Implications of Family Size on Students Educational Attainment in Cameroon

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Abstract

The purpose of this study is to find out the implications of family size on students educational attainment in Cameroon. To this effects educational attainment was capture through various levels of child education. The ordered probit model was use to estimate our result while data was Demographic Health Survey. The result shows that family size negatively and significantly affects child educational attainment while a child is more likely to attain primary education but less likely to attain both secondary and higher education relative a child from small family size. We recommend that the ministry of planning and urban development should passed a law limiting the number of children one should have so that more resources will be allocated per child which will go a long way to increase child quality.

Keywords: Effects, Family Size, Students Educational Attainment, Cameroon

1. Introduction

The educational process is an important part of human development. While there are many determinants of education, one factor still being controversial is family size (also called sibship) size. Considering children's education in particular, family-related factors are often thought to be among the main determinants of educational outcomes. However, despite a lot of existing research works, the exact components of children's educational "production function" still remain unclear (Black, Devereux and Salvanes, 2005). This relationship between family size and student's educational attainment which has attracted a lot of attention in social sciences can be as a result of constraints on parental resources. When parents have many children, they can, for a given income, invest less in each child than if they have fewer children. This can cause a negative relationship between family size and educational attainment (Becker (1981). Also numerous empirical studies have found a negative relationship between the number of siblings, and future economic and educational achievements (Hanushek, 1992).

There are many hypotheses explaining the nature of this relationship. The explanations often involve various economic, socio-psychological and genetic factors (Conley and Glauber, 2006). One hypothesis interprets the relationship in the way that each additional child in a family places additional financial constraints on their parents and thus fewer resources are invested in the education of each child. This so-called "resource dilution" hypothesis was developed by Angrist, Lavy and Schlosser (2010) and is supported by many early studies. Later, Steelman and Mercy (1980) add that this hypothesis is the strongest for poor people whose financial resources are more binding. In contrast to the dilution of resources framework, which posits an equal allocation of resources among siblings, the sibling rivalry hypothesis assumes that parents invest in their children to maximize family utility, which often results in investment inequities. This hypothesis assumes that parents make human capital investments in their children based on assessments of their differential ability to contribute to the wealth of the entire family (Becker 1981). These parental investments improve the "quality" or the life prospects of children. However, even with inequities in resource allocation among children, the interaction between the quantity and quality of children means that education per child tends to be lower in families with more children.

Therefore, given a set pool of family resources, more children mean fewer resources available for all children, and therefore lower life prospects (Becker 1981). Another hypothesis is called a "confluence model" according to which the negative relationship between sibship size and children's education is explained by psychological atmosphere within the family. The ones with many children or children born with relatively short time spaces have rather unfavorable intellectual climate since it is children but not adults who dominate in such families (Zajonc, 1976). However, as Conley and Glauber (2006) notice, according to this theory what really affects children's education is

not the number of children, but the age distribution within each family. The number of children is a choice variable of the parents and it might be that certain characteristics, such as family income, birth order, marital status as well as the educational attainments of parents can cause a negative correlation between the number of siblings and future educational achievement. A vast majority of studies carried out in the developed countries confirms a negative association between number of siblings and educational outcomes (Steelman and Mercy, 2006). However, surprisingly, the evidence for some low and middle-income countries is less clear (Lu 2009). Even though parental resources in these countries are particularly restricted and the support from the welfare state for families with children is missing, growing up in a large family does not always impede educational chances of children in these countries. This divergence in family size effects merits attention. One of the arguments that could potentially explain the limited effect of having many siblings on child education attainment is related to the role of extended kinship network. The key assumption underlying the resource dilution is that parental material and non-material resources are constrained (Desai, 1995). However, in some societies parents share the responsibility for taking care and covering financial costs of raising children with a wide circle of relatives (Shavit and Pierce, 1991). Hence, the differences in cultural conditions related to collectivism and strength of family ties across kinship network may potentially explain the variation of family size. However, testing hypothesis on the moderating impact of family ties requires systematic comparisons across countries. Another source of inconsistencies in findings across studies may be related to the spuriousness of the association between family size and child educational attainment. Parental preferences regarding family size may be correlated with opportunities that parents have for offering their children favorable conditions for intellectual development (Guo and VanWey 1999).

