

## DEMOGRAPHICS, SOCIO-ECONOMIC FACTORS AND THE SIZE OF FAMILY IN THE UNITED KINGDOM

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The motive of the research is to analyse whether demographics and socio-economic factors have an impact on the size of family in the United Kingdom or not. The purpose of the study to estimate the Poisson model and analyse the influence of demographic (age, religion, spouse, marital status, urban) and socio-economic factors (house ownership, education, occupation). The study will adapt a model based from the theoretical work by Becker (1960, 1981, and 1992). Research methods include: (a) the scope of the studies in this research includes women and child bearing age 15 to 49 years old. The dependent variable is the number of children (b) the data type and data source i.e. the type of data used is secondary data from Minnesota Population Centre Integrated Data 1991 (c) the method of analysis in this research is quantitative descriptive and model parameter estimation. The result of the research will be descriptive and quantitative analysis will be in the form of Poisson Model estimation. The resulting model can be tested to get a good model using Person goodness of fit results, which indicate that the number of children significantly differs for a Poisson distribution, according to the p value of 1 ('Prob.chi2'), which is above the standard threshold of 0.05. The finding on the demographic factors revealed that spouse present in the household does not affect the decision of having children. However, being married is a positive and significant factor. For child-bearing age, positive and significant 30-49. Findings on the socio-economic factors indicate that women with higher rank and education prefer to have fewer children with a negative coefficient.

**Keywords:** socio-economics, demographic, child, family

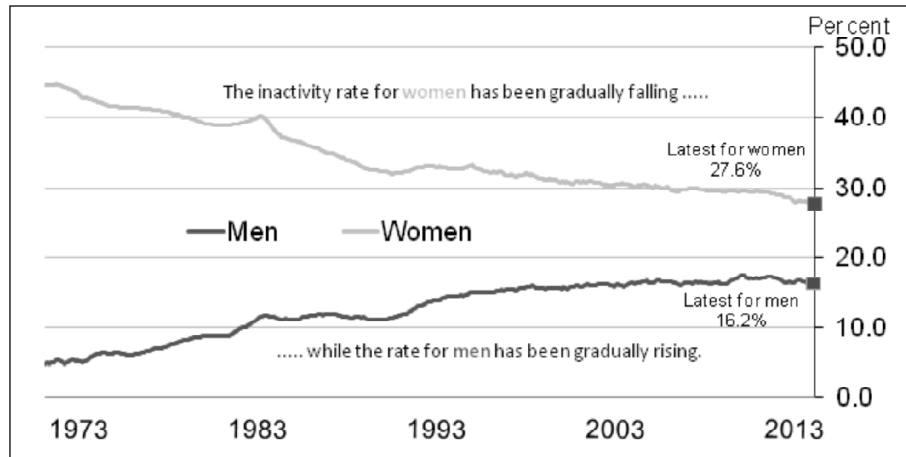
### 1. INTRODUCTION

Increase in women's economy activity, women's high educational attainment, late marriage, childcare and education expenses, changing valuation of children, household income and the instability of employment status and residence are important factors that contribute to the declining fertility rate (Ermisch, 1988, 1989; Caldwell & McDonald, 2002). Many studies have indicated that as women become more socially active, they are less inclined to have a baby directly after marriage (Shapiro & Mott, 1994). However, other studies in European countries have indicated that countries with relatively high levels of women's social participation have correspondingly higher level of fertility (Del Boca, 2003). For the United Kingdom (UK), the key measures used in setting the fertility assumptions are formulated in terms of completed family size i.e. the average number of children that a woman bears in particular years.

The economic inactivity rate for women has been gradually falling from more than 40 percent in 1971 to 27.6 percent in 2013. This data in Figure 1 has proven

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**Figure 1:** Economic inactivity rates (aged 16-64) from January- March 1971 to January-March 2014.

