reduces as the rank of the lecturer increases. Thus, the assistant lecturer whose status is uncertain (with a short term contract renewable twice) is also the one with the highest number of lecturing hours and this could be harmful to his change of rank.

Column 2 shows the relationship between moonlighting and certain determinants used as control variables in column 3 when we control for gender and the localisation of the university. The results in this column will enable us to test some of the hypotheses on the determinants of moonlighting formulated by Shishko and Rostker(1976) in the case of lecturers of state universities in Cameroon. These hypotheses are made on the variables *work hour constraints on the main job, wages in the main job* and *income from secondary jobs*. Thus, for the *(chc*sex, chc*pluri, sex*pluri)* and *(chc*uo, chc*pluri, uo*pluri)* models, the likelihood ratios between hour constraints and moonlighting are less than 1 showing that whatever the gender and region of localisation of the university, lecturers with a weekly workload less than 10 hours have a lower tendency to practice moonlighting than those with weekly workloads more than 10 hours. We however notice that the chc*pluri interaction effect of the *(chc*sex, chc*pluri, sex*pluri)* model is not significant. In other words, when we control for the variable gender, the variable workload in the main job doesn't have an effect on moonlighting (see table 13 on the analysis of variance). However, when we control with respect to the region of localization of the university (*(chc*uo, chc*pluri, uo*pluri)* model), the chc*pluri interaction effect is significant (see table 14 on the analysis of variance). *We can therefore conclude that whatever the region of localization of the university, the variable hour constraints on the main job is a significant determinant of moonlighting.*

In the same manner, the *(rdu*sex, rdu*pluri, sex*pluri)* and *(rdu*uo, rdu*pluri, uo*pluri)* models show that whatever the sex of the lecturer or region of localization of the university, a higher wage in a secondary job, the less the tendency for the lecturer to search for another job since the interaction effects (rdu)(pluri) are highly significant for both models (see tables 11 and 12 on the analysis of variance).

When the income from a secondary job is not consistent, the tendency to exercise other secondary jobs is higher than when this income is consistent. In fact, lecturers in Cameroonian state universities benefit from a particular status which is that of having a job that makes it difficult for them to be dismissed. This employment insurance gives them the

liberty to search for employment outside their universities. This state of mind is even more reinforced when the income from the secondary job is not consistent. Lecturers who find themselves in this situation would therefore have the tendency to exercise double employment in order to attain the income levels considered as consistent as shown by the variable secondary income according to which those with inconsistent secondary incomes are more likely to continue holding multiple secondary jobs than those whose secondary incomes are considered as consistent. *We can therefore conclude that income from secondary jobs is an important determinant of moonlighting whatever the sex of the lecturer or the region of localization of his university.*

Finally, the *(csa*sex, csa*pluri, sex*pluri)* and *(csa*uo, csa*pluri, uo*pluri)* models show us the relationship between moonlighting and the wage from the main job when the control variables are sex and the region of localization. These models predict that whatever the sex of the lecturer or region of localization of the university, the better the wages in the main job, the smaller the tendency to practice moonlighting. We however note that the interaction effect (csa)(pluri) in the *(csa*sex, csa*pluri, sex*pluri)* model is not significant when we control for the variable sex (see the tests on the interaction effects in the table for model 1 on the analysis of variance). However, the second model *(csa*uo, csa*pluri, uo*pluri)* shows that the significance of the interaction effect (csa)(pluri) is small when we control for the region of localization of the university (see the tests on the interaction effects in table 10 on the analysis of variance). *We can therefore conclude that there is a link between the income in the main job and in secondary jobs only when we control for the region of localization of the university.*

These results to a certain extent confirm those of the descriptive analysis performed in section 4 of this study.

5. Conclusion

The main objective of this study is to highlight the factors that explain moonlighting of lecturers of state universities in Cameroon. Different log-linear models enable us to capture the different aspects of moonlighting when we control for certain factors like gender or the region of localisation of the university. Our analysis shows that the main determinants of moonlighting by lecturers in Cameroon are the wage in the main job, hour constraints in the main job and the income from secondary jobs. Besides these factors, the study also reveals that control variables like gender and the region of localisation of the university also explains moonlighting. The particularity of this study lies in the fact that it reveals the interaction effects between moonlighting and its determinants using odds ratios. The survey data collected shows that moonlighting deteriorates the quality of lectures in state universities in Cameroon. In order to reduce the level of moonlighting by lecturers, the state should put in place a system of incentives based on three main aspects. Firstly, it should create an attractive working environment with offices equipped with fast internet connection and air conditioners, especially in Douala. In fact, in Douala and Dschang, only a minority of lecturers with administrative responsibilities have offices on the university campus. The result of this is that

the majority of lecturers lack where to go after lectures or between two lectures and tend to offer their services in the private sector. Secondly, the hourly remuneration that was adopted since the 70's, i.e. about forty years ago should be revised. These rates do not take into consideration changes in the cost of living that have taken place since they were adopted, with the cost of certain basic necessities having been multiplied since then. There is therefore a necessity to adapt these rates to the current price levels. Finally, there should be a substantial increase in the basic salaries of lecturers to levels comparable to those in other African countries at similar levels of development as Cameroon.

