

The Labour Market Policy and performance of Cameroonian Firms

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Abstract: The aim of this study is to evaluate employees' productivity in relation to their contract status. This study uses the survey data collected between April and May 2006 in Cameroonian manufacturing sector firms having more than 15 employees and completed by information issued from the National Institute of Statistics. The collected information concerned 45 firms spreaded on 3 years (2003-2005). This study uses the stochastic production frontier and distinguishes employees holding temporary contracts from holders of unspecified periodic contracts. Results are estimated in 2 stages, with the first being the evaluation of determinants of the utilisation of temporary workers and the second is devoted to the estimation of the level of efficiency and the workers' productivity. The empirical analyses show that employees holding temporary contracts are more productive than those holding unspecified periodic contracts when the firm is on the production frontier.

Résumé: L'objectif de cette étude est d'évaluer la productivité des employés en relation avec leur statut contractuel. Cette étude utilise les données d'enquête collectées entre Avril et Mai 2006 dans les entreprises du secteur manufacturier camerounais ayant au moins 15 employés et complétées par des informations issues de l'Institut National de la Statistique. Les informations collectées concernent 45 entreprises sur trois années (2003 – 2005). Cette étude utilise la frontière de production stochastique et distingue les employés titulaires d'un contrat à durée déterminée de ceux titulaires d'un contrat à durée indéterminée. L'estimation des résultats est faite en deux étapes. La première étape consiste à évaluer les déterminants de l'utilisation des employés temporaires et la seconde étape est consacrée à l'estimation des indices d'efficacité et de la productivité des employés. Les analyses empiriques montrent que les employés détenteurs d'un contrat à durée déterminée sont plus productifs que ceux détenteurs d'un contrat à durée indéterminée.

Keywords: Labour market policy, specified period contract, unspecified period contract, and production frontier.

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1. Research problem

After the 1952 Code undertaken by the colonial authorities, the legislator successively promulgates the 1967, 1974 and 1992 Codes. The provisions contained in the former Codes preceding the one currently applied (1992), especially the 1974 Code are rigid concerning labour contracts. First article 30 line 2 of the 1974 Code stipulated that « if the contract is concluded on a specified period basis, this period shouldn't exceed 2 years». Line 3 stipulates that “the specified period contract becomes an unspecified period contract when the reckoned 2 years period above is exceeded while labour relations continue after expiry”. Thus, the unspecified period contract is the rule and the specified periods contract the exception. Next, dismissal conditions were restricting notably in terms of advance notice, monetary compensation, administrative procedure, etc.

Since the 1980s, the crisis borne by Cameroon and the requirements of the different adjustment programs to which it was submitted, the 1974 Code was judged unsuitable (Tjouen, 1996). This Code considered too rigid and resented by employers as source of inefficiency. Ameliorate the labour regulation by making it more flexible, was the wish of local employers (Pougoue, 1991), as well as international financial institutions like the IMF and the World Bank.

The 1992 Code is found as the continuation of the liberalism wind that blowed over Africa in general and Cameroon in particular since 1990, with the December 12, 1990 law number 90/093. It aimed at ameliorating labour market flexibility and thus enable firms to be more efficient. This ambition was realised through modifications related to unions, negotiations working relations. This led to the legislation of the specified period labour contract which was formerly an exception in the 1974 Code, accompanied by various uses of the specified period contract (SPC). These SPC are different by the length in time, degree of attachment to the firm, and number of renewal.

Sixteen years after the application of the labour Code, the question of the labour structure neutrality on the firm's performance finds its significance. In other words, what is the effect of contractual forms on firms' performance in the Cameroonian manufacturing sector? The aim of this paper is to evaluate employees' productivity referring to their contractual status and the level of efficiency of each firm. The remaining part of this paper is structured as follows: section 2 presents modelling strategy, section 3 results and section 4 the conclusion as well as recommendations.

2. Modelling strategy

The performance of firms is measured by efficiency index. This study uses a stochastic parametric production frontier. The stochastic parametric frontier was first proposed by Aigner et al. (1977) and Meeusen and van den Broeck (1977). Once a functional form has been chosen for the production function, these authors propose the following model: $y_i = f(x_i, \beta) + \varepsilon_i$, where y_i is the output obtained by the firm i , x_i is the vector of used inputs, β is a vector of parameters to be estimated and ε_i is a composed error with two elements, $\varepsilon_i = v_i + u_i$.