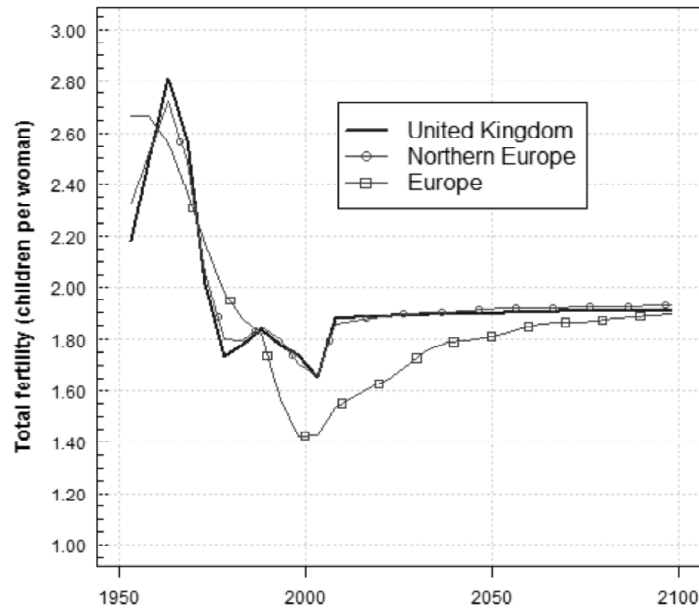
Source: Office of National Statistic, UK (2013)

that women's contribution towards the economic activity has been more in the last 30 years.

In 2013, up until the age of 22, the percentage of men and women in work was similar. However, above this age men consistently had a higher employment rate than women as some women chose to start family and not work. The gap between the two rates narrowed in older ages with some women re-joining the labour force when their children are older. In some of the oldest age groups the gap widens as women approach and pass their state pension age and retire while men have to wait until 65 for the state pension age.

Figure 2 presents the total fertility trends of the UK along with a consistent trend within the Northern Europe region. However, a slight increase between 1990s and early 2000 from overall Europe has been shown in the figure.

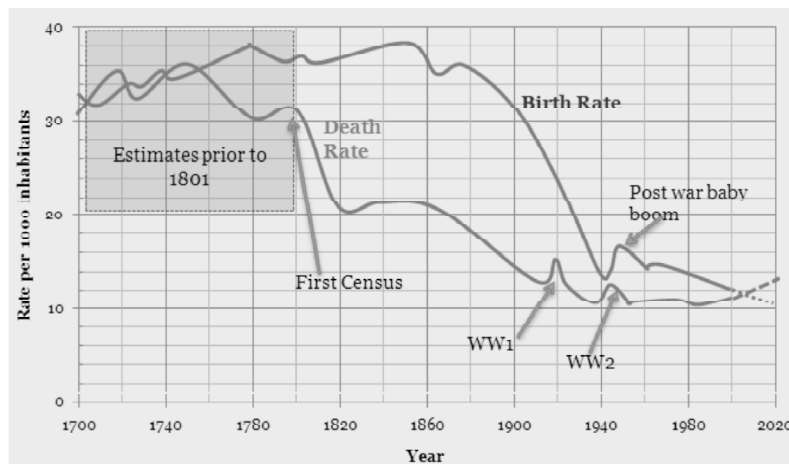
Figure 3 explains the history and future of the UK demographic transition. In stage 1 of the United Kingdom demographic transition, both the birth rate and death rates are high and fluctuating. For the period from 1760s to 1940s, the birth rate has gone above death rate, which indicated that the population was increasing. At stage 2, the birth rates stay high throughout due to the improvement in medical care and vaccinations that were invented. At stage 3, birth rates finally begin to fall and become almost at par with death rates during the period of World War 1 and World War II. The war and the family planning programs as initiated by the government were the major impacts, which made parents recognize that they no longer need to have lots of children. In stage 4, birth rates and death rates remain low and fluctuate thereby resulting in a steady population. As stage 5 were added



**Figure 2:** Total Fertility between the UK, Northern Europe and Europe

Source: United Nations, World Population Prospects (2013)

to the model, there was decline in population as birth rates and fertility rates fell below the replacement level of 2.0.



