The effects of fertility on the level of insertion of women in the labor market in Cameroon

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Abstract

The total fertility rate remains high in Cameroon while women are more affected by inactivity, unemployment and underemployment compared to men. This study aims to analyze the effects of fertility on the level of insertion of women in the labor market in that country. The level of insertion in the labor market is measured by a composite indicator constructed from five related employment variables. Breaking from most of the prior studies, which have addressed the same issue, infertility is used as instrumental variable of the fertility and an ordinal multinomial logistic regression model is applied to run an econometric analysis from the 2011 DHS country data. The results reveal that the presence of under- five children in the households negatively affects the level of insertion of women in the labor market in Cameroon. Nevertheless, that relationship depends on the education level of women as expected, but not on their standards of living. Given that the more educated women are, the less is the importance of the negative effects of their fertility on their insertion level in the labor market, the policies which aim to improve the women's education and training should be strengthened.

Keywords: Fertility, Infertility, insertion of women, labor market

JEL Classification: C21, C25, C26, D13, E24, J13, J22

Introduction

Sub-Saharan Africa (SSA) is the poorest continent and the least developed in the world (UNDP, 2014). Moreover, this is also the area where the level of fertility is highest and the practice of contraception is lowest (Vimard and Fassassi, 2007; PRB, 2015). These two facts strengthen the interest of the "population and development" concept at least in the African context. Indeed, the links between population dynamics and economic development established by the Malthusian thesis find a special resonance in the economic and socio-demographic issues analysis in Africa. In addition, many SSA countries have been hit by unprecedented economic crises in the 1980s with the consequent slowdown in economic activity and a recession which led to reductions in production and investment among others, the level of fertility remained steady in most of countries concerned and this should attract the attention of researchers.

Cameroon does not make exception to this reality given its population, estimated in 2011 to be more than 20 million habitants, is very young and is growing on an average of about 2.5% per year since 1976 (BUCREP, 2011). The level of fertility is still high and has weakly decreased given that Total Fertility Rate moved from 5.8 in 1991 to 5.2 in 1998, and then to 5.0 in 2004 and finally to 5.1 in 2011 (DHS-MICS 2011).

Nevertheless, the Cameroonian economy has experienced from 1984 to 1995 a recession that led leaders to adopt a structural adjustment plan from 1988 (Touna Mama, 2008). This led to the privatization of public enterprises, reduction of State spending and tax increases. One of the area of the economy most affected was the labor market where structural adjustment measures led to a wave of layoffs in the broader public sector and a decrease in numbers of workers in the public services. The unemployment rate also increased from 15% to 25% between 1987 and 1993 (Nouétagni, 2004).

Despite a significant recovery in economic growth in Cameroon since the late 1990s, the labor market is still far from being able to successfully absorb the available manpower. Indeed, inactivity, unemployment and especially underemployment are phenomena whose levels are still a concern in the Cameroonian society.

According to the Survey on Employment and Informal Sector (SEIS, 2010), approximately 33.6 percent of Cameroon's workforce is unoccupied, 3.8 percent of the active population is unemployed and about 70 percent of employed individuals are experiencing underemployment. In addition, women are the most affected by those phenomena given the rates of underemployment and inactivity are higher by at least 10 points among women while

the urban unemployment rate among women is higher by 5 points in percentage compared to men (EESI, 2010). Still, full employment of the labor force should be one of the most important macroeconomic objectives since the labor is the most important factor of production and a main determinant of economic growth (Mankiw, 2012). At the microeconomic level, having a decent job remains the key determinant of people's standard of living and the main factor that allows them to be economically independent (World Bank, 2013).

So, it is through the observation of the relatively high level of fertility in Cameroon and the problematic employment situation of women compared to that of men that it becomes interesting in our view point to investigate on the effects that fertility could have on the level of insertion of women in the labor market in Cameroon. That issue is even timelier since, many sociocultural norms of that country, as elsewhere in Africa, continue to assign the burden of care and education of children to women (Ela, 1995; Wakam, 2004).

The purpose of this study is to determine the effects of fertility on the level of insertion of women in the labor market in Cameroon with a focus on the role played by education and the standard of living. Indeed, we also seek to test the hypothesis that a high level of education allows women to practice economic activities even with a high children burden as the human capital theory supposes, and the hypothesis that poor women are generally those who increase their levels of insertion in the labor market with the rise of their fertility as argued by the theory of survival strategies.

The scientific interest of this study lies in the improvement of knowledge concerning the relationship between fertility and female employment through the less common lens of level of education and the standard of living.

The rest of the paper is organized as follow: The next part (Part II) presents a review of the literature related to the subject. Part III presents the theoretical framework while the part IV describes data, variables and the econometric model. Part V provides and explains the results of econometric analysis, Part VI presents a discussion of those results the conclusion and the political recommendation, while the last point (part VII) contents the bibliography.

Literature review

There are many empirical research works which focused on the links between fertility and women's work. Depending on the geographical context, they have established different results.

In the Western context these studies are more numerous, negative effects of having children on the female labor is the most observed conclusion. A lot of authors established that result (Connelly (1992), Klepinger (1997), Angrist and Evans (1996; 1998), and later Millimet (2000) Thevenon (2003) Kögel (2003) Moshion (2009), etc.). However, some reached the conclusion that fertility does not affect the activity of women (Iacovou (2001) and Goodman and al. (2004)).

The effects of fertility on women's employment in developing countries and African countries in particular is also mixed according to the country of study (Schockaert 2005; Fah, 2014). Indeed, several authors showed that there is a conflict between procreation and the participation of women in economic activities (Gennaio - Giugno (1985) in the Nigerian context, Ackah et al. (2009) in the Ghanaian context, Cruces and Galiani (2006) in Argentina and Mexico, and Aguero and Mark (2011) in 26 developing countries). But, some studies carried in developing countries found that fertility does not affect women's work (Kpadonou et al. (2011) in Benin and Chalachew (2013) in Ethiopia).