The error component v_i represents the symmetric disturbance that captures the random variations in production due to factors such as random errors, errors in the observation and measuring of data and chance, and is assumed to be identically and independently distributed as a $N(0, \sigma_v^2)$. The error component u_i is an asymmetric term that captures technical inefficiency, and is assumed to be distributed independently of v_i , and to satisfy $u_i \leq 0$. A statistical distribution for u_i has to be assumed. Aigner et al. (1977) analyse the cases of half-normal and exponential distributions. Meeusen and van den Broeck (1977) consider only the latter. In this paper it will be assumed that the random error u_i is half-normally distributed, since it better fits the available data.

2.1. The consideration of labour contracts in modelling

In spite of the numerous temporary contracts authorised by the 1992 Code, the information provided by the firms as well as those obtained from the National Institute of Statistics only enable to distinguish between employees under UPC and SPC in a firm. The theoretical framework commonly used is a production theory. The underlying assumption is that the firm has a method of transforming various inputs into output and this process can be represented by a production function (Brynjolfsson and Hitt, 1996). The Cobb-Douglas specification is the most used as it generally represents a good description of the production process (Jorgensen, 1972; Heyer et al., 2004). The econometric model is inspired of the works of Mairesse and sassanou (1989), Mairesse and Cunot (1988) and, N'gbo (1994) taking into account the heterogeneity of the labour factor.

$$\ln y_{it} = \ln[f(X_{it}, \beta)] + v_{it} - \mu_i \quad (1)$$

Where y_{it} is the output of firm i at period t ; X_{it} is the vector of independent variables as labour, capital, etc. and β is the parameters vector of the production frontier to be estimated, v_{it} is the symmetric error term such as $v_{it} \rightarrow N(0, \sigma_v^2)$; μ_i is the error term representing technical inefficiency and assumed invariant in time such as $\mu_i \rightarrow N(0, \sigma^2)$. Following Schmidt and Sickles (1984), we set:

$$\beta_0^* = \beta_0 - \rho, \mu_i^* = \mu_i - \rho \text{ et } \varepsilon_{it} = v_{it} - \mu_i^*$$

Equation (10) can now be written as follows:

$$y_{it} = \beta_0^* + X_{it}'\beta + \varepsilon_{it} \quad (2)$$

Considering the two main factors of production which are capital and labour, and adopting a Cobb-Douglas specification, equation (2) can be rewritten as follows:

$$\ln y_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \varepsilon_{it} \quad (3)$$

K_{it} measures the firm's capital i at period t , L_{it} measures the effective labour used by firm i at period t ; and ε_{it} the error term. Given that the labour force is made of employees who labour contracts with the firm are different, the labour factor is thus broken up in two sub-groups which are : employees under UPC and those under SPC.

$$L_{it} = N_{it}^{cdi} + \delta N_{it}^{cdd} \quad (4)$$

Where δ measures a SPC equivalent in SPC. $0 < \delta < 1$ simply because it is assumed that employees under SPC are less productive than those under UPC. In equation (4) N_{it}^{cdi} and N_{it}^{cdd} are the number of workers under UPC and SPC in firm i at period t respectively. Let T_{it}^{cdd} be the proportion of workers under SPC, it's given by:

$$T_{it}^{cdd} = \frac{N_{it}^{cdd}}{N_{it}} \quad (5)$$

Let N_{it} be the number of UPC and SPC in firm i at period t , it's expressed as follow:

$$N_{it} = N_{it}^{cdi} + N_{it}^{cdd} \quad (6)$$

While substituting (6) in (4) effective labour written according to N_{it} , N_{it}^{cdd} and δ is given by:

$$L_{it} = N_{it} + (\delta - 1)N_{it}^{cdd} \quad (7)$$

Substituting (5) in (7) the expression of effective labour according to N_{it} , T_{it}^{cdd} and δ is given by:

$$L_{it} = N_{it} \left[1 + (\delta - 1)T_{it}^{cdd} \right] \quad (8)$$

The linearization of this expression enables to write:

$$\ln L_{it} = \ln N_{it} + \ln \left[1 + (\delta - 1)T_{it}^{cdd} \right] \quad (9)$$