**Figure 3:** The UK's demographic transition from 1700 to 2020

Source: [www.coolgeography.co.uk](http://www.coolgeography.co.uk)

Fertility in this study involves women decision which is strongly influenced by demographic and socio-economic factors. Do women in the UK formulate a desired family size? The issues of the study i.e. do the women develop a sense on the sizes of the family i.e. too small or too large, based on demographic and socio-economic factors.

### **LITERATURE REVIEW**

Demand of children refers to the number of children a couple desires and basically most couple have some idea about it. However, beside the number of family size, couples may have preferences about the sex of the children, spacing between them and the education they should receive. According to Becker (1960), Mincer (1963) and Willis (1973), demand for children can interplay between tastes for children and constraint on the couple. A couple is assumed to have some preferences between children and other goods, including such things as consumer goods and leisure activities. According to Easterlin (1978), it is seen as the number of children parents would have if there were no subjective or economic problem involved in regulating fertility. Accumulated evidence to date reveals that deciding number of children varies not only between couples and families but also within families. Couple faces a variety of circumstances both within and beyond their control. These considerations also range from social and economics demands, cultural and social norms, demographic characteristics and environment factors.

According to Dorling (2013), in his book entitled "Population 10 Billion," he wrote about a measure called "wanted fertility," where mothers are asked how many children they would wish to have. He elaborated that wanted fertility turns out to be the "single best predictor for actual fertility levels in the less developed regions". The concept of "replacement-level fertility" is the level that needs to be sustained over the long run to ensure that a population replaces itself. To achieve replacement level fertility, each woman on an average needs to have one surviving daughter. In a population in which all females survive through the reproductive years and the probability of having a daughter at each pregnancy is 50 per cent and total fertility at the replacement level will be 2.0 children per woman. In reality, replacement-level fertility is slightly higher than 2.0 children per woman because the chances of survival from birth to the reproductive ages is less than 100 per cent and more boys are born than girls (i.e., the sex ratio at birth is greater than 100). For most countries with low or moderate mortality levels and a sex ratio of around 105 boys per 100 girls at birth, replacement level is approximately 2.1 children per woman (United Nations).

According to Bagozzi & Van Loo (1978), children constitute a special type of social currency in three aspects:

- i) Reward and punishments to couple – benefits for love, companionship or fulfilment, loses – emotional strain, physical pain or financial hardship.

- ii) Indirectly vehicles for rewards and punishments – strengthening the bond between husband and wife, social and financial insurance and attainment of social status.
- iii) Impact on consumption of goods and services - family decision process as considerations require trade-offs on the household's scarce time and money.

## RESEARCH METHODOLOGY

### Scope and Data

The source of data is Integrated Public Use Microdata Series (IPUMS), in which the data is provided by the participating National Statistical Offices of a particular country. Census micro data contains information collected on persons and households. The responses of each person and household with the different census questions are recorded in separate variables. However, for this study only female within the household will be analyzed at a child-bearing age of 15-49 years. Due to the limitation of census data, only the data of 1991 was available.

### Method of analysis

The method of analysis employed the Poisson model. The univariate Poisson distribution, denoted by Poisson ( $n|\lambda$ ), for the number of children of  $n$  over a fixed exposure period has the probability mass function. In the Poisson model the probability that  $N_i$  equals  $n$  is given by

$$P_r(N_i = n) = \frac{e^{-\lambda_i} \lambda_i^n}{n!} \quad (1)$$

where  $N_i$  is a non-negative integer and  $\lambda_i$  is the expectation (and also the variance) of the random variable  $N_i$ . The regressors of  $\lambda_i$  are specified in a conventional way:  $\lambda_i = \exp(b_0 + X_i \beta)$ , where  $\beta$  is a coefficient vector and  $b_0$  can be estimated by substituting for  $\lambda_i$  in the above equation and applying the MLE method.

### Model Specification and Variables

The base-case count model used in this study includes the following variables in addition to the constant term:

NCHILD = (urban, ownrshp, spouse, age, marst, relig, ethnic, education, occisco)

Number of children (NCHILD) comprises information on the number of own children living in the household. Number of children and the dependent children is treated as count number in Poisson. The socio-demographic, socio-economic and inter-generational variables used as independent variables are: place of residence (urban), ownership (ownrshp) and spouse in the household, age, group of

respondents, marital status (marst), religion (relig), ethnicity/race, education and types of occupation (occisco). Many of the independent variables were categorically variable.