Concerning the Cameroonian context in particular, Zamo Evou (2006), Tsafack and Zamo (2010), and Jah (2014) found that fertility is not an obstacle to the participation of women in economic activities in urban Cameroon while others authors reached to the conclusion that fertility negatively affects women opportunities to have paid jobs in general (Mba Eyene, 2012), and to integrate the most decent segment of the labor market (Kuepie et al., 2013).

Nevertheless, according to some empirical studies, the level of education and the standard of living are the main determinants of the manner which women make trade-off between their child-keeper role and their economic role.

Education simultaneously acts on fertility and on female labor supply in Ecuador (De Paoli, 2010) and Cameroon (Kouty, 2004). At equal number of children, the most educated women seem to be more likely to participate in the labor market. Several studies have established this by controlling the level of education in the analysis of the impact of motherhood on women's labor supply. That evidence is confirmed in Nigeria (Bamikale, 1985), in USA (Angrist and Evans, 1998), Lomé (Beguy, 2004) and in several industrialized countries (Rindfuss and Brewster, 2000). In others words, the more educated women are, the better they are able to combine their parenthood and the practice of a profession. That is even the case in almost countries of the world (Kimm and Aassve, 2006).

In the Cameroonian context, that evidence is also true concerning the insertion of the formal public and private sectors. But, it is the opposite concerning the insertion into the informal sector (Tsafack and Zamo 2010). So, the more educated women participate more in the labor market despite the presence of children in comparison with women having a low human capital.

The standard of living also affects the ability of women to combine child care and the exercise of an economic activity. In Mali, it is the poorest women who combine easier domestic activities and business activities. Indeed, mothers of poor households are most likely to continue to exercise an economic activity when they have young children, in opposition to those of the rich households who prefer to step back from the labor market, probably to better take care of their children (Doumbia and Kuepie, 2008).

So, there are many studies which have addressed the fertility/employment link issue. But, only a few of them especially focused on the Cameroonian context. Thus, to the best of our knowledge, none has taken into account other dimensions of female work such as the regularity of the occupation during the year, the nature of wage received, the employer and socio-professional category. In others works the measurement of female employment generally used in the literature is limited in our view-point given that it does not permit to apprehend the quality and the security of the job. So, this study intends to fill this gap.

Theoretical framework

In addition to the literature review presented above, the analytical background of this paper is mostly inspired by a framework coming from a categorization of theories focusing on the link between fertility and women employment. These approaches which are requisites to build the architecture of our study are the economic, the sociological, and the cultural and feminist approaches. The economic theory of the link between fertility and female labor is mainly based on the economic theory of the family whose main author is Gary Becker. According to this theory, the reproductive behavior of women can be analyzed through the lens of economic rationality. So, from a microeconomic analysis of fertility, the family economic theory defends the idea that one of the main inputs of a households' economic production is the time available of its members given that families face budget constraints in terms of income and time. Children being a good whose demand requires

important sacrifices in terms of time (especially for their care and education), parents make a trade-off between quantity and quality of children (Becker and Lewis, 1973). The theory also shares the observation that an increase of households' income has two effects: an increase on the demand for normal goods including children (income effect) on behalf of households, and an increase of the opportunity cost that childcare generates (substitution effect). That opportunity cost usually represents the diminution of the household members' salaries who sacrifice their time to take care of kids. But, given that women are generally less educated and less trained than men, the shortfall in pay they suffer by agreeing to take care of children is generally lower than men. In addition, women have a comparative advantage in the custody of kids because they are more apt in this exercise. So, if there is a parent whose time must be sacrificed to the custody of new children, it is the mother.

The sociological approach basically boils down to the theory of the survival strategies whose paternity is often attributed to Duque and Pastrana (1973). According to this theory, an increase in the number of children in a family inevitably leads to a change in roles traditionally assigned to the different household's members. In particular, women are increasing their paid labor supply to try to preserve the standards of living of their families before the arrival of the last children. Thus, the distribution of roles supported by Parson and explaining that only the man is the economic mainstay of household and the wife the producer and the guardian of the offspring is only an optimum that should be seen as a reference situation. Poor women who mostly profess in informal or in agriculture sector are therefore, more comfortable in conciliating reproductive and productive activities given that, children represent for them an advantage in terms of labor force for their activities (Boserup, 1985).

The cultural feminist approach on its part considers inequalities between women and men on the labor market like the consequences of discrimination women face in society. Indeed, they occupy the lowest positions in society, positions historically and culturally constructed. When there is the arrival of a new birth, it is clear that the woman concerned is devoted entirely to the care and the education of the child in question whatever the occupation and the plan the she has. Indeed, this role is exactly the task the woman is naturally bound to exercise. Even when women are present in the labor market, the activities they engage in often constitute an

extension of domestic activities which are mainly precarious, underestimated and lowly paid (Boserup, 1985; Oppong, 1988; Kelodjoue, 2012).

Conceptual consideration
The two main concepts in the study about which clarifications are inescapable are the level of insertion in the labor market and the fertility.

The level of insertion of women in the labor market is defined here as the level where the women stand at the moment of the survey concerning their integration process in the labor market. The most used indicator for the measurement of women employment is the *participation to the labor market or economic activity*. That variable is very insufficient to effectively apprehend employment. So, following Agüero and Mark (2011) who took into account the *participation in economic activity* and the *nature of payment received* to measure the women employment, we go further by considering three others dimensions that are the *occupancy at the time of the survey*, *regularity of employment*, and the *employer.* In our viewpoint, it becomes timely to go further from the simple participation to the economic activities and consider outcomes such as *the occupancy*, *the regularity of the occupation* and *the kind of remuneration received* to make sure that the measurement effectively integrates the job quality. Indeed, only the good quality jobs can impact the living standard of people (ILO, 2013). So, the **level of insertion in the labor market** describes the step where women are situated concerning the five issues of job measurement just mentioned above.