More than fifty years ago, Becker (1960) applied the principles of standard consumption theory to analyze the decision to have children within an economic framework. He and his co-authors subsequently conceptualized parents' fertility decisions as a trade-off in the number (quantity) of Children that they choose to have versus the per-child investments (quality) that they choose to make in them (Becker, 1960). Since then, the relationship between family size and children's human capital has become one of the most frequently estimated relationships in social sciences with a vast literature concluding that children in larger families tend to have smaller human capital endowments (Schultz, 2005).

Today parents are often blamed for low educational attainment of their children, without actually finding out other related factors that can contribute to the students' academic problem. According to the resource dilution hypothesis, an additional child decreases amount of time and financial means that parents can devote per each child (Downey, 2001). The larger the family, the greater the dilution of parental resources, and the more limited are the educational chances of each child. Hence, parents face trade-off between quantity and educational chances of children when making decisions regarding the size of their family (Becker, 1960). One would like to find out the justification the people have for blaming the parents as regard the low educational attainment of their children.

Many factors associated with the family could have contributed to the high or low educational attainment of their children with the family size as one of them. The family size in one way or the other contributes to the failure or success of a student in school, in the sense that when the family is large, there will be no adequate concentration of resources on the child by parents' in terms of time and investment in education human capital. It has been found that family variables including family income, family type, family size, and parents' education are determinants of the amount and quality of education children receive over their lifetime (Schultz, 2005). This study is therefore to investigate how student educational attainment is affected by the family size. Thus the following research questions will be answered. The following are the specific objectives of the study: examine the determinants of family size and assess the extent to which family size affects child educational attainment

2. Literature Review

The empirical literature on the effects of family size on child outcomes generally supports a negative relationship between family size and child "quality" (usually education), even after controlling for socioeconomic factors. However, few of these findings can be interpreted as causal; family size is endogenously chosen by parents and hence may be related to other unobservable parental characteristics that affect child outcomes. Belmont and Marolla (1973) use a sample of around 400,000 19-year-old males born in the Netherlands between 1944 and 1947. They conclude a negative relation between family size and intellectual performance, measured as the score on a military examination. This negative relation is however not consistent for all social classes examined, where the social classes were based on fathers occupation. Blake (1981) uses different survey data sets from the United States, and concludes that the number of siblings correlates negatively with educational attainment. Hanushek (1992) estimates the effect of the number of children on achievements in school, whereby achievements are consider as test scores from the Iowa Reading Comprehension and Vocabulary tests. The main result in this paper is that family size has a significant negative relation with school achievements of children, and he concludes that a distinct trade-off between the quantity and quality of children is found to exist.

These studies do however not take the possible endogeneity of the number of children into account. Recently the effect of family size on educational achievement is investigated using an instrumental variable approach. Black et al (2005) use multiple births as instruments for the number of children, to investigate the effect of sibship size on children education in Norway. They conclude a negative correlation between family size and educational attainment, but when they include control variables such as birth order dummies, and when they use the twin births as instruments, they conclude no significant negative effect of the number of children on educational attainment.

Hanushek (1992) all attempt to use exogenous variation in family size to determine the causal relationship between family size and child quality. Rosenzweig and Wolpin (1980), using data from India, and Hanushek (1992), using data from Korea, examine the effect of increases in fertility induced by twin births and sex of the first child, respectively, on child quality. Rosenzweig and Wolpin find that increases in fertility decrease child quality, while Lee finds that, if anything, larger families result in more educational expenditures per child. However, in both cases the sample sizes are small (25 twin pairs for Rosenzweig and Wolpin, approximately 2000 families), the estimates imprecise, and any family size effect could be confounded by the omission of birth order controls. Also, a recent literature suggests that sex composition may have direct effects on child outcomes (Hanushek, 1992) all find some evidence of sex-composition effects. However, Hauser and Kuo (1998) find no evidence for these effects). Such effects imply that sex composition may not be a valid instrument for family size. We take two approaches to distinguish the causal effect of family size on children's education. First, we include controls for family background characteristics and birth order to see how much of the estimated effect of family size on child education can be instead attributed to these observable factors. Our second approach implements two-stage-least squares using the birth of twins as a source of exogenous variation in family size. There is substantial research conducted on the determinants of children's educational outcomes.

