Topic: An examination of factors that influence total number of children among women

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Introduction/Background

It is increasingly obvious that more and more women are having fewer children than previous generations in the United States (Smith, 2011). This has been attributed to a number of factors such as increasing access to education, age of first child birth and age of women (Becker, 1981and Billari, Philipov, and Testa, 2009). The fewer children women have the fewer number of persons become available for the labour force which can result in importing labour as seen in places like Denmark, Norway and Sweden (Thompson, 2013). In addition, having fewer children for a prolong period can lead to an increase ageing population, which has been the case in places like China and Jamaica, which burdens social services and their dependents (Shearer, 2012). Therefore, it is a problem for women to have fewer children due to the numerous negatives associated with such a decision.

The description based on the literature and the General Social Survey data set of 2010 suggests that the number of children respondents have has been influenced by their level of education, age of first child and age. The General Social Survey (GSS) is considered to be a sociological survey used to collect data on demographic characteristics and attitudes of residents of the United States. The 2010 GSS dataset will be used to explore the factors influencing the number of children had.

Rationale and Objective

The number of children a woman has implications not just for the family but the country and the world in which we live. One such issue which was pointed out earlier was the fact that having fewer children for a prolong period can lead to an increase ageing population, which burdens social services and their dependents. This was one of the many reasons why the study is worth doing. In addition, the study will add to the growing body of literature and assist in directing policies by examining the significance of the influence of these variables on the number of children had.

Previous studies based on the literature have found the three variables to be influential. In this study, the researcher wishes to ask the question, how does child bearing age, age at first child birth and level of education (number of years completed in school) affect the number of children had? The researcher therefore sets out to examine the extent to which the three independent variables (age at first child birth, level of education and child bearing age) influence the dependent variable, number of children had (it is dependent because it is your outcome variable). Independent variables are variables being manipulated by the researcher.

Major objective:

To what extent does age of first child birth, child bearing age (18-49) and number of years completed in school (level of education) affect or influence the number of children had? The aim is to determine the extent of the influence.

Specific objectives:

- To determine if there is a statistically significant relationship between age at first child birth and number of children had.
- To ascertain whether there is a statistically significant relationship between child bearing age group (18-49) and the number of children had.
- To determine the relationship between highest years of school completed (level of education) and number of children had.

Theoretical Framework

There are a number of theories put forward by scholars to explain the number of children women will have. One such theory is the socio-economic explanation for low fertility which focuses on the direct and indirect opportunity costs of having children (Becker, 1981). Opportunity cost in essence is anything one has to give up for something else. According to this theory, improved education access and subsequent higher labour force participation have increased women's economic independence. This reduces the gains from marriage based on traditional role of women in the family and increases the costs of childbearing. It is assumed that women will give up earnings to care for children at home, or that they reduce their work hours. Therefore, women would spend less time in school or give up earning opportunities for raising a child, opportunity cost. One of the relationships that will be examined is level of education and the number of children women will have. Becker (1981) has provided a soci-economic theory that explains the underlying reason behind this relationship.

Another insightful theory is the wealth flow theory by Caldwell (1967). In traditional societies, wealth flowed from children to parents but in modern societies, costs of children are very high which leads to a decline in fertility rates. This is primarily due to the nature of modern societies where cost of living is not just high but there are laws put in place for parents to support their children until a given age. This theory is particularly important because it looks to history to add insight to the discourse and suggests a purely economic reason for decline fertility rates.

The theory of planned behaviour applied to fertility rates by Billari, Philipov, and Testa (2009) posits that intentions are the most proximate determinant of the corresponding behaviour. They explained that intentions are formed under the immediate influence of three groups of factors: (a) personal positive and negative attitudes towards the behaviour, in this case, having a child; (b) subjective norms, that is, perceived social pressure to engage or not to engage in the behaviour; and (c) perceived behavioural control, which is the ability to perform the behaviour, which may depend, for example, on the availability of housing, income, or other resources. Some women for may have a child at a very early age because of the social pressure and the positive attitude for having that child. It therefore means that over time, women who have a child at an early age will continue having more children as they get older especially if there is a high behavioural control. Also, the later the woman has a child the smaller the family size would be in

comparison to those who have children earlier. Generally, women will have more children as they get older once they are within the child bearing age.

