International Journal of Mathematics and Statistics Invention
(IJMSI) E-ISSN: 2321 – 4767 P-ISSN: 2321 – 4759
www.ijmsi.org Volume 5 Issue 8 || October. 2017 || PP-11-15

The Impact of Demographic Factors on Socio-Economic Development in Bangladesh: Logistic Regression Analysis

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ABUSTRACT: *Economic development is the primary objective of every nation in the world.The major objectives of planned development have been increased national income, rural development, self-sufficiency in food and increased industrial production.Economic growth contributes to higher employment and higher employment leads to the reduction of poverty. In order to fulfill the vision the Government has planned to economic development and poverty eradication within 2021.This study employed a statistical technique namely, logistic regression analysis. Logistic regression analysis has been used to find out the effects of the selected demographic factor on socio-economic development. We have seen that 61.7% rural peoples have monthly low expenditure and 20.4% urban peoples have monthly high expenditure. It is also seen that 52.9% illiterate peoples have monthly low expenditure and 34.5% highly educated peoples have monthly high expenditure. From the logistic regression analysis technique the independent variables education, wealth index, type of place of residence, husband or partner's occupation, respondent's occupation, type of toilet facility, type of cooking fuel, husband or partner's age, household has: mobile phone, electricity, motorcycle or scooter and monthly total income have significant effect on monthly total expenditure.*

Keywards*: Economic development, Demographic factors Impact factors and Logistic regression*

Date of Submission: 20-10-2017 Date of acceptance: 04-11-2017

I. INTRODUCTION

In 1991, with the reinstitution of elected government, a new economic program was initiated that included financial sector reform and liberalization measures to encourage investment, government revenue improvement efforts (realized largely through implementation of a value-added-tax), and tight monetary policy. Income transfer measures, Food-for-Work, and other programs were also implemented to help protect the poorest segments of the population from the transitional effects of structural reform.

Steady economic growth, strong inflow of remittances, controlled population growth, stable exchange rate helped improve per capita income of Bangladesh. The recent rebase of national accounting estimates also provided a lift (by about 15 per cent). As a result, the country is likely to be included in the lower-middle-income country list prepared by the World Bank. It may be recalled that the World Bank reviews the income criteria list on 1 July of every year. For the current 2015 fiscal year, lower-middle-income economies are those with a GNI per capita of more than USD 1,045 but less than USD 4,126 (calculated in Atlas method3). It is expected that for the fiscal year 2016, the threshold may be raised to some extent, as it has been the case in past years. The new review will consider the per capita income (in Atlas method) for FY2014. In nominal terms, according to the new national accounts estimates per capita income of Bangladesh was USD 1,084 which could give Bangladesh a good chance to be enlisted as a lower-middle-income country.

Objectives of the study

The main purpose of the study is to investigate the impact of demographic factors on socio-economic development. The population and economy are two important factors of a country. Economic growth contributes to higher employment and higher employment leads to the reduction in poverty based on three factors. Growth factor refers to the expansion of production potential of the economy that is represented by an upward shift of the production possibility frontier. Elasticity factor- an upward shift of the production possibility frontier enhances the employment potential (improved quality and quantity of employment).

Methods of Creating Dependent Variables

To estimate "The associated demographic factors that significantly affected on socio-economic development of Bangladesh" we have extracted 2381 individual respondents from Bangladesh Demographic and Health Survey (BDHS) 2014. The dependent variable used in this analysis was not found directly from the

BDHS data set which is supposed as a dichotomous variable, such as monthly total expenditure less than ten thousand taka assigns 0 and greater than ten thousand taka assigns 1.

Independent Variables

A great deal of independent variables is considered in this study. All the independent variables used in the analysis were not found directly from the BDHS data set. Again for the convenience, we computed some new explanatory variables and transformed some original and computed variables that are suitable for study. They were recorded into homogeneous sub-groups where necessary. Some other variables remain unchanged. Most of the variables are coded as categorical and some are in dummy. Above twenty-seven explanatory variables are included and examined in this study. All independent variables, we can broadly classify into three groups. These are:

I. Demographic variables
II. Socio-economic variables
III. Cultural variables

Demographic Variables

The explanatory variables that summarize the demographic behaviors of the respondents are treated as demographic variables. In this study the demographic variables that are used to analysis:

IV. Respondent's current age
V. Husband/partner's age

Socio-economic Variables

The variables which reflect the social and economic status of any community are known as socio-economic variables. These variables are important in any demographic studies. The following socio-economic variables are examined in the analysis:

VI. Education
VII. Main floor material
VIII. Main wall material
IX. Main roof material
X. Type of cooking fuel
XI. Husband/partner's education level
XII. Husband/partner's occupation
XIII. Respondent's occupation
XIV. Monthly Total Income

Cultural Variables

XV. Type of place of residence
XVI. Type of toilet facility
XVII. Household has: mobile phone
XVIII. Household has: electricity
XIX. Household has: television
XX. Household has: motorcycle/scooter