Rozenzweig and Wolpin (1980) study the effect of family size on children's "quality" using data for India. They use twin births and sex of the first child as an instrument for family size and make a conclusion that higher fertility leads to lower child quality. However, there are only 25 observations for families with twins, thus the results cannot be considered as reliable due to the small sample of twins and impreciseness of estimates. Blake (1981), using the "dilution model" also reports a negative correlation between the number of siblings and chances to attend college. The results found by Zajonc (1976) are almost the same: the higher is the number of siblings, the lower are the educational scores of students. Additionally he concludes that there is a penalty for children who are born later. Their grades are significantly lower than grades of children who are among the first in their family. Zajonc (1976) explains this relationship by the adverse psychological atmosphere and inferior intellectual climate within the family with a high number of children. However, more recent papers challenge these conclusions. For example, Guo and VanWey (1999) after controlling for sibship and year fixed effects they find no relationship between sibship size and quality of children's education.

However, despite the fact that many recent research works confirm no relationship between family size and education of children, some recent findings still confirm the early results. Lee (2003) focuses on son preference (according to which fertility timing and family size are affected by the gender of the first child). Using the Korean dataset, he finds out that the quality-quantity tradeoff is not as big as if cross-sectional analysis was performed instead. But larger quantity of children still negatively affects investments in children's educational attainments. The effect is especially strong for families where high fertility rates are dominating.

3. Econometric Model

In this framework, we shall make use of the Ordered Probit model as proposed by Becker et al (1992) and reformulated by Green (2012). Principally, ordered probit is a generalization of the widely used probit analysis to the case of more than two outcomes of an ordinal dependent variable (a dependent variable for which the potential values have a natural ordering). In our case, the dependent variable known as: educational attainment has a natural ordering of four outcomes as: (1) has no education, (2) has primary school, (3) has secondary school, (4) went through higher education. This natural ordering of the dependent variable in relation to the family size as the main independent variable and other exogenous characteristics can be formulated as follows:

$$EA^* = \lambda FX^T + \varepsilon \qquad [1]$$

Whereby EA^* is the exact but unobserved level of educational attainment as indicated above, FX represent the family size as the main independent variable and the vector of other independent variables belief in association to the family size is affecting educational attainment. As considered in this case of our study, the other variables associated with family size to affect child educational attainment are parental characteristics (education, occupation, age-group, wealth status, sex of household), child characteristics (age, sex) and environmental characteristics (place of residence). The estimate λ is the vector of regression coefficients which we wish to estimate while the $\lambda \varepsilon$ is the error term.

From the natural ordinal nature of the educational attainment variable, we observed that, while we cannot observed EA^*, we can actually observed the the various categories of the response. This observed categories can be express in equation two as follows:

$$EA = \begin{cases} 0 \ if EA^* \leq 0, \\ 1 \ if \ 0 < EA^* \leq \mu_1, \\ 2 \ if \mu_1 < EA^* \leq \mu_2 \\ . \\ . \\ . \\ N \ if \mu_{N-1} < EA^*. \end{cases} \qquad [2]$$

From equation 2, we make use of the observations on EA, through the ordered probit technique, which are a form of censored data on EA^* to fit and estimate the parameter vector λ. As already shown in the literature, the model cannot be consistently estimated using the ordinary least squares; it is usually estimated using the maximum likelihood (Greene, 2012). It is also already confirmed in the literature that ordered probit technique is more reliable in estimating educational attainment as compare to multinomial probit due to its natural ordinal nature. This is complete different from the estimation of level of education which has multiple outcomes but not so much in a natural order as oppose to educational attainment variable (Becker et al., 1992).

It is more preferable than other techniques of estimation like the ordinary least square technique because the dependent variable is nominal with more than two outcomes that deal mostly with time series. It's as well better than logit and orprobit model since it is binary with just two outcomes. However the choice between ordered logit and probit was arbitral since both were appropriate and there was no need of using the two. It will be regress using STATA 13.

Data setting

The major source of the data used in this study is the demographic and health survey (DHS) carried out by the Cameroon national institute of statistics in 2011. It covers a sample of 11732 household located all over the territory of Cameroon and it provides information at household and individual level. This data is secondary in nature .There are two main types of DHS; standard DHS which have a large sample size(usually greater than 5000 households) and typically are conducted every 5 to 7 years to allow comparison over time. And secondly we have interim DHS which focus on the collection of information on key performance monitoring indicators but may not include data for all impact evaluation(such as mortality rate).It has shorter questionnaire and smaller samples size usually between 2000 but less or equal to 5000 households.

With regards to Cameroon, the ministry of economic affair, programming and regional development is the executive agency of the DHS and it is the national institute of statistics that collect the data. The 2011 DHS was realized after three other collections; 1991, 1998 and 2004 respectively. This method of data collection has been chosen because it has proven to be more reliable since it represent the most recent data obtain from the national institute of statistics. DHS are designed to collect data on fertility, family planning, mortality, reproductive health, child health, nutrition, HIV/AIDS, education, employment, household expenditure and size, areas of residence and a number of other topics. The survey is carried out by administering questionnaires link to their objectives.