Literature Review

Mathews and Ventura (1997) found in their study that a woman's educational level is the best predictor of how many children she will have. Based on their 1994 analysis of birth certificate data, they found a direct relationship between years of education and birth rates, with the highest birth rates among women with the lowest educational attainment. In particular, women with one or more years of college have lower lifetime fertility than those who are considered to be less educated. Women who have a college education therefore are not able to adequately reach the number of children of women with lower level of education. In addition, childlessness was almost likely to occur to women highly educated, professional category. This is complement by women's new found autonomy in recent times. Abadian (1996), in her study of 54 developing countries, found that female autonomy has a negative and significant impact on fertility. It therefore comes as no surprise that the first birth rate for women aged 35–39 increased from 1970 to 2006, decreased from 2006 to 2010, and increased again in both 2011 and 2012 according to Mathews and Hamilton (2014). The overall pattern suggests a negative relationship, as level of education decreases the number of children increases.

It has also been recognized in a number of studies that age (child bearing age) and age at first child birth play an important role in the number of children a woman will have. Carlson and Furstenberg (2006) found in their study of births in urban areas that although multiple-partner fertility is rare among teen mothers, mothers whose first birth occurred between the ages of 14-16 and 17-18 were more than twice as likely to have had children with multiple partners, 9 compared to mothers who began childbearing at age 30 or older. Therefore, the earlier a woman has her first child, the more children she will have over reproductive years especially with more than one partner. In addition, a weak or non-existent relationship with the father of their first child, and an unwanted first birth increases the odds that young mothers will experience a closely-spaced birth with a new partner (Carlson & Furstenberg, 2006). What is most interesting is the fact that the average age of first-time mothers increased by 3.6 years, from 21.4 years in 1970 to 25 years in 2006 which has implications for family size. In other words, family sizes have been decreasing because women who have children at a later date usually have fewer numbers of children compared to someone who started having children at an earlier age. This

also suggests a negative relation, as age at first child birth decreases, the number of children that a woman will have increases.

With all things being equal, age (child bearing age) independently yields a positive relationship with the number of children had. Bhuyan, Islam and Uddin (2011) demonstrated in their study using secondary data in Bangladesh that as one age increases so does the number of children had. A number of things can happen over the span of a woman's reproductive years. Many children are born not necessarily because they were planned but the exact opposite which happens to millions of women. They went on to explain that couples will keep having more children if they for example have only sons or daughters as there is a sense of achieving balance in the sexes. This conclusion was also made by Carlson & Furstenberg (2006) when they examined age of first child birth.

Methodology

A stratified three stage area probability sample was used for the General Social Survey of 2010. All adults in the United States were a part of this sample except Alaska and Hawaii. The process involved four stages (Talbot, 2014).

The initial stage generated the primary sampling units by dividing the United States into exactly 2489 metropolitan and non metropolitan areas. Both metropolitan and non-metropolitan primary sampling units were classified by regions with two exceptions: non-metropolitan countries used percentage minority and per-capita income to assist with this classification process. Random sampling was then used to select one hundred primary sampling units within strata with probability proportional to size. Stage two involved dividing these primary sampling units into what is known as census blocks. Random sampling was employed once more to select three blocks from each primary sampling unit producing a total of 384 blocks. In the last two stages, households were selected from each block and all adults were enumerated. One adult was selected from each household by a random procedure to be interviewed in the survey. Using this procedure, each household in the continental US had an equal chance of being selected for the sample. However, adults living in small households had a slightly higher probability of being selected into the sample than adults living in large households (Talbot, 2014).

The information was received using a questionnaire. The survey questionnaires include a set of about 400 core questions. Only 170 of these questions are asked of all respondents, while the rest were asked of two-thirds of the respondents who were randomly selected. The interviews were conducted in person and a few by phone in extreme cases by trained interviewers. On average, each interview lasted about 90 minutes. The data was collected in the year 2010 with a sample size of 2044 adults (Talbot, 2014).