## RESULT AND DISCUSSION

### Descriptive Analysis

Table 1 shows descriptive analysis, which shows that 58% of the sample have no children and 18% at least have one child and less than 2% have more than 4 children.

TABLE 1: DESCRIPTIVE ANALYSIS ON NUMBER OF CHILDREN IN THE HOUSEHOLD (15-49) – THE UK

<i>Number of children in the household</i>	<i>Frequency</i>	<i>Percent</i>
0	133,185	58.27
1	42,562	18.62
2	36,746	16.08
3	12,011	5.26
4	3,067	1.34
5	676	0.30
6	199	0.09
7	71	0.03
8	27	0.01
9 or more	12	0.01
Total	228,556	100

Table 2 presents that the sub-population in the age group of 30-34 has 14,183 children as compared to the subpopulation in the age group of 40-44 that has 13,049 children. The least number of children is from the age group 15-19 and 20-24.

TABLE 2: DESCRIPTIVE STATISTICS OF SUBPOPULATION BASED ON CHILD-BEARING AGE –THE UK

<i>No of Child/ Age interval</i>	<i>0</i>	<i>1</i>	<i>2</i>	<i>3-4</i>	<i>&gt;5</i>	<i>Total Children</i>
15 -19	16,649	614	52	7	0	673
20-24	16,471	3,045	1,356	341	5	4,747
25-29	11,035	4,877	4,392	1,685	89	11,043
30-34	5,532	3,904	6,622	3,409	248	14,183
35-39	3,498	3,269	7,318	978	105	11,670
40-44	4,207	4,453	8,061	334	201	13,049
45-49	5,239	5,018	4,709	1,572	92	11,391

### Poisson Model Analysis

The Pearson goodness-of-fit results indicate that the distribution of number of children significantly differs for a Poisson distribution due to the p value i.e. 1.000

(‘Prob.chi2’), which is above the standard threshold of 0.05. Therefore, Poisson regression is more appropriate for this particular data set.

TABLE 3: POISSON GOODNESS-OF-FIT TEST

Deviance goodness-of-fit	=	2749.60
Prob > chi2 (52817)	=	1.0000
Pearson goodness-of-fit =		3506.43
Prob > chi2 (52817)	=	0.9943

Based on the results of the model estimation in Table 4, the following findings have been gathered:

- The factors on inter-generational relationship are highly significant. However, the negative coefficient for spouse present in the household does not affect the decision on having children. The marital status coefficient variable is positive and significant, which suggests that being married is important to have children. According to Engle (1997), contribution to household income from fathers tends to be associated with improved child status. Female-headed and maintained households with children are generally poorer than families with a male head, although there is considerable variation depending on the social and economic context of the female heads.
- As per socio-economic factors, ownership shows positive sign but not significant. Education and occupation show negative sign and significant for education but only significant for legislator and elementary workers. These indicate that females with high rank position and education prefer to have fewer children. As per ownership, if the family secures a home, then only they decide to have more children. The estimated coefficient for education which is proxy for opportunity cost for a woman are negative and the coefficient increases as the education level increase. This result indicates that as the opportunity cost of raising children increases, household prefer less children.
- For child-bearing age, the results show the negative sign at the age of 20-29 and with positive sign at the age of 30-49 and significant. These suggest that as women mature they are ready for more children. For the region coefficient, people who live in London prefer to have more children than outside London and as per the race only Buddhist show positive and significant sign.

Table 5 presents the marginal effect analysis after Poisson. It is calculated as the partial derivatives,  $dy/dx$  where  $\hat{a}_i$  is the expected number of children in the household. The interpretation of the Table 5.16 is as below and only significant for six variables.