4. Empirical Results
4.1 Weighted Descriptive Statistics

The analysis in Table 1 shows that there are different levels of education, ranging from no education to higher education. Thus we have people who went to primary school and did not complete, those who went to primary school and completed, those who went to secondary school and did not complete, those who went to secondary school and completed and those who went to higher education. In 2011 there are children who did not go to school at all while others attempted at least primary school and others went right up to universities. It further shows that at least 48% of students were able to meet up with their educational attainment while 52% of the students were not able to meet up with their educational attainment, which thus means that most of the student though went to school but ended half way which can be as a result of family size related factors.

The result also shows that there are some household where there is only a single individual while there are others with up to 43members given a mean value of 10. Amongst these people mothers were able to spend between 0 to 17years to meet up with their education with a mean value of four in each household. This means that there are some mothers who spent zero years in school (attended no school at all), others spent just a single year while others spent up to 17 years in school. The reproductive age group of these women was between 15 to 49years which means by 15years women start given birth while the most old woman gave birth to the first child at the age of 49year. The result also shows that 68% of the women were able to take part in economic activity where 93% of them were marry couples while the rest were either divorce or widows. In this household 26% 0f the men had skill labour while 74% had unskilled labour. It also shows that 72% of this man was living with their families at home. These parents spent between 0 to 17years in school which means the highest person in education spent up to 17years to meet up with his education while their ages range between 17 to 98years meaning the youngest father was 17years while the oldest was 98years.53% of these parents own wealth .it should however be noted that 39% of these household were from urban areas while 41% were from rural areas where 86% were males and 14% were females.

Table 1: Weighted Descriptive Statistics

Variable	Obs	Mean	Std Dev	Min	Max
Outcome Variable					
Educational attainment	11732	1.481367	1.321043	0	5
Main Independent					
Household size	11732	10.21253	5.599108	1	43
Exogenous Variable					
Mothers education in complete years	11732	4.593339	4.046172	0	17
Mothers education square	11732	37.46888	49.42428	0	289
Mother's reproductive age	11732	28.49593	6.975576	15	49
Mother reproductive age square	11732	860.6727	.423.4997	225	2401
Mother's participation in the labour market	11732	.6845337	.4647211	0	1
Marital status (1= marry, 0 otherwise)	11732	.9383207	.405825	0	1

Fathers had a skill labour	11732	.2647137	.4411995	0	1
Father at home (1= present, 0 otherwise)	11732	.724314	.4468784	0	1
Father education in complete years	11732	5.056658	4.871342	0	17
Father education square	11732	49.29774	66.52963	17	289
Father age	11732	40.05989	11.36027	17	98
Father age square	11732	1733.84	1142.762	289	9604
Wealth status(1 own wealth,0 otherwise)	11732	.5383972	.4985447	0	1
Variables Control for Place of Residence and Gender of Household Head					
Urban	11732	.3943723	.4887363	0	1
Rural	11732	.6056277	.4887363	0	1
Male	11732	.8590341	.3480012	0	1
Female	11732	.1409659	.3480012	0	1

Source: Computed by Author from DHS

4.2 Factors Influencing Family Size

The result of Table 1 shows that mothers education in complete years relate negatively with family size. Base on the result if years of schooling were to increase by one year, household size will reduce by 16.5%. This is because mothers who are educated they have knowledge of family planning which help them to control their birth rate. The result is statistically significant at one percent. Thus we reject the null hypothesis and accept the alternative hypothesis and conclude that mother's education reduces family size. Also, mother's reproductive age relate positively with family size .if mothers reproductive age were to increase by one year family size will increase by 0.2%. This is due to the fact that when women are in the reproductive age group most of them try to give birth before they reaches the age of menopause. However, the result is insignificant .Thus we fail to reject the null hypothesis and conclude that mother's reproductive age does not significantly increase family size.

The results further show that mothers participation in the labour market reduces family size. That is in a household were mothers are involve in the labour force family size is lower by 69.2% to family were mothers has no job. This is because of the fact that when women are involve in economic activity it reduces the chances of given birth to many children as time become a major issue in taken care of their children .Thus they give birth to limited number of children in order to have enough time to concentrate in their job. This result is significant at 1% hence we reject the null hypothesis and accept the alternative and conclude that mother's participation in the labour market goes a long way to reduce family size.

