

## **An Empirical Investigation between Foreign Aid and Fertility Rate among Women in Bangladesh**

Shahtaj Mahmud<sup>1</sup>, Maaesha Nuzhat Nazmul<sup>2</sup> and Sakib Bin Amin<sup>3</sup>

*Bangladesh is an emerging third world country. The country has potential to develop a great amount in the future; however, high poverty, low rates of literacy and a rapidly increasing population can hinder its development. The fertility rate of Bangladesh had dropped significantly in the early 1990s but it has plateaued ever since entering the third millennium. This might be of great concern to an evolving economy like Bangladesh. A great worth of foreign aid is flowing into the country every year to support its future development. Thus, it is crucial to analyze the effects of foreign aid on the fertility rate of Bangladesh. This paper looks critically at the relationship between foreign aid and fertility rate in Bangladesh over a span of 35 years. Augmented Dickey Fuller (ADF) test has been used to check for unit roots followed by co-integration tests. Finally, the Granger causality test has been performed to look for the direction of relationship. These tests have showed that a bi-directional causal relationship runs between the two variables.*

**Field of Research:** Economics

### **1. Introduction**

Bangladesh is a country considered to have a bright future. With a Gross Domestic Product (GDP) of 195.1 billion USD (World Bank 2015), our nation is an emerging economy expected to have a GDP growth rate of 6.5% (World Bank 2017) in the year 2017. Bangladesh is also widely regarded as a densely populated country. Foreign aid comes to aid regarding many development issues of Bangladesh. While the government of Bangladesh is expanding its infrastructure using a fair portion of foreign aid, how the already large population can be helped using foreign aid will be discussed in this paper.

A very basic definition of the term “foreign aid” is resources given from one country to another. While this is considered to be in form of goods, services, money, human resources etc., most well-known and acknowledged form remains Official Development Aid (ODA). We will be looking at a unique aspect in our paper- foreign aid and fertility. While it may not seem like a very obvious relationship at first glance, a deeper look will reveal that the case can be different. We are curious to know any direct or indirect relationship foreign aid might have to the fertility rate of women in Bangladesh.

---

<sup>1</sup> BS Student, Department of Economics, North South University, Dhaka, Bangladesh,  
Email: shahtaj.mahmud@gmail.com

<sup>1</sup> BS Student, Department of Economics, North South University, Dhaka, Bangladesh,  
Email: maaesha\_n@hotmail.com

<sup>1</sup> Assistant Professor, Department of Economics, North South University, Dhaka, Bangladesh,  
Email: sakib.amin@northsouth.edu

## Mahmud, Nazmul & Amin

As one of the biggest nations, the US Government provides assistance to over 100 countries around the world. Every dollar spent on each of those efforts is an investment in the future. When this aid is received by a country in need, their Purchasing Power Parity (PPP) is a major deciding factor of how much of a difference the amount received can make. \$1 (USD) can buy different baskets of goods in different parts of the world. This allocation of foreign aid

that is received, hence, becomes a crucial matter. Foreign aid can equip youth with education, job possibilities, and a reason to feel optimistic about their life; it contributes in creating more stable communities where girls are empowered and they can reinvest in their families and communities and support peacekeeping missions.

While above mentioned are some obvious implications that an economy can derive from proper utilization of foreign aid, especially if the economy in question is a promising developing nation like our motherland, a less realized one is that the fertility rate of the women of a nation will experience. Through our paper we are trying to find out that if there exists a link between foreign aid and fertility. In other words, we are trying to see if there is a relationship between foreign aid and population growth. And, if we conclude that there is in fact a relationship between the two, we would like to analyze if that is likely to have positive or negative effects on the economy.

First and foremost, increased fertility translates to increased population- for a country like Bangladesh that is a less than ideal situation. Bangladesh is one of the most densely populated countries not only in the South Asian region but in the world. As off this year there are approximately 164, 450, 324 people in Bangladesh (Worldometers 2017). If foreign aid increases population growth in the recipient countries, it may thus not only directly lead to the expansion of the poor populations, but, as follows from the standard theory on the link between population growth and economic growth, it may also indirectly lead to their further impoverishment.