Hypotheses

General hypothesis:

There exists a statistically significant relationship between age of first child birth, child bearing age (18-49), number of years completed in school (level of education) and the number of children had.

Bivariate hypotheses:

Null hypothesis: There is no relationship between child bearing age (18-49) and number of children had

Alternative hypothesis: There is a positive relationship between child bearing age and number of children had

Null hypothesis: There is no relationship between age at first child birth and the number of children had

Alternative hypothesis: There is a negative relationship between age at first child birth and the number of children had

Null hypothesis: There is no relationship between highest years of school completed and the number of children had

Alternative hypothesis: There is a negative relationship between highest years of school completed and the number of children had

Data Analysis and Interpretation

Data transformation

A total of four variables were selected: **age** (Age of respondents), **agekdbrn** (Respondent's age when first child was born), **edu** (Highest year of school completed) and **childs** (Number of children). The three independent variables were **age**, **agekdbrn** and **edu**. They were independent variables because they were manipulated by the researcher. The dependent variable on the other hand was **childs**. It was the dependent variable because it was the outcome or result. **Justification:** The **edu** and **agekdbrn** variables were selected because it was found in the literature that these variables played a significant role in influencing the number of children had (See theoretical framework and literature review).

Select cases was used for sex (selected females only) and age (18-49 years) which meant that all four variables specifically looked at females between child bearing age group. The variable **agekdbrn** measured the age at which women had their first child with a range from 13 to 42 years (age in years). **Edu** as indicated above measured the highest year of school completed (level of education) for women with a range from 0 to 20 years of school completed. **Childs** measured the number of children women had with a range of 0 to 8 or more. Eight or more was regarded as 8 so the variable could meet one of the assumptions for doing the regression analysis. Therefore, the label 8 or more was removed by recoding the variable in **Recode_child_ratio**. The ranges remained the same (0 to 8).

The statistical procedures used were regression analyses/models. All variables were ratio and normally distributed which met the requirements for the statistical procedures. The level of significance was 5% (0.05). This meant that we are 95 percent confident in our results. In other words, when the regression model is used to make future forecasts, we would be correct 95 times out of a 100. SPSS (Statistical Package for the Social Sciences version 19) was used for the analyses.

Description of the sample

Out of a total of 2044 respondents, the majority were females 56.4 percent compared to 43.6 percent of males (See table 1 in appendix). In addition, the majority (56.4%) were working

out of a total of 2041 respondents (Table 2 in appendix). More persons were married (43.6%) compared to 27.7% who were who were never married and the other categories out of 2043 respondents (Table 3 in appendix). In addition most of the fathers (42.6%) went to high school out of 1574 respondents (Table 4 in appendix). However, 49.1% of mothers went to high school out of 1882 respondents (Table 5 in appendix). Out of 2044 respondents, the majority (75.8%) was white; while 15.2% were black and 9% were other (Table 6 in appendix). One is also able to observe that out of a total of 625 women; the majority (53.4) had one to no children (See table 7 in appendix). Of the 626 women of child bearing age (18-49 years) the majority (51.8%) were 34 and below (See table 8). Most women (51.2%) out of 414 were 21 and below when they had their first child (Table 9). In addition, out of a total of 625 women, most (50.1%) completed 13 to 0 years of schooling (Table 10 in appendix). Note briefly, Table 7 to 10 represent women of child bearing age (18-49). See data transformation for clarity.