The fertility is unanimously defined as the number of living children bore by a women during her fertile period (generally from 15 to 49 years old). But, as another particularity of our work, the **number of children under 5 present in the household** is retained as the representative of fertility. An unavoidable reason allows such choice rather than "*the number of births given during the last 5 years*" considered by previous works. Children of young ages are effectively those who really constitute a burden for women because of time to devote to their care and education. Nevertheless, the phenomenon of children "entrusted" is very common in Africa (Locoh, 2002; Jonckers, 1997; Wakam, 1997; Delaunay, 2009). In fact, parents often assign or lend their children at young ages for long periods. That practice of children transfer between households leads to the fact that many women are supposed to take care of more children than they have given birth, or less if they have assigned more children than those entrusted to them. So, the number of children under 5 present in the household also reports the social dimension of the fertility phenomenon in addition to the apprehension of the woman's fertility in a certain way.

On the basis of the literature review presented in the previous section and the theories and concepts described above, we frame as the main research hypothesis that the more the number of under-five children the women have in their households, the lower is their level of insertion in the labor market. Thus, in accordance with the Becker's theory of family economics and the survival strategies theory, we can plan to highlight the mechanisms through which the presence of children in the households negatively affects the insertion level of women on the labor market. Especially, we are expecting to find that the less educated the women are, the more important are the negative effects of their fertility on their level of insertion, and also that, the higher are the standards of living of women's households, the lower are their capacities to conciliate the presence of children with a high level insertion on the labor market. The data and the econometric strategy used to check those assumptions are described below.

Data and methodology
Data
The data used to conduct statistical analysis come from the fourth Demographic and Health Survey, coupled with the Multiple Indicator Cluster Survey (DHS-MICS) carried out in Cameroon in 2011 by the National Office of Statistics. Among others, the aims of that combined survey were to collect nationally data in order to calculate rates of demographic phenomena and identify trends. However, the operation also permitted to collect information concerning the characteristics of men and women, and in particular those related to the economic activity carried out by the respondents. The survey sample was drawn from clusters stratified by urban and rural areas of residence. The operation targeted a group of 15,426 women aged 15 to 49 distributed in all the ten regions of the country.

Description of variables
Endogenous variable
The variable **level of insertion in the labor market** is a combined indicator constructed from the five variables above using the Factorial Multiple Correspondence Analysis (FMCA)

technique[i]. The categories of that new variable are the following:

➢ The modality **not inserted** includes women who said they had carried out no economic activity in the last 12 months preceding the survey and who therefore have no occupation at the time of the survey;

➢ The modality **weakly inserted** includes women who reported working during the past 12 months but who were without work for several months, women who work in agriculture, who are servants, maids or operating in the clergy, women who are not paid or paid in kind for the work they offer, women who work for a family member and those whose employment is only seasonal;

➢ The modality **moderately inserted** contains women who have worked in the last 12 months and who are still employed or on leave, women who operate commercially or are laborers, women who are self- employed and those working occasionally;

➢ The modality **well inserted** includes women who have worked all year, women who are executives or operating in services, women whose employer is not a member of the family and those who are paid only in cash.

The variable **level of insertion in the labor market** has the following distribution of frequencies:

Table 1: Frequencies distribution of the level of insertion of women in the labor market

Categories	Effectives	Frequencies (%)
Not inserted	3543	26.91
Weakly inserted	5606	42.59
Moderately inserted	3077	23.37
Well inserted	938	7.13
Total	**13164**	**100**

Source: Computed from DHS-MICS 2011 data

Exogenous variable

Instead of using the number of lifebirths within the last five years which is the most used variable, this study prefers the use of children below 5 present in the household. This is so because there exists a strong and significant correlation between these variable and other different variables related to fertility as depicted by table 2.

Table 2: Correlation matrix of fertility variables

	Number of live births	Numbers of children still alive	Number of births carried out during the previous 5 years	Number of children under age 5 living in the household
Number of live births	1			
Numbers of children still alive	0.957***	1		
Number of births carried out during the previous 5 years	0.375***	0.381***	1	
Number of children under age 5 living in the household	0.204***	0.214***	0.465***	1

Source: Computed from DHS-MICS 2011 data

So, all the fertility variables are significantly correlated at the significance level of 1 %. Given the nature of the endogenous variable (qualitative), the *number of children under 5 living in the household* has been categorized into four sub-groups. The sub-group "no children" translates the absence of child burden for the women. The sub-group "one child" apprehends the weakness of the children burden whom the mean is 2.6 children per household. The sub-

group "between two and tree" tries to highlight that mean among the categories and the last sub-group "four or more" represents the

category which is over the mean. The distribution of frequencies of those different categories is given by the following table:

Table 3: Distribution of frequencies of the number of children aged up to 5 years living in the household with the woman.

Categories	Effectives	Frequencies (%)
No children	3609	27.42
One child	3798	28.85
Between two and three	4628	35.16
Four or more	1129	8.57
Total	**13164**	**100**

Source: Computed from DHS-MICS 2011 data

So, most of the women (72.58 percent) have at least one child under five years old in their household. The most observed class is "between two and three" and only 8.57 percent of women have four or more children under five in their households.

Econometric model

The econometric analysis model is specified as follows:

$$IMT_i = \alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s X_{is} + \varepsilon_i$$

In which **IMT_i** represents the insertion level on the labor market, **F_i** captures the number of children under age 5 living in the household, and β is a coefficient which measures the effect of fertility on the insertion level. The **X_s (s=1,…,m)** represent the **m** controlled variables that will be introduced in the model, the λ_s are their respective coefficients, and ε is the error of model specification. Those controlled variables are: are the age group, region of residence, area of residence, religion and occupation of the husband.