Marital status also relates positively with family size which means that household where people are married family size is higher than household were people are not married. Thus in household where people are married family size is 23.1% higher than household with no marital status. When people are married there is a possibility that they will have children than if they were not married. Couples thus increase the family size reason being that children are one of the most important reasons why people get married. This result is significant at one percent hence we reject the null hypothesis and accept the alternative hypothesis and conclude that marital status increase family. More so father having skill labour relate positively with family size. That is household were fathers has skill labour family size is higher than household were fathers has no skill labour. Increasing the chance of men having skill job by one unit will increase family size by 28.9 percent. This result is however insignificant hence we fail to reject the null hypothesis and conclude that skill labour does not increase family size. Sex of household head also relate positively with family size .This means that household were men are head of the house, family size is higher to household were women are head of the house. This is because the male can decide on the number of children to have base on his means to take care of the family as well as influence from his wife. A one percent increase in the number of men as household head increases family size by 97.6% higher than women who are head of the family .The result is significant at one percent hence we reject the null hypothesis and accept the alternative hypothesis and conclude that men who are households head increases family size.

The result as well explains that father present at home reduces family size. Household were fathers are at home reduces family size compare to household were the father is not at home. This is because the father may have knowledge on family planning as well as the wife may pass the reproductive age. A one percent increase of parents who stay at home reduces family size by 76.5%t lower than household were the father is not present at home. The result is statistically significant at one percent. We thus reject the null hypothesis and accept the alternative hypothesis which means father at home reduces family size.

Table 2: Determinants of family size

Variable	Coefficient	Std. Err.	T	P>|t|
	Household size			
Mother's education	-.1646705	.018142	-9.08	0.000
Mother's reproductive age	.0027477	.0084059	0.33	0.744
Mother's participation in the labour market	-.6918286	.107263	-6.45	0.000
Marital status	1.23098	.2611564	4.71	0.000
Sex of household head	2.965984	.1608007	18.45	0.000
Father has skill labour	.2089082	.1171142	1.78	0.074
Father present at home	-2.765686	.1356123	-20.39	0.000
Fathers education	-.0374885	.0145871	-2.57	0.010
Father's age	.0952121	.00513	18.56	0.000
Wealth status	2.695833	.1459435	18.47	0.000
Area of residence(1 urban,0 rural)	-2.457693	.1372539	-17.91	0.000
Constant	5.502387	.3332731	16.51	0.000
R-squared	0.1249			
F statistics	53.33 [11, 11720; 0.0000]			
Number of obs	11732			

Source: Computed by Author from DHS

The result also confirms that Father's education reduces family size. This is due to the fact that the father has knowledge on family planning and birth control which reduces the rate at which he gives birth. A one percent increase in father's education reduces family size by 3.7%. This result is however significant at one percent hence we reject the null hypothesis and accept the alternative hypothesis and conclude that father's education reduces family size. Furthermore, fathers reproductive age according to the result also increase family size. When a father is at the reproductive age, it increases family size because of its willingness to have children. A one percent increase in father's reproductive age lead to 9.5% increase in family size. This result is significant at one percent hence we reject the null hypothesis and accept the alternative hypothesis and conclude that father's age increase family size.

In addition wealth status plays a significant role in family size. Wealth significantly determines the number of children one should have. From the result a 1% increase in wealth status increases family size by 69.5%. This result is significant at one percent hence we reject the null hypothesis and accept the alternative and conclude that wealth status increase family size. Lastly area of residence determines family size. From the result urban areas correlate negatively with family size. This means household who are in urban areas has the possibility of having a fewer family size compare to thus in the rural areas. This is because thus in the urban areas are more educated on the consequences of having many children as well as the living cost as compare to those in the rural areas. A one percent increase in urban areas reduces family size by 45.7%. This result is significant at one percent hence we reject the null hypothesis and accept the alternative and conclude that urban areas reduce family size. The goodness of fit R-square shows that about 12% variation in the family size is being influenced by factors above while 88% is being influence by variation in the stochastic term. This means that there are other determinants of family size not included in our analysis.