Assuming T_{it}^{cdd} to be very small, the second member of expression (9) is close to $(\delta - 1)T_{it}^{cdd}$ ¹ so, expression (9) becomes:

$$\ln L_{it} = \ln N_{it} + (\delta - 1)T_{it}^{cdd} \quad (10)$$

Substituting (10) in (3), the production frontier function to be estimated is given by:

$$\ln y_{it} = \beta_0 + \beta_1 \ln K_{it} + \alpha_1 \ln N_{it} + \alpha_2 T_{it}^{cdd} + \varepsilon_{it} \quad (11)$$

Where $\alpha_1 = \beta_2$ and $\alpha_2 = \beta_2(\delta - 1)$

$\delta = \frac{\partial y_{it}}{\partial N_{it}^{cdd}} / \frac{\partial y_{it}}{\partial N_{it}^{cdi}}$ is the relation between the marginal productivity of workers under SPC and

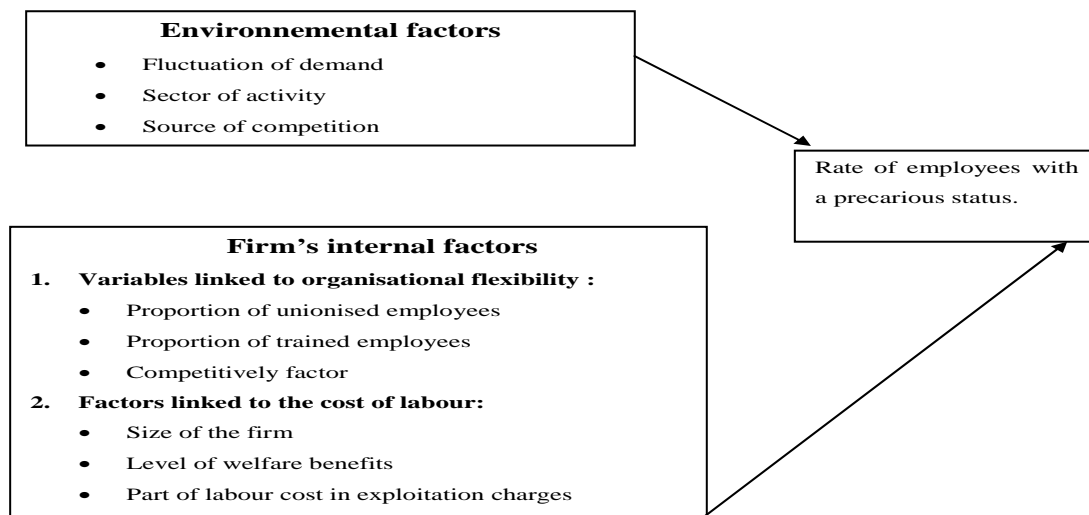
those under UPC.

¹ When x is small, $\ln(1 + x) \approx x$

2.2. Endogenous of the temporary employee rate

The number of temporary employees in the firm obeys to an economic calculation and can be subjected to particular constraints. Thus, the rate of temporary employees can't be considered as an exogenous variable. To solve this problem, we have to regress the rate of SPC employment on variables which can explain it. The second step consists in obtaining the predicted values of the rate of SPC employment in each firm. These values are then used in place of the variable SPC in expression (20). Works interested in the utilization of temporary labour contracts (Davis-Blake and Uzzi, 1993; Betcherman et al., 1994 ; Mangun et al., 1985 ; Casey, 1988) diverge on the methodological plan, forms of studied contracts and results obtained. Nevertheless, they displayed factors influencing the utilization of temporary employees. Figure 1 is a synthesis of these factors.

Figure 1: Factors explaining the utilisation of temporary employment



Source : Author

2.3. The determinants of temporary employees' utilisation

The modelisation of the determinants of temporary employees' utilisation is done with the double truncated Tobit model. The estimation of this model is done through the maximum likelihood method. The results of these estimations are displayed in table 2.

4. Results

Data used in this study were collected during the survey realised between April and May 2006. This information was completed with those from the National Institute of Statistics. Amongst the surveyed

companies, only 45 gave usable information on these 45 firms available on three periods which are 2005, 2004 and 2003.