Given that the nature of the variables (all qualitative) lead to the violation of certain OLS (Ordinary Last Squares) assumptions such as

continuity of residues and the homoscedasticity (Bourbonnais, 2009), a model of ordinal multinomial logistic regression will be used. But first, infertility is useful to test the endogeneity of exogenous variable of the model.

The dummy variable used can be defined as follows:

$Z = \delta_0 + \delta_1 X_1 + ... + \delta_k X_k + \varepsilon$. Because the endogenous variable has four terms, we assume thresholds C_1, C_2 and C_3 that permit to switch from the latent variable to the observed ordinal variable with the following rules:

$$IMT = 0 \text{ if } Z \le C_1$$
$$IMT = 1 \text{ if } C_1 < Z \le C_2$$
$$IMT = 2 \text{ if } C_2 < Z \le C_3$$
$$IMT = 3 \text{ if } C_3 \le Z$$

Each value of IMT represents an interval of the dummy variable Z which a countinuous variable, and the different cut off C allow a segmentation of Z into four independent intervals.

Then, the probability distribution of the endogenous variable can be expressed in terms of the latent variable:

$$P_{i0} = \text{Prob}(Y = 0) = \Phi(C_1 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}))$$

$$P_{i1} = \text{Prob}(Y = 1) = \Phi(C_2 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}) - \Phi(C_1 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}))$$

$$P_{i2} = \text{Prob}(Y = 2) = \Phi(C_3 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}) - \Phi(C_2 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}))$$

$$P_{i3} = \text{Prob}(Y = 3) = \Phi(C_3 - (\alpha + \beta F_i + \sum_{s=1}^{m} \lambda_s K_{is}))$$

P_{ij} represents the marginal effects of the modality of an explanatory variable on the respective terms of the dependent variable. Specifically, these probabilities express the variation of opportunity that the woman belonging to a given category of the dependent variable experiences after her move from one modality to another of the explanatory variables. For instance, these probabilities will measure how vary the chances for a woman to be well inserted on the labor market when the number of children under age 5 in her household moves from zero to three.

Φ represents the distribution function of the law of logistic probability given by:

$$\Phi(Y) = \mathrm{Prob}(Y \le j\,|$$
$$X) = \frac{\exp(\beta_0^j + \beta_1 x_1 + \ldots + \beta_k x_k)}{1 + \exp(\beta_0^j + \beta_1 x_1 + \ldots + \beta_k x_k)}, j = 1,\ldots,J-1$$

For each woman, it will therefore issue for calculating the probabilities of the various categories of the dependent variable knowing that she has a characteristic of the independent variable.

Instrumental variable

Following Agüero and Mark (2008; 2011) and Kuepie *et al.* (2013), we use *infertility* like instrumental variable in our study if the endogeneity of our fertility variable were to be established. Indeed, infertility is the fact for a woman to have been no live births in a given period. If the woman has already been considered fruitful in the past, we are talking about secondary infertility. Conversely, if she has never had a birth, it is primary infertility

(Evina, 1990; La Rochebrochard, 2011). This variable is exogenous to the behavior of women in participation in economic activity, we consider here, as our predecessors, ***involuntary childlessness***. The latter has the particularity of being likely to be spread across the reproductive life of women in contrast to other instruments that are either one-time (two older sex) or very scarce (twin births). Furthermore, the gender of two older (used by Foley and York (2005), Iacovou (2001), and Zamo Evou (2006) Kpadonou *et al.* (2011), etc.) is not relevant in the Cameroonian context in our view point. Indeed, the rationale behind this choice is that women generally make a third birth when both elders have the same sex, and the sex of the two older becomes a source of exogenous variation in fertility. But, women give on average 5.1 living children each in Cameroon during their reproductive live (DHS 2011), and therefore, it is uncouth to assimilate fertility to the arrival of the third birth.

So, women who have never had a live birth and have never used contraception or do anything to avoid pregnancy are those who are infertile (primary level), as well as those who have already given birth and who had no live birth in the last 5 years preceding the survey while they wanted to give birth and have done nothing to avoid the arrival of a pregnancy (secondary level). Women who reported having reproductive problems are also considered infertile. As shown in the following table, infertile women had on average 0.74 children under 5 years in their households compared to those who are not infertile.

Table 4: **Comparison Test of means of children under 5 in the household between childless women and women who are not infertile**

Groups	Effectives	Number of children under age 5 in the household
Infertile	1853	0.89
Not infertile	11311	1.62
Combined	13164	1.52
Difference		**-0.74**

H_a: Différence $\ne$ 0
Pr(|T|>|t|) = 0,000

Source: Computed from DHS-MICS 2011 data

In addition, the presence of children under 5 in the household is affected by infertility as shown in the following table

Table 5: Regression results of the number of children under 5 years present in household on infertility.

					LR chi2(12)=692,23	
					Chi2=0,0000	
					(Pseudo R²=0,0961)	
Categories	**RRR**	**Std. Err**	**Z**	**P>|z|**	**[95% conf interval]**	
No child (Reference)						
One child						
Not infertile				Reference		
Infertile	0.34***	0.021	-16.99	0.000	0.30	0.38
Two or three						
Not infertile				Reference		
Infertile	0.22***	0.015	-22.49	0.000	0.19	0.25
Four or more						
Not infertile				Reference		
Infertile	0.20***	0.024	-13.10	0.000	0.15	0.25

***significant at the level of 1%;** significant at the level of 5%;* significant at the level of 10%
Source: Computed from DHS-MICS 2011 data

So, infertility significantly determines fertility ($P(LR > \chi^2) = 0.00 < 5\%$) despite the fact that the predictive power of the model is only 10% (*Pseudo R²=0.0961*). Indeed, compared to fertile women, childless women have virtually no chance of having one, two or three children under 5 years present in their households rather than to have none. Concerning the relation between *infertility* (instrumental variable) and the *level of insertion in the labor market* (dependent variable), the first has practically no influence on the second as shown in the following table:

Table 6: Regression results of the insertion level of women on the labor market on their infertility

					LR chi2(12)=75,65	
					Chi2=0,0000	
					Pseudo R²=0.0023	
Categories	**RRR**	**Std. Err**	**Z**	**P>|z|**	**[95% conf interval]**	
Not inserted (Reference)						
Weakly inserted						
Not infertile				Reference		
Infertile	1.608***	0.097	7.86	0.000	1.428	1.810
Moderately inserted						
Not infertile				Reference		
Infertile	1.001ns	0.001	0.01	0.98	0.076	1.142
Well inserted						
Not infertile				Reference		
Infertile	1.009ns	1.105	0.09	0.927	0.823	1.238

***significant at the level of 1%; ** significant at the level of 5%; * significant at the level of 10%
Source: Computed from DHS-MICS 2011 micro data

We can therefore conclude, given the extreme weakness of Pseudo R2 (*Pseudo R²=0.0023*), that infertility does not affect the level of insertion. So, the effect of infertility on the level of insertion can only be achieved through fertility. Indeed, infertility determines fertility, but it has no effect on the level of insertion in the labor market. Thereby, infertility appears to be a valid instrument for our econometric model.

Econometric analysis results
Endogeneity test results
Table 7 below shows the results of the regression of the insertion level in the labor market. The OLS column presents the results for the model which has the number of children aged under 5 living in the woman household as exogenous variable and the 2SLS column shows those related to the model in which infertility is used as instrument of the number of children aged under 5 in the household.

Table 7: Results of the regression of the level of insertion of women into the labor market

| | OLS | | | | 2SLS (IV=Infertility) | | | |
	Prob>F=0.000				Prob>chi2=0.000			
Insertion level	Coef	P>|t|	[95% conf. Interval]		Coef	P>|t|	[95% conf. Interval]	
Number of children	-0.041	0.00	-0.054	-0.03	-0.03	0.00	-0.044	-0.016
Constant	2.2	0.00	2.18	2.22	2.6	0.00	2.38	2.81

***significant at the level of 1%; ** significant at the level of 5%; * significant at the level of 10%
    Source: Computed from DHS-MICS 2011 micro data

The method of instrumental variables (IV) does not provide significantly different coefficients of the Ordinary Last Squares one (OLS). Therefore, we conclude that fertility is not endogenous to the insertion level in the labor market in the present study. We can thus, as did Kuepie *et al.* (2013), use with confidence the retained fertility variable.

Interpretation of the results of the econometric model estimation
Following are the results provided by them estimations of the ordered multinomial logistic model in which the insertion level on the labor market is the endogenous variable and the number of children aged below 5 years in the household the unique explanatory variable.

Table 8: Odds ratio terms of the fertility variable on the level of insertion

Pseudo R^2 = 0,014
Prob > Khi-2 = 0,000

Number of children under 5	Odds Ratio	Std. Err.	Z	P>|Z|	[95% Conf. Interval]	
None	Ref					
One	0.92*	0.04	-1.86	0.063	0.85	1
Two or three	0.79***	0.032	-5.78	0	0.73	0.85
Four and more	0.75***	0.046	-4.72	0	0.66	0.84
C1	-1.14	0.033			-1.21	-1.08
C2	0.58	0.032			0.52	0.64
C3	2.35	0.042			2.27	2.43

***significant at the level of 1%;** significant at the level of 5%;* significant at the level of 10%
    Source: Computed from DHS-MICS 2011 micro data

Table 9: Results of the estimations of the marginal effects on the probability of a given level of insertion.

	Marginal effects			
Number of children under 5	ME0	ME1	ME2	ME3
None	Ref	Ref	Ref	Ref
One	0.016*	0.002**	-0.012*	-0.006*
Two or three	0.047***	0.005***	-0.035***	-0.016***
Four and more	0.060***	0.001^{ns}	-0.042***	-0.019***

***significant at the level of 1%;** significant at the level of 5%;* significant at the level of 10%
MEj are the marginal effects associated with the probability of belonging to the category j
J=0 for Not inserted, j=1 for weakly inserted, j=2 for moderately inserted and j=3 for well inserted
Source: Computed from DHS-MICS 2011 micro data

As shown in Tables 8 and 9 above, the presence of children under 5 years of age in households negatively affects the level of insertion of women in the labor market. Especially, table 8 reveals that the more the number of under 5 children living in the household, the weaker are the chances women have to be well inserted into the labor market. For instance, women who have two or three children under 5 in their households have 21 percent less chance to be well inserted on the labor market compared to those who have no children. According to table 9, when a move from a situation of having no child under 5 in the household to having two or three, the probability of not being inserted into the labor market increases by 0.047 while the same variation increases the probability to be weakly inserted by 0.005, but decreases the probability to be moderately inserted by 0.035 and the one to be well inserted by 0.016. When the women reach rather the situation of having four children or more in their home, the probability not to be inserted increases by 0.06 while the probabilities to be moderately and well inserted diminish respectively by 0.042 and 0.019.

Nonetheless, these results remain very superficial. Indeed, a real investigation of the role of education and standard of living on this influence remains to be done; and the information needed to accomplish this are contained in Tables 10 and 11 below.