The majority of findings on the variables in this study confirm the hypothesis that financial need is one of the main reasons why lecturers in the universities of Dschang and Douala engage in moonlighting (Parham and Gordon, 2011; Winan, 2005). This is mainly due to the social and community pressure on the lecturer in the African context. The lecturer is generally viewed by the traditional community as someone who possesses important material and financial means that should be put at the disposal of the community. In other to satisfy this community, the lecturer is somewhat obliged to practice moonlighting.

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Note

Note 1. There are eight state universities in Cameroon: Yaoundé 1, Yaoundé 2, Douala, Dschang, N'Gaoundéré, Buea, Maroua, Bamenda

Note 2. In April 2008, there was a hunger riot in Cameroon. This pushed the state to increase the level of salaries in the civil service by about 20%.

Note 3. Limited financial means was also one of the reasons for choosing two universities only. We however will gradually extend the study to the other state universities.

Note 4. ATER stands for Teaching and Research Assistant

Appendix: Models obtained by cross tabulation

Cross tabulation1: current wage condition (CSA)*sex (SEX)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(CSA, SEX, PLURI)	complete Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{pluri}$	7	23,73	<0,001
(CSA*SEX, PLURI)	mutual Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ik}^{(csa)(sexe)}$	5	12,66	<0,02
(CSA*PLURI, SEX)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{jk}^{(csa)(pluri)}$	5	17,46	<0 ,003
(PLURI*SEX, CSA)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ij}^{(sexe)(pluri)}$	6	16,28	<0,01
(SEXE*PLURI, SEX*CSA)	conditional Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ij}^{(sexe)(csa)} + \lambda_{jk}^{(sexe)(pluri)}$	4	5,21	0,26*
(CSA*PLURI, SEX*PLUR)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{jk}^{(csa)(pluri)} + \lambda_{jk}^{(sexe)(pluri)}$	4	10,01	0,04
(SEX*CSA, LURI*CSA)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{jk}^{(csa)(pluri)} + \lambda_{ik}^{(sexe)(csa)}$	3	6,39	0,09
(SEX*CSA, SEX*PLURI, CSA*PLURI)	Homogeneous association $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ij}^{(sexe)(csa)} + \lambda_{ik}^{(sexe)(csa)} + \lambda_{jk}^{(pluri)(csa)}$	2	1 ,54	0,46*

Cross tabulation2: current wage condition (CSA)* University of origin (UO)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(CSA, UO, PLURI)	complete Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{csa}$	7	28,67	<0,0002
(CSA*UO, PLURI)	mutual Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ik}^{(csa)(uo)}$	5	4,55	<0,0002
(CSA*PLURI, UO)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{jk}^{(csa)(pluri)}$	5	22,40	<0,0004
(PLURI*UO, CSA)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ij}^{(uo)(pluri)}$	6	10,78	<0,09
(UO*PLURI, UO*CSA)	conditional Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ik}^{(uo)(csa)} + \lambda_{ij}^{(uo)(pluri)}$	4	6,66	0,15*
(CSA*PLURI , UO*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{jk}^{(csa)(pluri)} + \lambda_{ij}^{(uo)(pluri)}$	4	4,52	0,34*
(UO*CSA , PLURI*CSA)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ik}^{(uo)(csa)} + \lambda_{jk}^{(pluri)(csa)}$	3	18,28	0,05
(UO*CSA , CSA*PLURI , UO*PLURI)	Homogeneous association $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{csa} + \lambda_{ij}^{(uo)(pluri)} + \lambda_{ik}^{(uo)(csa)} + \lambda_{jk}^{(pluri)(csa)}$	2	2 ,06	0,35*

Cross tabulation3: income earned in the secondary employment (RDU)* University of origin (UO)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(RDU, UO, PLURI)	complete Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu}$	10	109,96	<0,0001
(RDU*UO, PLURI)	mutual Independence $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(rdu)(uo)}$	7	94,63	<0,0001
(RDU*PLURI, UO)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{jk}^{(rdu)(pluri)}$	7	33,56	<0,0001
(PLURI*UO, RDU)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ij}^{(pluri)(uo)}$	9	83,40	<0,0001

(UO*PLURI, UO*RDU)	**conditional Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(uo)(rdu)} + \lambda_{ij}^{(uo)(pluri)}$	**6**	**68,07**	**<0,0001**
(RDU*PLURI, UO*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{jk}^{(pluri)(rdu)} + \lambda_{ij}^{(uo)(pluri)}$	**6**	**7**	**0,32***
(UO*RDU, PLURI*RDU)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(uo)(rdu)} + \lambda_{jk}^{(rdu)(pluri)}$	**4**	**18,23**	**<0,001**
(UO*RDU, RDU*PLURI, UO*PLURI)	**Homogeneous association** $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ij}^{(uo)(pluri)} + \lambda_{ik}^{(uo)(rdu)} + \lambda_{jk}^{(pluri)(rdu)}$	**3**	**1 ,33**	**0,72***