Logistic Regression Analysis Approach

Logistic regression method was also performed to identify significant determinants of socio-economic development in Bangladesh. Logistic regression is used to model the relationship between a binary response variable and one or more predictor variables, which may be either discrete or continuous. There are a variety of multivariate statistical techniques that can be used to estimate a binary dependent variable from a set of independent variables. Multiple regression analysis and discriminate analysis are two related techniques but these techniques are applicable only when the dependent and independent variables are measured in interval scale under the assumption that they are normally distributed. However, in most applications, dependent variable may be dichotomous one and one or more explanatory variables are qualitative or measured in nominal or ordinal scales and the assumption of normality is violated. To solve this problem, a very interesting and appropriate technique is the logistic regression method. Cox (1958) is the pioneer of logistic regression model. Subsequently this model was developed by worker and Duncan (1967) and Cox (1970). More recently Lee (1980) and Fox (1984) have further modified the Cox's model.

Table: Results of logistic regression analysis for the simultaneous effect of all factors in the model of monthly total expenditure in Bangladesh.

Variable							**95% C.I. for OR**	
	β	**S.E.**	**WaldTest**	**df**	**p-value**	**Odds Ratio**	**Lower**	**Upper**
Place of residence								

Rural	1.224	.312	15.372	1	.000	.294	.159	.542
Household has: mobile phone								
Yes	.091	.203	.198	1	.025	1.095	.698	1.630
Household has: electricity								
Yes	-.089	.218	.167	1	.034	.915	.596	1.403
								Household has: television
Yes	.289	.284	1.033	1	.309	1.335	.765	2.331
Household has: motorcycle/scooter								
Yes	.804	.214	14.080	1	.000	.448	.294	.681
Wealth index								
Poorest(ref)			23.537	4	.000			
Poorer	.617	.311	3.947	1	.047	1.854	1.008	3.407
Middle	.606	.424	2.047	1	.033	1.834	.799	4.209
Richer	-1.029	.582	3.131	1	.077	.357	.114	1.117
Richest	-.195	.836	.055	1	.815	.823	.160	4.231
Husband/partner's education level								
No education(ref)			11.517	3	.009			
Primary	.621	.249	6.226	1	.013	1.860	1.142	3.028
Secondary	.680	.274	6.145	1	.013	1.973	1.153	3.378
Higher	-.271	.484	.313	1	.126	.763	.295	1.971
Type of toilet facility								
Flush to septic tank(ref)			12.103	5	.033			
Ventilated improved pit toilet	.491	.447	1.208	1	.272	1.634	.681	3.921
Pit toilet with slab	.672	.450	2.234	1	.135	1.958	.811	4.728
Pit toilet without slab	1.287	.470	7.499	1	.006	3.623	1.442	9.103
Hanging toilet	1.518	1.061	2.047	1	.153	4.561	.570	36.480
Others	.358	.586	.374	1	.541	1.431	.454	4.512
Main floor material								
Earth, Sand(ref)			8.191	2	.017			
Cement	.921	.482	3.649	1	.046	2.511	.976	6.457
Others	3.986	1.628	5.996	1	.714	53.818	2.216	1307.305
Type of cooking fuel								
Wood(ref)			40.108	4	.000			
Agricultural Crop	-.842	.243	12.013	1	.001	.431	.268	.694
Animal Dung	-1.366	.326	17.616	1	.000	.255	.135	.483
Natural Gas	1.641	.489	11.275	1	.001	5.159	1.980	13.442
Others	-.854	.575	2.207	1	.037	.426	.138	1.313
Husband/Partner's Occupation								
Farmer(ref)			20.411	5	.001			
Agricultural Worker	.808	.367	4.850	1	.028	2.243	1.093	4.602
Rickshaw Driver	.396	.384	1.064	1	.002	1.486	.700	3.157
Taxi Driver	1.005	.313	10.350	1	.001	2.733	1.481	5.043
Small Businessman	.503	.323	2.416	1	.020	1.653	.877	3.117
Others	1.393	.343	16.511	1	.000	4.027	2.057	7.885

II. RESULTS AND DISCUSSION OF LOGISTIC REGRESSION ANALYSIS

The monthly total expenditure is a dichotomous numeric variable, we have tried to find out the significant factors affecting on economic development through binary logistic regression model.

The result of logistic regression analysis are presented in Table, presents the estimate of the logistic regression coefficient (β), S.E, Wald Test, p-value, Odds ratio that are calculate for each of the categorical variable. According to the fitted model, there are ten variables appear as the significant predictors in case of monthly total expenditure. Such variables are type of place of residence, household has: mobile phone, household has: electricity, household has: motorcycle/scooter, wealth index, husband/partner's education level, husband/partner's age, main floor material, type of cooking fuel, husband/partner's occupation have the significant effect on monthly total expenditure. On the other hand, respondent's current age, household has: television, education, monthly total income, type of toilet facility, main wall material, main roof material, respondent's occupation have insignificant effect monthly total expenditure.