Table 10: Odds ratio terms of the exogenous variables of the model

Variables and cathegories	Gross effects	Net effects
Area of residence	***	Ns
Yaoundé/Douala	Ref	Ref
Others town	0.62***	1.1
Rural	0.52***	1.1
Region of residence	***	***
Yaoundé/Douala	Ref	Ref
Centre/South/East	0.52***	0.58***
Big North	0.45***	0.75
West	0.67***	0.78
Nord- West/South- West/Littoral	0.66***	0.68*
Religion	***	***
Catholic	Ref	Ref
Protestant	1.01	1.01
Moslem	0.55***	0.57***
Others religions	0.99	1.01
Level of instruction	***	***
No level	Ref	Ref
Primary level	1.58***	1.55***
Secondary level	1.58***	1.64***
Higher level	3.50***	3.84***
Standard of living	***	***
Poor	Ref	Ref

Medium	1.19***	0.99
Rich	1.63***	1.09
Husband occupation	***	***
Don't work/Domestic	_Ref_	_Ref_
Trade/service	1.31***	1.13
Executive/ qualified lobourer	0.74***	1.29***
Agriculture	0.47***	0.94
Marital status	***	***
Single	_Ref_	_Ref_
Maried	1.86***	0.76***
Free union	1.99***	0.81***
Widow/divorced	2.98***	2.67***
Age group	***	***
15-19 years old	_Ref_	_Ref_
20-34 years old	3.26***	2.76***
35-49 years old	5.02***	4.37***
Number of children under 5	***	Ns
None	_Ref_	_Ref_
One	0.92*	1.01
Two or three	0.79***	0.94
Four and more	0.75***	0.95
_C1_		-0.25
_C2_		1.74
_C3_		3.63
Pseudo-R^2		0.0538
Khi-2 value		1761.97

*****significant at the level of 1%;**** significant at the level of 5%;* significant at the level of 10%*
<u>_Source_</u>_: Computed from DHS-MICS 2011 micro data_

<u>**Table 11**</u>**: Marginal effects of the exogenous variables of the model**

Variables and cathegories	ME0	ME1	ME2	ME3
Area of residence	Ns	Ns	Ns	Ns
Yaoundé/Douala	_Ref_	_Ref_	_Ref_	_Ref_
Others town	-0.015^{ns}	-0.002^{ns}	0.013^{ns}	0.005^{ns}
Rural	-0.016^{ns}	-0.002^{ns}	0.013^{ns}	0.005^{ns}
Region of residence	***	***	***	***
Yaoundé/Douala	_Ref_	_Ref_	_Ref_	_Ref_
Centre/South/East	0.11**	-0.003^{ns}	-0.08***	-0.027***
Big North	0.053^{ns}	0.003***	-0.042^{ns}	-0.015^{ns}
West	0.047^{ns}	0.001^{ns}	-0.035^{ns}	-0.012^{ns}
Nord- West/South- West/Littoral	0.076*	0.001^{ns}	-0.057*	-0.033***
Religion	***	***	***	***
Catholic	_Ref_	_Ref_	_Ref_	_Ref_
Protestant	-0.0027^{ns}	-0.001^{ns}	0.002^{ns}	0.001^{ns}
Moslem	0.11***	0.004***	-0.08***	-0.027***
Others religions	-0.003^{ns}	-0.003^{ns}	0.002^{ns}	0.001^{ns}
Level of instruction	***	***	***	***
No level	_Ref_	_Ref_	_Ref_	_Ref_
Primary level	-0.079***	-0.014***	0.067***	0.026***
Secondary level	-0.089***	-0.016***	0.075***	0.030***
Higher level	-0.174***	-0.144***	0.19***	0.13***
Standard of living	**Ns**	**Ns**	**Ns**	**Ns**
Poor	_Ref_	_Ref_	_Ref_	_Ref_
Medium	-0.002^{ns}	-0.002^{ns}	0.001^{ns}	-0.001^{ns}
Rich	-0.017^{ns}	-0.003^{ns}	0.013^{ns}	0.005^{ns}
Husband occupation	***	***	***	***
Don't work/Domestic	_Ref_	_Ref_	_Ref_	_Ref_

Trade/service	-0.022[ns]	-0.004[ns]	0.018[ns]	0.008 [ns]
Executive/ qualified laborer	-0.045***	-0.008***	0.038***	0.015***
Agriculture	-0.011[ns]	0.001[ns]	-0.010[ns]	-0.003 [ns]
Marital status	***	***	***	***
Single	Ref	Ref	Ref	Ref
Married	-0.068***	-0.007***	0.055***	0.02***
Free union	-0.073***	-0.02***	0.066***	0.027***
Widow/divorced	-0.10***	-0.045***	0.098***	0.045***
Age group	***	***	***	***
15-19 years old	Ref	Ref	Ref	Ref
20-34 years old	-0.19***	-0.012***	0.151***	0.056***
35-49 years old	-0.23***	0.09***	0.216***	0.11***
Number of children under 5	**Ns**	**Ns**	**Ns**	**Ns**
None	Ref	Ref	Ref	Ref
One	-0.002[ns]	-0.001[ns]	0.002 [ns]	0.002 [ns]
Two or three	0.011[ns]	0.001[ns]	-0.009 [ns]	-0.001 [ns]
Four and more	-0.008[ns]	-0.008[ns]	0.006 [ns]	-0.002 [ns]

***significant at the level of 1%;** significant at the level of 5%;* significant at the level of 10%
<u>*Source*</u>*: Computed from DHS-MICS 2011 micro data*

The role of education on the relation between fertility and women's work

Table 11 above shows that, other things being equal, and with an equal number of children under 5, women with primary level of education were 1.55 times more likely to be well inserted on the labor market compared to those who have no level of education. As for those who have a secondary level and those who have a higher level, they are respectively 1.64 and 3.84 times more likely to be well inserted with respect to those who have no level and with the same number of children as them. In other words, the higher the level of education women have, the more are their chances to have a good level of insertion into the labor market despite the presence of children under 5 in their households. Table 12 which shows the marginal effects of the categories of exogenous variables reveals that the chances of having a good level of insertion into the labor market increases with the level of education of women. Indeed, with equal numbers of children under 5 in the household, the fact that a woman goes from no education situation to the primary level reduces from 0,079 the probability for her of not being inserted in the labor market. Her change of status from a no education position to secondary level reduces the same probability by 0.089; and when she moves from a no education position to the higher level of education, the reduction is even stronger (-0.174). On the contrary, for the same number of children, the probability of being moderately inserted for a woman increases by 0.067 when she passes from a no education position to the primary level; by 0.075 when her educational level varies from no education to secondary level; and 0.19 when it reaches the next level. It is the same for the probability of being well inserted. Indeed, its value increases of 0.026; 0.03 and 0.16 when the instruction of women varies from no level respectively to primary, secondary and higher level of education.