The population growth in Bangladesh had decreased from 1990 because of use of contraception. However, the population growth rate is still very high for Bangladesh. The population will likely reach 251.45 million in the year of 2061 if the fertility rate remains the same (BBS 2015). 31.5 % of the population of Bangladesh is living below the national poverty line which is higher than its neighboring countries like Nepal, Bhutan, India and Sri Lanka (Asian Development Bank, 2016). In fact, poverty in Bangladesh has become more pronounced rising from 40 million people in 1981 to 77 million in 2005 (Bauer et al 2008).

We understand that the country immediately needs to address its population growth rate if it wants to witness sustainable economic growth which serves as a motivation behind this paper. Robert Solow in his growth model had mentioned that a high population growth rate would lead to a reducing capital stock. Decreasing capital accumulation will in turn result in decreased economic output thereby affecting the economic growth of a country. Not to mention, Ashraf et al. (2013) had noted that a reducing fertility rate might result in economically significant rising per capita income.

A comparison with some other nations will help put the idea of fertility rate in perspective. In Bangladesh, the fertility rate of women stood at 2.18 births per

## Mahmud, Nazmul & Amin

woman in the year 2014 (World Bank 2015). During the same year, 2.08 births per woman in Sri Lanka, in Myanmar it was 2.20 births per woman; 2.43 births per woman in India and 3.28 births per woman in Pakistan. Bangladesh is yet to reach its *Replacement Level Fertility*, i.e., the number of children per woman that will enable a population to exactly replace itself from one generation to the next.

While the rate at which the population is growing in Bangladesh currently is not one that is unacceptable, 1.2 % annual change (World Bank 2015), Bangladesh is still a densely populated country. *The Malthusian Trap*, as said by Thomas Robert Malthus, states that if the population keeps on growing, it will eventually reach a stage when the food supply to feed the entire population will be inadequate. However, the situation can be helped; proper technological advancements can enhance the standard of living. This is where financial aid can make a difference.

ODA is used as a proxy for foreign aid in this study, was developed by the Development Assistance Committee (DAC) of the OECD in order to measure aid. While the governments of the aid receiving countries and the donors have taken necessary steps in attempts to make the implementation of aid effectiveness more successful over the years, more often than not, foreign aid is also thought to be wasted. A huge level of inefficiency and corruption can be expected to exist here and this is why it's an area of concern. We believe that using the aid given to Bangladesh can not only help us attain all our goals as a developing country but also make ourselves recognized as highly motivated and united in building an exemplary nation.

To the best of our knowledge, a research investigating a plausible relationship between foreign aid and fertility rate of the women in Bangladesh has not been conducted yet. As we have identified this research gap, we want to use the resources available at our disposal to identify whether this relationship exists, and if it does, the extent to which it will affect the future of Bangladesh. The results of this research will lead to new findings which can be utilized for developing the economy of Bangladesh sustainably. A causal relationship between the two variables may come with positive or negative effects on the economy or both. By proving that such a relationship exists, Bangladesh will be more equipped in handling its actively growing population.

Two questions we seek the answer to are as follows:

1. To examine the long run co-integrating relationship of foreign aid and fertility rate in Bangladesh.
2. To detect causal relationship between the variables

Our paper is based on similar studies conducted in other countries and the data of foreign aid and fertility rate over the last 35 years. It is different because we look solely at the variables in terms of Bangladesh and such a relationship has not been looked at before. Our purpose is to learn more about the two variables as independent and dependent and lay the ground work for further, more advanced research, in the future. The paper continues with section 2 looking at a review of the literature while section 3 follows with a brief scenario of foreign aid and fertility rate in Bangladesh. The rest of the paper contains methodology and data set, results, policy recommendations, conclusion and references from sections 4 to 8 respectively.