Cross tabulation4: income earned in the secondary employment (RDU)*sex (SEX)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(RDU, SEX, PLURI)	**complete Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu}$	**9**	**53,07**	**<0,0001**
(RDU*SEX, PLURI)	**mutual Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(rdu)(sexe)}$	**6**	**46,91**	**<0,0001**
(RDU*PLUR, SEX)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{jk}^{(rdu)(pluri)}$	**6**	**18,59**	**<0,004**
(PLURI*SEX, RDU)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ij}^{(pluri)(sexe)}$	**8**	**23,08**	**<0,003**
(SEX*PLURI, SEX*RDU)	**conditional Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(sexe)(rdu)} + \lambda_{ij}^{(sexe)(pluri)}$	**5**	**19,12**	**<0,001**
(RDU*PLURI, SEX*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{jk}^{(pluri)(rdu)} + \lambda_{ij}^{(sexe)(pluri)}$	**5**	**10,71**	**<0,05**
(SEX*RDU, PLURI*RDU)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ik}^{(sexe)(rdu)} + \lambda_{ij}^{(rdu)(pluri)}$	**3**	**1,81**	**0,61***
(SEX*RDU, RDU*PLURI, SEX*PLURI)	**Homogeneous association** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{rdu} + \lambda_{ij}^{(sexe)(pluri)} + \lambda_{ik}^{(sexe)(rdu)} + \lambda_{jk}^{(pluri)(rdu)}$	**2**	**1 ,74**	**0,41***

Cross tabulation5: weekly workload of courses (CHC)*sex (SEX)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(CHC, SEX, PLURI)	**complete Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc}$	**7**	**18,48**	**<0,01**
(CHC*SEX, PLURI)	**mutual Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{jk}^{(chc)(pluri)}$	**5**	**13,37**	**<0,02**
(CHC*PLURI, SEX)		**5**	**13,15**	**<0,02**
(PLURI*SEX, CHC)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ij}^{(pluri)(sexe)}$	**6**	**11,73**	**<0,06**
(SEX*PLURI , SEXE*CHC)	**conditional Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ik}^{(sexe)(chc)} + \lambda_{ij}^{(sexe)(pluri)}$	**4**	**6,63**	**0,15***
(CHC*PLURI, SEX*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{jk}^{(pluri)(chc)} + \lambda_{ij}^{(sexe)(pluri)}$	**4**	**6,40**	**0,17***
(SEX*CHC , PLURI*CHC)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ik}^{(sexe)(chc)} + \lambda_{jk}^{(chc)(pluri)}$	**3**	**8,04**	**<0,04**
(SEX*CHC, CHC*PLURI, SEX*PLURI)	**Homogeneous association** $\log(\mu_{ijk}) = \lambda + \lambda_i^{sexe} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ij}^{(sexe)(pluri)} + \lambda_{ik}^{(sexe)(chc)} + \lambda_{jk}^{(pluri)(chc)}$	**2**	**2 ,46**	**0,29***

Cross tabulation 6: weekly workload of courses (CHC)* University of origin (UO)* moonlighting (PLURI)

MODEL	TYPE	DF	G^2	P-VALUE
(CHC, UO, PLURI)	**complete Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc}$	**6**	**20,88**	**<0,001**
(CHC*UO, PLURI)	**mutual Independence** $\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ik}^{(chc)(uo)}$	**4**	**20,57**	**<0,0004**
(CHC*PLURI, UO)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{jk}^{(chc)(pluri)}$	**4**	**9,38**	**<0,05**

(PLURI*UO, CHC)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ij}^{(uo)(pluri)}$	**5**	**4,47**	**0,48***
	conditional Independence			
(UO*PLURI , UO*CHC)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ik}^{(uo)(chc)} + \lambda_{ij}^{(uo)(pluri)}$	**3**	**3,99**	**0,26***
(CHC*PLURI , UO*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{jk}^{(pluri)(chc)} + \lambda_{ij}^{(uo)(pluri)}$	**3**	**0,3**	**0,91***
(UO*CHC , PLURI*CHC)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ik}^{(uo)(chc)} + \lambda_{jk}^{(chc)(pluri)}$	**2**	**6,77**	**<0,03**
	Homogeneous association			
(UO*CHC , CHC*PLURI , UO*PLURI)	$\log(\mu_{ijk}) = \lambda + \lambda_i^{uo} + \lambda_j^{pluri} + \lambda_k^{chc} + \lambda_{ij}^{(uo)(pluri)} + \lambda_{ik}^{(uo)(chc)} + \lambda_{jk}^{(pluri)(chc)}$	**1**	**0 ,01**	**0,91***