Role of the standard of living on the relation between fertility and women's work

Tables 11 and 12 show that unlike the case of education, the living standard has no effect on how the presence of children under five in the household affects the insertion level of women into the labor market. Indeed, the coefficients representing the net effects as well as those representing the marginal effects of categories of living standards are not significantly different from zero at the 5 % significance level. The values of the associated probabilities (p-value) of the different modalities of that variable are significantly higher than 0.05. In other words, with the same number of children and all others things being equal, the women belonging to poor households do not significantly has different chances of being well inserted into the labor market in comparison with those who are living in medium or rich households.

Finally, only the level of education significantly affects the relationship between the presence of children under five in the households and the insertion level of women into the labor market. Women who have a higher level of education are those who achieve a high insertion level into the labor market despite the presence of children. This is also the case for women who are aged between 35 and 49 years, residing in Yaoundé or Douala, who are Catholic or are not single.

Discussion of the results

The human capital theory, according to which *the opportunity costs of the demand for children supported are higher for individuals with a high human capital (or level of education)* matches very well with our findings. Indeed, that theory contributes to explain why well educated women ignore the stress of the presence of young children in their households by participating in economic activities better than do the less educated women with the same burdens in terms of children as expected in the first mechanism suggested in the theoretical framework. That specific result has been also fund by Kuepie *et al.* (2013). Definitely, well educated women would be less favorable to the idea of spoiling the important human capital they have by staying home to take care of kids. The exercise of an economic activity or an employment represents for well educated women an imperative that cannot be replaced by the fertility burden. These women are more emancipated in comparison to their less educated counterparts who accept more easily to be only wives and mothers. In addition, the recovering of all the expenses made for school and training is surely one of the reasons why the well educated women are the most oriented toward the labor market and high quality jobs.

Unlike the study made by Kpadonou *et al.* (2011) in Cotonou, the survival strategy theory is not confirmed in the Cameroonian context given that the effects of fertility on the women's employment do not vary according to the women's standard of living. Indeed, those authors found that the weaker the women's standard of living is, the more they increase their labor supply after the arrival of the new child in their households, and in order to keep their prior live style unchanged. Nevertheless, the hypothesis according to which the higher the women's standard of living is, the weaker are their chances to have a high integration level into the labor market with the presence of an important number of under five children in their households is not verified in our study for two reasons. Firstly, the poorest women in Cameroon generally stay for very long time in the subsistence farming activities (INS, 2013), and practice that activity regardless of the evolution of the number of young children in their households. Secondly, the usage of an ordered multinomial logistic regression prevents us from focusing on some particular categories of the endogenous variable such the "weakly inserted" women for example. Indeed, it is probable to find that the less rich women have more chance to be weakly inserted in the labor market than their richer counterparts with the same number of under five children in the households, rather than to be not inserted at all. But, we assume that there will be no difference in terms of chance for those two sub-sets of women to be moderately inserted or well inserted. In others words, the fertility burden would cause a very slight improvement of the insertion level of poorest women inserted into the labor market while it does not drive any change from the richest women.

In respect to find globally the effects of the fertility on the women's employment, the results we arrived at are similar to those reported by some authors (Mba Eyene (2012), Kuepie *et al.* (2013)). Indeed, they found that fertility negatively affects women's employment in Cameroon. But, our findings are contradictory from those established by others ones (Zamo and Evou (2006) and Tsafack and Zamo (2010)) also concerning the Cameroonian context. That comparison remains essentially questionable for several reasons. None of the cited studies used the same fertility variable we did in the present work. Thus, the way we apprehended the female work breaks from the manner of the prior authors and, last but not the less, an ordered regression model has not been ever used to the best of our knowledge.

Conclusion and Recommendation

This study aimed to analyze the effects of the fertility on the level of insertion of women in the labor market in Cameroon. Data coming from the DHS-MICS 2011 have been used for the econometric analysis, and the insertion level into the labor market has been apprehended through a composite indicator of five related employment variables constructed thanks to the FMCA technique unlike prior studies which considered only the participation in the labor market as the employment measurement. Infertility has been used as a source of exogenous variation of fertility to test the endogeneity of the latter on the endogenous variable. The results of a multinomial ordinal logistic regression model estimated in order to verify the research hypothesis show that the presence of children under five in the household negatively affects the level of insertion of women into the labor market. However, those effects depend on the level of education of women. Indeed, women with high educational levels easily manage to reconcile the roles of mother and worker, compared to those who are less educated. Nevertheless, women's standard of living has no effect on how the presence of children under 5

crowds their integration into the labor market. Whether living in poor, rich or medium households, the insertion level into the labor market does not seem to undergo differential effects due to the presence of young children at home; when they have similar characteristics in terms of age, marital statuses, region and area of residence and occupation of the spouse for those in union. In others words the hypothesis according to which the level of education represents a mechanism through which fertility affects women's employment has been verified, while the standard of living has not been revealed as such a mechanism.

From our results, the main guidance we can provide to the Cameroonian authorities and even the development programs planners is to strengthen the policies of promoting the girls' education. They should pay a particular attention on the women living in the northern parts of the country given that the results reveal their weak insertion level in the presence of an important number of children under five in comparison to other women all others things being equal.

This study would, however, be more successful if variables such as *wages* and the *sector informality which* are absent from the database used, had been taken into account in the construction of the indicator used to measure the level of insertion in the labor market. Thus, the choice of a composite indicator as endogenous variable is not also without a limit. Although it allows us to measure employment through a way which integrates the quality of the jobs, it could be more prejudicial than useful in certain view points. Indeed, that technique of measurement cannot permit us to provide policy guideline concerning each factor which contributes to the elaboration of the indicator. A longitudinal approach using panel or even historical data remains an interesting option as well as the usage of a qualitative survey to investigate the issue more deeply.