Type of place of residence has been appeared as a significant factor affecting monthly total expenditure negatively. The odds ratio of type of place of residence is .294 with 95% confidence interval (.159, .542). It indicates that monthly total expenditure will be .294 times lower for those respondents who live in urban rather than those respondents who live in rural (reference category).

Household has: mobile phone has also most significant effect on monthly total expenditure positively. The odds ratio of household has: mobile phone is 1.095 with 95% confidence interval (.698, 1.630). It indicates that monthly total expenditure will be 1.095 times higher for those respondents who have mobile phone rather than those respondents who have no mobile phone (reference category).

Household has: electricity has been appeared as significant factor affecting on monthly total expenditure negatively. The odds ratio of household has: electricity is .915 with 95% confidence interval (.596, 1.403). It indicates that monthly total expenditure will be .915 times lower for those respondents who have electricity rather than those respondents who have no electricity (reference category).

Household has: motorcycle/scooter has also most significant effect on monthly total expenditure positively. The odds ratio of household has: motorcycle/scooter is .448 with 95% confidence interval (.294, .681). It indicates that monthly total expenditure will be .448 times higher for those respondents who motorcycle/scooter have rather than those respondents who have no motorcycle/scooter (reference category).

Husband/partner's education level has also come out as a most significant factor affecting monthly total expenditure positively but higher education level is not significant at all. The odds ratio of husband/partner's education level are 1.860 and 1.973 with 95% confidence interval (1.142, 3.028) and (1.153, 3.378) respectively, which indicate that monthly total expenditure are 1.860 and 1.973 times higher for those husband/partner's have primary and secondary education than those husband/partner's have no education (reference category).

Husband/partner's age level has also come out as a most significant factor affecting monthly total expenditure positively. The odds ratio of husband/partner's age are 7.692, 6.317 and 4.940 with 95% confidence interval (2.939, 20.132), (2.235, 17.856) and (1.587, 15.460) respectively, which indicate that monthly total expenditure are 7.692, 6.317 and 4.940 times higher for those husband/partner's whose age group 26-34, 35-43 and 44 & above than those husband/partner's whose age group ≤25 (reference category).

Main floor material has also come out as a most significant factor affecting monthly total expenditure positively but others is no significant at all. The odds ratio of main floor material are 2.511 with 95% confidence interval (.976, 6.457) respectively, which indicate that monthly total expenditure are 2.511 times higher for those respondents whose house floor material cement than those whose house floor material earth & sand (reference category).

Type of cooking fuel has also come out as a most significant factor affecting monthly total expenditure positively. The odds ratio of type of cooking fuel are .431, .255, 5.159 and .426 with 95% confidence interval (.268, .694), (.135, .483), (1.980, 13.442) and (.138, 1.313) respectively, which indicate that monthly total expenditure are .431, .255, 5.159 and .426 times higher for those respondents are using agricultural crop, animal dung, natural gas and others than those who are using wood (reference category). Husband/partner's occupation has also come out as a most significant factor affecting monthly total expenditure positively.

III. SUMMARY AND CONCLUSION

The study shows that 73 percent of households in Bangladesh have access to electricity, either from the national grid or solar power connections. Independently, the national grid covers 62 percent of households all over the country, with more coverage in urban areas (91 percent in urban and 51 percent in rural areas)(BDHS 2014).

Earth and sand are the most common flooring materials used in Bangladesh (68 percent). These materials are predominantly used in rural areas (82 percent), while in urban areas the most common material is cement (61 percent). The proportion of households in Bangladesh that have earth and sand flooring has gradually declined from 81 percent in 2007to 74 percent in 2011 to the current rate of 68 percent. Most Bangladeshi households (85 percent) use tin as roofing materials. Nine in ten rural households and seven in ten urban households use this roofing material. In addition, about three in ten urban households use cement as roofing material.

Possession of mobile phone has continued to increase, from 78 percent in 2011 to 89 percent of households in 2014. The increase is mainly due to a larger increase of mobile phone ownership in rural areas (from 75 percent in 2011 to 87 percent in 2014) than in urban areas (from 89 percent in 2011 to 93 percent in 2014). Four out of ten households have a television set. Urban households are more likely to possess a television (71 percent) than rural households (33 percent). Ownership of radio has decreased from 8 percent in 2011 to 4 percent in 2014, while ownership of a television has increased from 40 percent to 44 percent at the same time. Ownership of a motorcycle is slightly higher in urban areas (8 percent) than in rural areas (6 percent).

Based on the findings of the study, we can conclude that income of individual respondents is increasing and the expenditure of individual respondents is also increasing. Hence, the contribution of women in family is also increasing day by day. To ahead the country's position economically we have to increase women's empowerment just like other developed countries. We have to increase our GDP growth and it is based on agriculture, industry, manufacturing and services. We need to improve conditions of these sectors for increasing GDP. The increasing trend of development is remarkable in recent years in Bangladesh. After all, the development of our country is increased gradually with the comparison of other developed and developing countries.

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