Hypothesis testing

Null hypothesis: There is no relationship between child bearing age (18-49) and number of children had

Alternative hypothesis: There is a positive relationship between child bearing age and number of children had

The regression model between child bearing age and the number of children had was found to be statistically significant ($F=93.004$, $p<0.05$). This meant that the influence that child bearing age had on the number of children had actually exist in reality, there is a relationship. The researcher failed to accept the null hypothesis because p was less than 0.05 (see explanation under data transformation). Based on the coefficients table, the variable age was significant ($p<0.05$). Therefore, the model was:

Number of children had=-.583+.061 (Child bearing age)

When child bearing age is zero (no child bearing age), the number of children had would be -.583. In addition, for every unit change or increase in child bearing age (yrs), number of children changes or increases by .061. This meant that there was a positive relationship between child bearing age and number of children had which supports the researcher's alternative

hypothesis above. This is supported by both positive signs of the regression coefficient (slope=.061) and R=.360. R^2 is therefore .130. This meant that 13% of the variation in number of children had can be explained by child bearing age. In other words, child bearing age influenced number of children had by 13% and 87% is due to some other factors (See syntax for raw SPSS output).

Null hypothesis: There is no relationship between child bearing age (18-49) and number of children had

Alternative hypothesis: There is a positive relationship between child bearing age and number of children had

Null hypothesis: There is no relationship between age at first child birth and the number of children had

Alternative hypothesis: There is a negative relationship between age at first child birth and the number of children had

Null hypothesis: There is no relationship between highest years of school completed and the number of children had

Alternative hypothesis: There is a negative relationship between highest years of school completed and the number of children had

The regression model between child bearing age, highest years of school completed, age at first child birth and the number of children had was found to be statistically significant ($F=47.125$, $p<0.05$). This meant that the influence child bearing age, highest years of school completed and age at first child birth had on the number of children had actually exist in reality, there is a relationship. In addition, all three independent variables in the model were significant (all $ps<0.05$). Based on the coefficients table, the model was:

Number of children had=2.815+0.060 (child bearing age) -.071 (highest years of school completed) -.079 (age at first child birth)

The model is saying that whenever child bearing age, highest years of school completed and age at first child birth is zero, the total number of children expected to have would be 2.815.

In addition, for every unit increase in child bearing age (yrs), number of children is expected to increase by 0.060. For every unit increase (one year) in the number of years in school completed, number of children is expected to decrease by .071. This meant that there was a negative or inverse relationship, which is supported by the negative sign before .071 in the model. Lastly, for every unit increase in age at first child birth, number of children had will decrease by .079. In other words, the younger a woman has her first child during child bearing age the more children she will have. This too is a negative relationship based on the negative size of .079 in the model. R^2 was .257 which meant that all three variables account for 25.7% of the variation in the number of children had. In other words, 73.3 % of the change in the number of children had can be explained by other factors because the three independent variable influence the number of children had by only 25.7% (See appendix for raw SPSS tables).

Based on these findings, the null hypotheses for all three variables were failed to be accepted. Therefore, the alternative hypotheses were accepted. **To reiterate**: there is a negative relationship between age at first child birth and the number of children had, there is a negative relationship between highest years of school completed and the number of children had, and there is a positive relationship between child bearing age and number of children had.

What is the difference in the number of children a woman is predicted to have if she is age 40 compared with a woman who is 25?

Number of children had=-.583+.061 (child bearing age). Therefore, number of children had=-.583+.061 (40), =-.582+2.44=1.858.

Number of children had=-.583+.061 (25). Therefore, number of children had=-.583+1.525 which equalled 0.942. The difference is therefore 1.858-0.942=0.916 child.

How does your prediction differ in the second regression model?

Number of children had=2.815+0.060 (child bearing age). Therefore, number of children had=2.815+0.060 (40) =2.815+2.4=5.215.

Number of children had=2.815+0.060 (25). Therefore, number of children had=2.815+1.5=4.315.

Based on the calculations above, one is able to observe an increase in the number of children had if a woman were 40 and 25 in the second regression model. Specifically, a 3.357 children increase (using 5.215-1.858 for age 40) and a 3.399 children increase for age 20 (4.315-0.916).

Summary of Findings/Conclusion/Recommendation

The findings supported the researcher's hypotheses. That is, there is a positive relationship between child bearing age group and number of children had, a negative relationship between age at first child birth and the number of children had, and a negative relationship between highest years of school completed and the number of children had. These relationships may be explained by Becker's theory of socio-economic explanation, Caldwell's wealth theory, and the theory of planned behaviour applied to fertility rates by Billari, Philipov, and Testa (2009). This was further substantiated by a number of studies done by Mathews and Ventura (1997), Abadian (1996), Carlson & Furstenberg (2006), and Bhuyan, Islam and Uddin (2011) which were briefly looked at in the literature.