## **2. Literature Review**

Dao (2012) studied the co-relation between population growth and economic growth by examining data from 43 developing countries. Population growth rate has a linear and negative relationship with per capita income. The expansion of economy in China by reducing its fertility rate from 5.8 to 2.2 births can be used as an example. Moreover, Dao also mentions that a decline in fertility rate is not a significant factor to examine economic growth when dependency ratio is taken into consideration.

Klasen et al (2007) had looked upon the link of economic growth, poverty and population growth in Uganda using panel data. Uganda had achieved a significant growth in economy and reduction in poverty by having one of the highest population growth rates in the year 2007. By using macro and microeconomic approaches, this paper concluded that a high population growth rate could be a hindrance to Uganda's improving economic growth. Since Uganda is also a developing country, the patterns in seen in Bangladesh might be similar to Uganda. Thus, this tells us that Bangladesh's growing population might also serve as a hindrance to its prospering economy.

According to Azarnert (2009), during the 1990s, foreign assistance averaged over 10% of GNI in nearly two-thirds of the countries of the region (World Bank 2001). At the same time, the sub-Saharan African population has been growing faster than that of any other major world region. In the mid-1990s, African population was growing by about 2.7% per year. This goes against our assumption that foreign aid can lead to a smaller population growth size.

A study conducted by Rashid et al. (2014) looked at the long run and short run impacts of foreign aid and family planning programmes from the year 1973 till 2011 in Pakistan. With the help of ARDL and ECM techniques, it was found that female education is negatively related to fertility rate in Pakistan which meant foreign aid did have a negative relationship with fertility rate. The opportunity cost of spending time behind a child is higher for an educated woman compared to a woman with no education. Thus, it was identified that family planning programmes were inefficient. To control the fertility in Pakistan, the governing body should instead invest time on educating women.

Similarly, another study conducted by Ahmad et al. (2014) investigated the relationship between foreign aid specific to health and education and fertility rate in women in Pakistan. This paper revealed that foreign aid to education had a statistically significant negative impact on fertility using time series data between 1973 and 2012. In contrast, foreign aid denoted for health did have a negative effect on fertility; however, this relationship was statistically insignificant. On the other hand, Cuberes and Kevin (2011) had found an empirical relationship between foreign aid and fertility rate. Foreign aid, specifically social sector aid but not economic aid, had a positive relationship on the quantity of children borne, thereby, postponing the demographic transition.

Bahar (2009) used panel data from developing countries to study the relationship between foreign aid and fertility in order to measure the effectiveness of foreign aid inflows. It was found that a point increase in foreign aid in the total share of GDP could lead to an additional child for 22 child bearing women. This study focused on

## **Mahmud, Nazmul & Amin**

the proper allocation of foreign aid across developing regions so that the impact of foreign aid inflows on economic growth can be measured accurately. A study conducted by Kemal et al. (2016) in Islamabad, Pakistan looked at the association of foreign aid on primary, secondary and tertiary education. It was found that foreign aid had a positive effect on primary school enrolment. However, it does not play a part in secondary or tertiary school enrolment.

Akmam (2002) had looked at the relationship between female education and fertility rate in developing countries. This study looked closely at Bangladesh as the country achieved a significant decline in fertility with a poor female literacy rate. Thus, this study pointed out that education does have an effect on women's autonomy in household matters. Through this autonomy, education can have an impact on fertility. The greatest negative effect of education on fertility is at secondary levels. The effect of primary education on fertility can vary from one social setting to another. A study by Mine (2013) in Turkey made use of compulsory schooling law as a variable and showed that one year of additional schooling can reduce up to 0.003 teenage births. The reduction in fertility from education is more pronounced when the initial fertility rate is high in low population density areas. Moreover, compulsory schooling law can delay marriages by encouraging education among girls.

It is evident from the above literature that no exclusive study was conducted in Bangladesh linking foreign aid and fertility rate. Moreover, no empirical study has been conducted using the two variables in lower middle income countries. A causal relation between the two variables with help policy makers steer Bangladesh towards economic sustainability. We are expecting to find negative relationship between the two variables, that is, foreign aid can help downsize the fertility rate in Bangladesh through an increase in education and emancipation of women. Existing literature shows mixed results. It is evident that the relationship is country specific. Thus an in-depth analysis in country specific data can help us answer our questions accurately.