4.1. Definition and Summary statistics for the variables in the data set

Output is captured through annual turnover the firm realised expressed in CFA francs. For inputs, they include labour and capital (value of the entire available immobilisations at the end of the fiscal year). In addition to these variables, we have the intensity of temporary employees' utilisation, the proportion of trained workers, the number of union strikes, staff expenses, unionised workers, sectors of activity, and the turnover index. The turnover index deserves a special attention.

The turnover index enables to capture demand fluctuations. This variable permits to verify if demand variations in goods and services prompts employers to a greater utilisation of workers with a precarious status. As emphasized by Mangum et al. (1985), Abraham (1988) and Maniscalco (1995). The measurement of demand fluctuations through the difference between demands observed on two consecutive periods, leads to lose one observation. The expression of the turnover index is given by:

$$turnover_index = \begin{cases} 1 & \text{si } t = 1 \\ \frac{y_{t+1}}{y_t} & \text{if } t = 2 \text{ or } t = 3 \end{cases} \quad \text{where } y_t \text{ is turnover at period } t.$$

The turnover index confirms the properties of a simple index and due to this can be used in measuring the evolution of demand.

Table 5: Summary statistics for variables in the data set

Variable	Definition of variables	Observations	Mean	S.D.	Min	Max
Log (Yt)	Logarithme of turnover.	N=135 N=45 T=3	21,1717	1,5914 1,5699 0,3236	17,6823 17,9759 20,1579	25,1891 24,0671 23,112
Log (Kt)	Logarithm of capital.		19,7856	2,3751 2,3859 0,1828	12,9147 13,2201 19,1224	25,5222 25,4173 20,8984
Log (Lt)	Logarithm of labour		4,4615	1,1579 1,1487 0,2026	2,1972 2,4026 3,5317	7,8180 7,5532 5,0785
Indexe of turnover	Index of turnover		1,1781	1,4840 0, 1,2209	0,0875192 0,7503768 -4,378734	17,5792 6,5568 12,2004
Proportion of SPC/year	Proportion of workers under SPC.		0,4165	0,3003 0,2991 0,0457	0 0 0,2868	1 1 0,6201
Rate of trained workers	Proportion of trained workers.		0,2570	0,2719 0,2707 0,0414	0 0 0,0903	1 1 0,5659
Rate of unionised workers	Proportion of unionised workers.		0,376531	0,2578266 0,2581274 0,0289704	0 0 0,247743	1 1 0,565925
Strikes	Number of strikes during the last five years.		0,4666	1,0059 1,0135 0	0 0 0,4666	4 4 0,4666
Staff expenses	Average staff expenses		143.204,5	77.973,74 77.702,71 11.502,53	42.272,92 44112,06 93.204,48	487.500 420.557,3 243.204,5
Chemical	Firms of the chemical sector		0,2888	0,4549 0,4583 0	0 0 0,2888	1 1 0,2888
Food	Firms of the food sector		0,2888	0,4549 0,4583 0	0 0 0,2888	1 1 0,2888
Plastic and paper	Firms of the plastic and paper sector		0,2888	0,4549 0,4583 0	0 0 0,2888	1 1 0,2888
Mechanic	Firms of the mechanic sector.		0,1333	0,3412 0,3437 0	0 0 0,1333	1 1 0,1333

Source : Survey and National Institute of Statistics.

4.2. Determinants of use temporary employee

Results of the Tobit model are globally significant. Six variables enable to explain the intensity of temporary employees' utilisation, that is, the membership rate, proportion of trained workers, average staff expenses, firms located in Douala, the plastic and paper sector of activity and the metallic sector.

Table 2: Tobit model of determinants of the intensity of temporary employees' utilisation

Variables	Temporary employee rate
Log of labour	-0,018633 (-0,96)
Index of turnover	0,0058 (1,39)
Membership rate	-0,8861 (-3,36)***
Squared membership rate	0,4058 (1,29)
Proportion of trained workers	-0,2032843 (-2,13)**
Average staff expenses	-7,26e-07 (-1,98)**
Union strike	0,00525 (0,17)
Douala	-0,1856305 (-2,10)**
Sectors of activities	
Food	-0,0600193 (-0,85)
Plastic and paper	-0,1859907 (-2,68)***
Metallic	-0,2514084 (-2,84)***
Constant	1,178886 (8,89)***
Sigma_u	0,1783013 (7,76)***
Sigma_e	0,0594503 (12,23)***
Rho	0,89995 (30,04)***
Number of observations	135
Number of firms	45
Number of period	3
Log likelihood	99,1921
Wald chi2 (10)	119,03
Prob>chi2	0,0000

Source: From STATA 9.0. Value in parentheses is student statistic.