TABLE 4: SPECIFICATION RESULT OF POISSON REGRESSION

<i>No of child</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>z</i>	<i>P&gt;  z </i>
constant	-1.731	0.257	-6.74	0.000
Ownership	0.114	0.063	1.81	0.071
Region	0.083	0.047	1.76	0.078
Spouse	-0.373	0.083	-4.49	0.000
<b>Age</b>				
15 -19	0.067	1.005	0.07	0.947
20-24	-1.803	0.327	-5.51	0.000
25-29	-0.574	0.114	-5.02	0.000
30-34	0.549	0.08	6.83	0.000
35-39	0.923	0.075	12.15	0.000
40-44	0.975	0.076	12.83	0.000
45-49	0.902	0.083	10.85	0.000
<b>Marital Status</b>				
Married	1.714	0.107	16.01	0.000
Divorced	1.463	0.114	12.82	0.000
Widowed	1.753	0.168	10.4	0.000
<b>Education</b>				
Level 2	-0.315	0.087	-3.61	0.000
Level 3	-0.138	0.046	-2.97	0.000
<b>Religion</b>				
Muslim	0.508	0.105	0.48	0.631
Buddhist	0.370	0.124	2.97	0.003
Hindu	-0.305	0.216	-1.41	0.157
Christian	0.286	0.137	2.09	0.037
<b>Occupation</b>				
Legislator	-0.750	0.220	-3.40	0.001
Professional	-0.458	0.211	-2.17	0.030
Technician	-0.524	0.223	-2.34	0.019
Clerks	-0.5	0.218	-2.29	0.022
Service worker	-0.298	0.236	-1.26	0.208
Skilled workers	-9.964	675.49	-0.01	0.988
Crafts	-0.324	0.412	-0.70	0.432
Operators	-1.045	0.615	-1.70	0.089
Elementary work	-0.241	0.320	-0.75	0.452

No of observation = 3750

LR chi2 (28) = 2482.34

Prob &gt; chi2 = 0.000



- a) An individual who is married has an expected number of children changes is 0.508 more than someone who is not married.
- b) For each child-bearing age, the expected number of children changes is more for age group 35-39 (32.6%) and 40-44 (35.9%). As for age 20-24, women are less likely to have no children (25 percent).
- c) In terms of occupation, only skilled workers show significant and less likely to have zero children (24.4 percent).

TABLE 5: MARGINAL EFFECTS AFTER POISSON REGRESSION – THE UK

<i>Variables</i>	<i>Nchild (0)</i>	<i>Variables</i>	<i>Nchild (0)</i>
Region	0.020	Age 25-29	-0.122
Ownership	0.028	Age 30-34	0.162
Spouse	-0.090	Age 35-39	0.326*
Married	0.508*	Age 40-44	0.359*
Divorced	0.732*	Age 45-49	0.334
Widowed	1.120	Legislators	-0.143
White	0.012	Professional	-0.116
Black	0.106	Technician	-0.103
Asian	-0.064	Clerks	-0.101
Indian	0.079	Services	-0.063
Education - Level 2	-0.067	Skilled Workers	-0.244***
Education - Level 3	-0.033	Crafts	-0.067
Age 15-19	0.016	Operators	-0.158
Age 20-24	-0.251*	Elementary Workers	-0.052

**Note:** \*\*\*=p<1%, \*\*=p<5%, \*=p<10%,

## CONCLUSION

Based on the research and testing in the previous section, some conclusions are obtained as follows:

- From the five demographic factors, three factors are significant which are age, spouse and marital status. Women at the age of 30-49 are positive and highly significant, which have influence on the size of the family in the UK. Having a spouse is also an important indicator; a negative sign reveals that without a spouse the household will limit their family size. Spouse and marital status is interrelated to each other. This finding proves that family institution is highly valued in the British community.
- As for socio-economic factors (house ownership, education, occupation), significant and negatively related are occupation and education. In determining the family size it does not associate with financial security of the family. As the women are educated and hold a higher-ranking position, they have influence on the family size.

The study can be concluded that the fertility level in the UK is directly influenced by demographic and socio-economic factor. Generally, the study confirms that more industrialized and economically developed societies have lower fertility than less developed societies. Also, more educated groups with higher incomes have lower fertility than less educated groups with lower incomes.

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