4.2 Family size affects child educational attainment in Cameroon

The ordered probit regression presented here is base to assess the extent to which family size affects child educational attainment. Thus it's examined family size and other variables on the likelihood of children attaining their education. Starting with marital status, the result reveals that marital status is positive .This means than couples who are married, there is a more likelihood that their children will attain a higher level of education relative those who are not married. With a coefficient of (0.577) a 1% increase in marital status increase the probability of children attaining a greater level of education of 57.7%.The result is significant at 1% hence we reject the null hypothesis and accept the alternative hypothesis and conclude that marital status enable children to attain a higher level of education. In the case of marginal effect couples who are married, there is less likelihood for their children to attain no education and primary education but more likely to attain secondary and higher education of 17.3% and 0.06% respectively.

Partners educational level is also positive (0.121) which means there is a more likelihood of children whose parents are educated to attain a higher education level relative to children whose parent are not educated. A 1% increase in parents educational level increase their children education by 12.1%.The result is significant at 1% hence we reject the null hypothesis and accept the alternative hypothesis and conclude that partners educational level enable children to attain more education. With marginal effects children whose parents are educated has a less likelihood of attaining no education and primary education but more likely to attain secondary and higher education of 0.36% and 0.01% respectively. Partner's age is negative (-0.007) which means there is a less likelihood for children whose parents are old to attain high education relative low education. A 1% increase partner's age reduces the likelihood of children attaining higher education relative to children whose parents are not old. This result is significant at 1% thus we accept the alternative hypothesis and conclude that partners age increase the likelihood of children attaining low level of education. The marginal effects result shows that children whose parents are old are more likely to attain no and primary education but less likely to attain secondary and higher education of 0.02% and 0.0008% respectively.

Wealth status is positive (0.606), thus children whose parents are rich are more likely to go to school relative to children whose parents are not rich. This is because their parents are financially viable which make them able to sponsor their children. A 1% increases in wealth status of parents increase the likelihood of children attaining more education of 60.6%. The result is significant at 1% thus we reject the null hypothesis and conclude that wealth status increase the likelihood of children attaining more education. In the case of marginal effects, the children are less likely to attain both no and primary education of 0.16% and 0.02% respectively but more likely to attain both secondary and higher education of 0.18% and 0.06%. Household size is negative (-0.0268) which means there is a less likelihood for children of large family size to attain more education than children from small family size. Family size is a major impediment to educational attainment such that the resources allocated per child reduces. A 1% increase in household size reduces the likelihood for children to attain educational level by (0.03%).The result is significant at 1% thus we reject the null hypothesis and conclude that household size reduces the likelihood of children attaining their educational level. The marginal effects results shows that when the family is large there is more likelihood to attain no and primary education of 0.07% and 0.01% respectively but more likely to attain both secondary and higher education of 0.08% and 0.002% respectively.

Place of residence is positive (0.281).Thus children from urban areas are more likely to attain more education relative to those from urban areas. A 1% increase in urban areas increases the chances of children attaining more education relative to those in rural areas by 28.17%. The result is significant at 1% hence we accept the alternatives hypothesis and conclude that urban areas increase the likelihood of children attaining more education than those in rural areas. The result for marginal effects shows that children in urban areas are less likely to attain both no and primary education of 0.76% and 0.11% respectively but more likely to attain both secondary and higher education of 0.84% and 0.03% respectively. Birth order is negative (-0.047) which means there is less likelihood for incoming children to attain low education relative to first born children. The result is significant at 1% level thus we reject the null hypothesis and conclude that incoming children are less likely to attain more education relative to first born children. With marginal effects incoming children are more likely to attain no and primary education of 0.13% and 0.02% respectively but less likely to attain both secondary and higher education of 0.14% and 0.004% respectively.

Sex of the child is negative (-0.0141).As result children who are male are less likely to attain higher education relative to female children in Cameroon. A 1% increase in male children reduces the likelihood of male children attaining education by 0.14% relative to their female counterpart. The result is however insignificant at 10% hence we fail to reject the null hypothesis and conclude that sex of the child does not reduces the chance of male children attaining higher education relative to female children. The result of the marginal effects shows that children who are male are more likely to attain no and primary education of 0.04% and 0.01% respectively but less likely to attain both secondary and higher education of 0.04% and 0.001% respectively. Partner's occupation is also negative (-0.003).Thus children whose parents have better jobs have a less likelihood of attaining higher education relative to children whose parents have normal job. Thus a 1% increase in better job opportunity reduces the probability of children attaining high education of 0.04% relative to children whose parents have normal jobs. The result is significant at 1% hence we accept the alternatives hypothesis and conclude that partner's occupation reduces the likelihood of children attaining high education. In the case of marginal effects children whose parents have better job are more likely to attain no and primary education of 0.01% and 0.001% respectively but less likely to attain both secondary and higher education of 0.01% and 0.003% respectively.