4.3. Employees' productivity

A frontier production function (equation 20) was estimated with panel data for 45 firms and three time period using FRONTIER 4.1 (see Coelli, 1996). This frontier indicates for each firms, given its characteristics (capital, number of workers, number of workers under UPC, number of workers under SPC), the maximum attainable production. The turnover frontier production function is estimated with panel data including 45 firms and 3 periods. Results are presented in table 3.

The computed value gamma $\gamma = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_v^2} = 0.9388$ is shown in table 3 and is interpreted to be an indicator of the relative variability of the two sources of random error. The value of γ is significant at 1%. This mean that the technical inefficiency (u_{it}), representing the degree of failure to produce the maximum from a given set of characteristics plays a substantial and significant role.

Table 3: Maximum likelihood estimates for the parameters of the stochastic production frontier

Variables	OLS estimation	Stochastic frontier production
Log (labour)	0,4690 (6,45) ***	0,3062 (3,26) ***
Log (capital)	0,4210 (11,41) ***	0,5758 (8,94) ***
SPC/labour (predicted values)	-0,0346 (-0,0867)	1,7179 (2,50) **
Constant	10,7648 (14,96) ***	8,9078 (7,07) ***
Number of observation	135	135
Number of firms	45	45
Number of time period	3	3
Sigma square	0.54989444	2,2188 (3,54) ***
Gamma		0.9388 (39,71) ***
Log likelihood	-149,1595	-116,2208

Source: From FRONTIER 4.1. value in brackets are student's statistic. *** and ** represent significance at 1% and 5% respectively.

When the firm operates on the frontier, production elasticity in relation to capital is more than that to labour; (0.5758) and (0.3062) respectively. This result isn't surprising since the manufacturing sector implies transformation; which takes lots of that is more capital. These elasticities are on the contrary close, when the firm is not on the production frontier.

The productivity difference between UPC and SPC can be analysed through the α_2 coefficient. This coefficient is positive and insignificant in both cases, but it is possible to determine the productivity relation δ both labour contracts. This relation is given by $\alpha_2 = \beta_2(\delta - 1) \Rightarrow \delta = \frac{\alpha_2}{\beta_2} + 1$ where α_2

is the coefficient associated to the temporary employees rate variable, β_2 is the coefficient to the logarithm of the total number of employees and δ is the productivity relation between employees holders of UPC and those holders of SPC. The numerical application shows that $\delta = 0,9363$ when the firm operates on average. This result means that employees' holders of UPC are less productive than those holding SPC when the firm operates on average. Contrarily, $\delta = 6,61$ when the firm operates on the production frontier. This result mean that employees holders of UPC are over six times

more productive than those holding UPC when the firm operates on the production frontier. Thus, hypothesis $\delta < 1$ is rejected when the firm operates on the production frontier and accepted when it operates on average.

Table 4: Distribution of efficiency by sectors

Sector	Number	Mean	S.D.	Minimum	Maximum
Chemical	13	0,3694944	0,2481354	0,087087	0,9372937
Food	13	0,3818986	0,2146048	0,095166	0,8664824
Plastic and paper	13	0,2624191	0,1529796	0,0741963	0,4995475
Mechanic	6	0,5236707	0,2918554	0,1113099	0,8713198
Set	45	0,3627018	0,2281267	0,0741963	0,9372937

Source : Survey and INS

These results show that the manufacturing sector firms are impressive enough. The mechanic sector which is the most impressive, has an average efficiency of $0.5236707 \ll 1$.

5. Conclusion

Since the labour Code reform in 1992, works on various innovations generally and on the effects of these innovations on firms' performances particularly are not legion. Meanwhile, knowledge of this relation will help ameliorate both firms' efficiency as well as workers' well-being. The present study attempts to fill this gap while questioning itself on employees' productivity in relation to their contractual status.

Empirical analyses enable to show that employees' holders of a SPC are more productive than those holding an UPC and that the productivity relation is 0.9363 and 6.61 when the firm is on average and on the production frontier respectively.

Thus, firms using their productive resources in an optimal manner (that is, those situated on the production frontier) must use a great proportion of temporary employees.

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