We have therefore learnt that the three independent variables examined still play an important role in determining the number of children that women will have. Therefore, whenever policies are being implemented to curb the number of children women have, these variables may be of some use. However, only 13% of the child bearing age influenced the number of children women had and 25.7% of child bearing age, age at first child birth and number of years completed in school combined. Other factors that affect number of children women will have to include marital status, income/expense of having children as Caldwell (1967) explained and tradition, just to name a few. Therefore, other factors should be explored to properly combat and understand the negatives associated with decreasing number of children.

One of the main disadvantages of the study was the examination of women only. As a result, a major recommendation for future study is to examine both males and females because women by themselves cannot reproduce. This could possibly increase the proportion or percentage of the variation in the number of children had using the independent variables examined in this paper (In other words, the independent variables would have a greater influence on the number of children had). Due to the possibility of a larger percentage of variation being explained, policies would have a greater chance of being more effective in tackling issues related to the number of children had.

Syntax

1. FREQUENCIES VARIABLES=sex
   /ORDER=ANALYSIS.
2. FREQUENCIES VARIABLES=wrkstat marital padeg madeg race
   /ORDER=ANALYSIS.
3. USE ALL.
   COMPUTE filter_$=(sex = 2 & age <= 49).
   VARIABLE LABELS filter_$ 'sex = 2 & age <= 49 (FILTER)'.
   VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
   FORMATS filter_$ (f1.0).
   FILTER BY filter_$.
   EXECUTE.
4. FREQUENCIES VARIABLES=agekdbrn age educ Recode_child_ratio
   /ORDER=ANALYSIS.
5. REGRESSION
   /MISSING LISTWISE
   /STATISTICS COEFF OUTS R ANOVA
   /CRITERIA=PIN(.05) POUT(.10)
   /NOORIGIN
   /DEPENDENT Recode_child_ratio
   /METHOD=ENTER age.
6. REGRESSION
   /MISSING LISTWISE
   /STATISTICS COEFF OUTS R ANOVA
   /CRITERIA=PIN(.05) POUT(.10)
   /NOORIGIN
   /DEPENDENT Recode_child_ratio
   /METHOD=ENTER age agekdbrn educ.

Appendix

Table 1 showing frequency and percent distribution of gender

Gender	Frequency	Percent
Male	891	43.6
Female	1153	56.4
Total (N)	**2044**	**100**

Table 2 showing frequency and percent distribution of labour force status

Status	Frequency	Percent
Working full-time	917	44.9
Working part-time	234	11.5
Temporarily not working	33	1.6
Unemployed, laid off	145	7.1
Retired	319	15.6
School	93	4.6
Keeping house	235	11.5
Other	65	3.2
Total (N)	**2041**	**100**

Table 3 showing frequency and percent distribution of marital status

Marital Status	Frequency	Percent
Married	891	43.6
Widowed	181	8.9
Divorced	341	16.7
Separated	65	3.2
Never married	565	27.7
Total (N)	**2043**	**100**

Table 4 Table showing fathers' highest degree along with frequency and percent distribution

Level of education	Frequency	Percent
Lower than high school	561	35.6
High school	671	42.6
Junior College	40	2.5
Bachelor	164	10.4
Graduate	138	8.8
Total (N)	**1574**	**100**

Table 5 Table showing mothers' highest degree along with frequency and percent distribution

Level of education	Frequency	Percent
Lower than high school	606	32.2
High school	924	49.1
Junior College	83	4.4
Bachelor	180	9.6
Graduate	89	4.7
Total (N)	**1882**	**100**

Table 6 showing respondents' race with frequency and percent distribution

Race	Frequency	Percent
White	1550	75.8
Black	311	15.2
Other	183	9
Total (N)	**2044**	**100**