For overall results, the probability of chi square shows that our analyses are 99% reliable. While the pseudo R square as a measure of goodness of fit shows that only about 23% of variation in child educational attainment is explain by the independent variable specified in the model while about 77% are unplanned. This means there are other variable that affect child educational attainment not included in the analysis.

Table 3: Assessing family size affects on child educational attainment

Variable	Coefficients	Std. Err.	Z	P>|z|
Marital status	.5779026	.0299326	19.31	0.000
Partner's educational level	.1213919	.0074163	16.37	0.000
Partner's age	-.0075436	.0012522	-6.02	0.000
Wealth status	.6060878	.013543	44.75	0.000
Household size	-.0268136	.002876	-9.32	0.000
Place of resident	.2816872	.0338716	8.32	0.000
Birth order	-.047725	.0059372	-8.04	0.000
Sex of child	-.0141388	.0230786	-0.61	0.540
Partner's occupation	-.003519	.0006738	-5.22	0.000
Pseudo R2	0.2331			
LR chi2(9)/ Prob> chi2	5483.54[9; 0.0000]			
Observation	11004			

Marginal effects on levels of education

Variable	dy/dx no education	dy/dx primary	dy/dx secondary	dy/dx higher
Marital status	-.1564903	-.0227684	.1733344	.0059242
Partner's education	-.0328717	-.0047826	0364099	.0012444
Partner's age	.0020427	.0002972	-.0022626	-.0000773
Wealth status	-.1641225	-.0238788	.1817882	.0062131
Household size	.0072608	.0010564	-.0080424	-.0002749
Place of resident	-.0762781	-.011098	.0844884	.0028876
Birth order	.0129235	.0018803	-.0143145	-.0004892
Sex of child	.0038286	.000557	-.0042407	-.0001449
Partner's occupation	.0009529	.0001386	-.0010555	-.0000361

Source: Author

4.3 Synthesis of family size – Student educational Attainment Relationship

The result of the study clearly reveals that certain factors can increase family size while others can as well reduce family size. According to the result of the determinants of family size; marital status, sex of household head, father reproductive age and wealth status positively and significantly increases family size while mother's reproductive age and father had skill labour positively but insignificantly increase family size. The positive effects are in agreement with our a priori expectation. This positive relationship is due to the fact that when people are married, a man is head of the house, partners are in their reproductive age group, one have skill labour and above all there is wealth people are bound to have children for these are significant reasons for people to have children .But having these children in access becomes a problem. This means that if persons who are found in the above determinants of family size are sensitized and educated on the danger on having many children, it will go a long way to reduce family size and as a result each of those children will be allocated with more resources. According to the theory for the demand for children, income plays a role in determining family size because families with higher incomes are more able to afford additional children. Kenya in the mid-nineties had it that women in childbearing years could not only expect to have about eight children at the end of their reproductive years, but they could also expect the number to rise in future (Himmelstand, 1994).

On the other hand mother's education, mother's participation in the labour market, father's education, urban areas of residence and father present at home negatively and significantly reduces family sizes. The negative effects are in agreement with our a priori expectation except for father present at home were we expected it to be positive. Father present at home can reduce family size reason being that he may be educated; have knowledge of family planning

and birth control and well as use contraceptives to control his family size. McLaren (1977) also investigated working class women working in textiles in the mid-19th century with the conclusion that women working in textile mills in Lancashire had smaller families than any other class except skilled professionals and businessmen. He also said that women were able to spread the knowledge of controlling family size amongst each other and give support, and that 'contraception' was often abortion.

Furthermore the second regression is based on accessing how family size affects child educational attainment. According to the result family size significantly affect child educational attainment as stated in a priori expectation. The results shows that when the family is large there is more likelihood for children to attain no and primary education but less likely to attain both secondary and higher education relative to household with small family size reason being that when the family is large according to resource dilution hypothesis, the resource allocated per child reduces which goes a long way to reduces child quality(education) .This also goes in conformity with the quantity-quality theory of Lewis and barker which look at the inverse relationship between child quantity and quality. Blake (1981), using the "dilution model" reported a negative correlation between the number of siblings and chances to attend college.

Apart from household size use as a proxy to child educational attainment, different variables were also use to capture child's education. Marital status according to the results has a positive effect on child education which goes in line with a priori expectation. When one is married there is less likelihood that his children will attain no and primary education but more likely to attain secondary and higher education relative to children from unmarried family. This is because when two partners combine their resources, they can better meet up with their children's education as well as give them better training. This is in conformity with the work of Verna and Barbara (1988) who claim in the journal of marriage and the family that Children raised in intact married families tend to earn higher grades than those in unmarried families.