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Annex:

Table 12: Frequencies distribution of the terms of the study variables

Variables and categories	Frequencies (%)
Area of residence	
Yaoundé/Douala	18,4
Others town	32,29
Rural	49,31
Region of residence	
Yaoundé/Douala	18,09
Centre/South/East	21,86
Big North	28,87
West	8,36
Nord- West/South- West/Littoral	22,83
Religion	
Catholic	37,28
Protestant	35,16
Moslem	19,57
Others religions	7,99
Level of instruction	
No level	19,71
Primary level	37,08
Secondary level	38,39
Higher level	4,82
Standard of living	
Poor	35,53
Medium	20,96
Rich	43,51
Husband occupation	
Don't work/Domestic	7,05
Trade/service	15,68
Executive/ qualified laborer	26,62
Agriculture	33,27
Marital status	
Single	17,38
Married	54,24
Free union	18,57
Widow/divorced	9,81
Age group	
15-19 years old	14,04
20-34 years old	55,24
35-49 years old	30,72
Total	**100**

Source: Computed from DHS-MICS 2011 micro data

Table 13: Result of test of the thresholds relevance

Tested hypothesis (H0)	Coef	Std. Err.	Z	P>|Z|	[95% Conf. Interval]		Decision
C1=0	0.60	0.13	4.54	0.00	0.34	0.85	H0 rejected
C1- C2=0	-1.89	0.02	-81.75	0.00	-1.94	-1.85	H0 rejected
C2- C3=0	-1.91	0.03	-59.19	0.00	-1.97	-1.84	H0 rejected

Source: Computed from DHS-MICS 2011 micro data

So, all the thresholds produced by the model are relevant.

Figure: Map of the factorial plan of the FMCA conducted on the five input variables
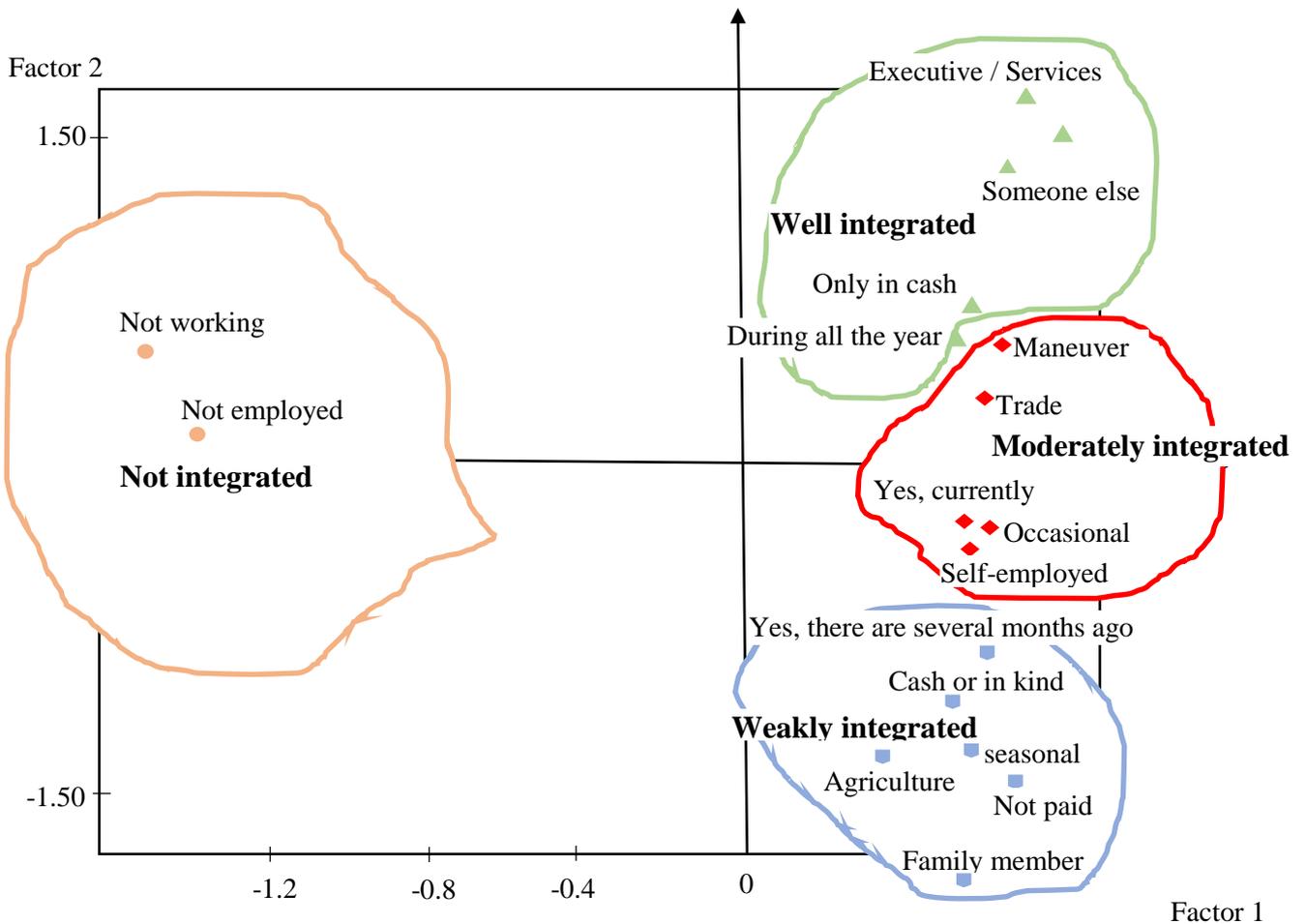
Source: Computed from DHS-MICS 2011 data

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[i] Factorial plan presented in annex