Table 7 showing number of children had by respondents

Response	Frequency	Cumulative %
0	207	33.1
1	127	53.4
2	153	77.9
3	84	91.4
4	37	97.3
5	9	98.7
6	3	99.2
7	2	99.5
8	3	100
Total (N)	**625**	

Table 8 showing child bearing age group frequency and cumulative percent

Responses	Frequency	Cumulative %
18	6	1
19	7	2.1
20	16	4.6
21	20	7.8
22	14	10.1
23	23	13.7
24	12	15.7
25	27	20
26	18	22.8
27	28	27.3
28	19	30.4
29	32	35.5
30	22	39
31	22	42.5
32	23	46.2
33	16	48.7
34	19	51.8
35	27	56.1
36	16	58.6
37	28	63.1
38	19	66.1
39	18	69
40	21	72.4
41	24	76.2
42	18	79.1
43	21	82.4
44	19	85.5
45	18	88.3
46	20	91.5
47	14	93.8
48	18	96.6
49	21	100
Total (N)	**626**	

Table 9 showing age of women at first birth

Response	Frequency	Cumulative %
13	1	.2
14	7	1.9
15	8	3.9
16	15	7.5
17	26	13.8
18	39	23.2
19	37	32.1
20	39	41.5
21	40	51.2
22	24	57
23	29	64
24	26	70.3
25	16	74.2
26	14	77.5
27	16	81.4
28	10	83.8
29	11	86.5
30	14	89.9
31	8	91.8
32	7	93.5
33	10	95.9
34	2	96.4
35	5	97.6
36	6	99
37	2	99.5
41	1	99.8
42	1	100
Total (N)	**414**	

Table 10 showing highest number of years in school completed

Response	Frequency	Cumulative Percent
0	1	.2
4	1	.3

5	1	.5
6	11	2.2
7	2	2.6
8	10	4.2
9	14	6.4
10	15	8.8
11	32	13.9
12	160	39.5
13	66	50.1
14	78	62.6
15	46	69.9
16	102	86.2
17	23	89.9
18	26	94.1
19	13	96.2
20	24	100.0
Total (N)	**625**	

1. First regression model

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	age AGE OF RESPONDENT	.	Enter

a. All requested variables entered.

b. Dependent Variable: Recode_child_ratio

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.360[a]	.130	.128	1.355

a. Predictors: (Constant), age AGE OF RESPONDENT

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	170.709	1	170.709	93.004	.000[a]
	Residual	1143.522	623	1.836		
	Total	1314.230	624			

a. Predictors: (Constant), age AGE OF RESPONDENT

b. Dependent Variable: Recode_child_ratio

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.583	.222		-2.625	.009
	age AGE OF RESPONDENT	.061	.006	.360	9.644	.000

a. Dependent Variable: Recode_child_ratio

2. Second regression model

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	educ HIGHEST YEAR OF SCHOOL COMPLETED, age AGE OF RESPONDENT, agekdbrn R'S AGE WHEN 1ST CHILD BORN	.	Enter

a. All requested variables entered.

b. Dependent Variable: Recode_child_ratio

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.507[a]	.257	.251	1.062

a. Predictors: (Constant), educ HIGHEST YEAR OF SCHOOL COMPLETED, age AGE OF RESPONDENT, agekdbrn R'S AGE WHEN 1ST CHILD BORN

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	159.586	3	53.195	47.125	.000[a]
	Residual	461.683	409	1.129		
	Total	621.269	412			

a. Predictors: (Constant), educ HIGHEST YEAR OF SCHOOL COMPLETED, age AGE OF RESPONDENT, agekdbrn R'S AGE WHEN 1ST CHILD BORN

b. Dependent Variable: Recode_child_ratio

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.815	.330		8.520	.000
	age AGE OF RESPONDENT	.060	.007	.373	8.387	.000
	agekdbrn R'S AGE WHEN 1ST CHILD BORN	-.079	.012	-.342	-6.712	.000
	educ HIGHEST YEAR OF SCHOOL COMPLETED	-.071	.020	-.172	-3.490	.001

a. Dependent Variable: Recode_child_ratio

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