Partners educational level also relate positive with child education. From the result children whose parents are educated are less likely to attain no and primary education but more likely to attain secondary and higher education which confirm a priori expectation. This is because children whose parents are educated do better in school since the parents assists their children in education especially homework ,teach their children at home and other school activities thus the children can better cope in school. Partners age also affect child education negatively. The results shows that as parents grow older there is more likelihood of their children to attain no and primary education but less likelihood to attain higher education. This is in conformity with our a priori expectation. This is because when parents are old, it is difficult for them to sponsor their children in school because at old age they don't have the necessary strength to look for financial means to carter for their children education for education become more expensive at higher level. However, the children can also be supported by their relatives to meet up with their education.

Place of residence also affect children's education positively. Urban areas have a positive effect on children's education compare to rural areas which is in line with a priori expectation. According to the results children's whose live in urban areas are less likely to attain no and primary education but more likely to attain secondary and higher education relative to children who live in rural areas. Children in urban areas are well informed than those in the rural areas. Also most of the children have educated parents who encourage them in school. According to quantity-quality trade off theory of Becker et al (1992) parents not only have an influence on child quality through investment of resources, but also through transmission of their endowments.

In addition to sex of the child also affects child education negatively. From the result children who are male are more likely to attain no and primary education but less likely to secondary and tertiary education relative to female children. This is contrary to our a priori expectation. In the past male children dominated female children in education but with modernization now our day's education is dominated by females since their number is even higher than that of male in Cameroon. Most females even perform better in education than males. Also Bad neighborhoods may result in adaptation of negative behavior, attitudes and aspirations,

5. Conclusion

The study was design to capture family size and student's educational attainment. Family size was capture using it determinants while educational attainment was capture using different levels of education like no education, primary , secondary and tertiary education. Two models were specified in the study firstly family size as a function of level of income, literacy ,fertility preference, parents level of education, desire for more children and child educational attainment as a function of level of income, gender, parents level of education, age of the child, place of residence, birth order number, family size, and ethnicity.

The data used in this study is the 2011 DHS carried out by the Cameroon national institute of statistics with a sample of 11732 households and it provides information at household and individual level and the techniques of data analysis is the ordered probit since the dependent variable is ordered outcomes. According to the result of the determinants of family size; marital status, sex of household head, father reproductive age and wealth status positively and significantly increases family size while mother's reproductive age and father had skill labour positively but insignificantly increase family size. On the other hand mother's education, mother's participation in the labour market, father's education, urban areas of residence and father present at home negatively and significantly reduces family sizes.

The multinomial probit results reveal that household size significantly affects child educational attainment negatively .The results show that when the family is large there is more likelihood for children to attain no and primary education and less likely to attain both secondary and higher education. In marital status and partners educational has a positive effect on child education. When one is married and educated there is less likelihood that their children will attain no and primary education but more likely to attain both secondary and higher education than another person who is not married and uneducated. Moreover, Wealth status and area of residence of parents also affects educational level of their children positively. Children whose parents are rich and live in towns are less likely to attain no and primary education but more likely to attain both secondary and higher education than other parents who are poor and base in rural areas. Partners age also affect child education negatively. As parents grow older there is more likelihood of their children to attain no and primary education but less likely to attain secondary and higher education. Also birth order number affects child education negatively. Incoming children are more likely to attain no and primary education but less likely to attain secondary and higher education compare to children of first birth. Sex of the child also affects child education negatively. Children who are male are more likely to attain no and primary education but less likely to attain secondary and tertiary education. Lastly Partner's occupation also affects child education negatively. From the result parents who have better job, their children are more likely to attain no and primary education but less likely to attain secondary and higher education. The research was out to investigate the effect of family size on student's education attainment in Cameroon. Two objectives were examined; determinant of family size and accessing how family size affects child educational attainment. The result shows that there are some factors that increase family size while there are others that reduce family size. The result further reveal that family size significantly affect student educational attainment with other variable like partners age, birth order number, sex of the child and partners occupation. Thus parents should be cautions to the number of children to have so as to avoid increasing family size in order for their children to meet up with their educational attainment. As the resources dilution hypothesis state the larger the family size the limited the resources that are allocated per child which goes a long way to reduce child quality.

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