### **3. Scenario in Bangladesh**

With its current population of about 164 million, Bangladesh has already been named the 9<sup>th</sup> most populated country in the world. Bangladesh's population contributes to 2.18% of the world's population. The proportion of Bangladeshi population in the world is quite a lot compared to the country's size. The country witnessed an outstanding decline in total fertility rate (TFR) between 1971 and 1996. Between the years 1971 and 1995, women had an average TFR of 6.3 births. By the end of the year 1994, the TFR had dropped to 3.4 births per woman. The decline in fertility was highly needed because the country experienced both high infant and maternal mortality rate.

The sharp decrease in the fertility rate of Bangladeshi women over a span of 20 years has been used as an example of successful family planning all over the world. Lack of education and good quality health services were the main reasons behind a high maternal mortality rate. Similarly, a high infant mortality rate prevailed because lack of nutritional resources and disease outbreak. Bangladesh's traditional and conservative nature made it common among women from different backgrounds to want large families. The main challenges of the family planning program in 1975 included absence of family planning knowledge and resources. The first step of the program was the deployment of female outreach officers. Women had limited

## Mahmud, Nazmul & Amin

mobility after the liberation war, thus, continued visits from female outreach officers with contraception and information quickly put the notion of smaller family into women's minds.

Female welfare officers walked from door to door and provided reproductive women with information and condoms. The female outreach officers visited each house every two months to follow-up. The women of the country were interested in family planning; however, they could not do much if their spouses objected to using contraceptive methods. A new approach was taken to change the mindset of men in the country. A mass media campaign was planned targeting male audiences to open up about contraception. This resulted in increased use of contraception over the years. The second stage of the program was to make contraceptive provisions available to families. The program then proceeded to opening up family planning clinics in rural areas where permanent or long time sterilization options were offered. Finally, the fourth stage of the program was to communicate, inform and educate the people about family size and contraception.

The success behind a declined fertility rate was the use of contraception which increased from 7% in 1975 to 54% in 2000 (Mitra et al. 2001). Despite rising contraceptive use, the decrease in fertility rate among Bangladeshi women has halted. The TFR remained over 3 even though the contraceptive prevalence rate had increased from 44.6% between 1993 and 1994 to 53.8% between 1999 and 2000 (World Health Organization 2016).

Availability of educational services among women can highly affect fertility rate. Women with access to education tend to have a lower number of children compared to women with no education in both developed and developing countries. Similarly, the fertility rate in women with five years of schooling is 2.4 births. This number is higher for women without secondary education. In the same way, women with no education have a 1 or two children more (Rahman et al. 2003)

The Millennium Development Goals (MDGs) 2008 progress report has shown that Bangladesh needs to work on a few MDGs. The country is on track when it comes to hunger, net enrolment in primary education, child mortality reduction, improvement of drinking water supply and control on diseases like malaria and tuberculosis. However, the country needs to focus more on primary education completion and adult literacy rates. It also needs to put emphasis on wage employment for women, forest coverage, and increase in knowledge for HIV and coverage of ICT (Keane et al., 2010). According to the Bangladesh Progress Report (2015), primary school enrolment increased from 83% in 2000 to 91% in 2015. On the other hand, the percentage of pupil attending grade 1 to 5 increased to 81% in 2014. However, the number of female students attending secondary school is not improving like the former figures. From previous literature, we found that secondary education can have a greater effect on fertility rate.

After the Liberation War, the independent Bangladeshi economy was in a bad state. Industrial production had come to a halt and agricultural production was declining rapidly. As a result, foreign aid started to flow in to revive the country. The aid allocated in the early years of independence mostly comprised of food and disaster reliefs. Over the years, the composition of foreign aid flowing into the country changed. As agricultural production rose and the country became self-sufficient in

food, food aid has virtually disappeared (Quibria 2010). Foreign aid is divided into food, commodity and project aid. Since the percentage of food aid and commodity aid fell, the share of project aid in net ODA increased over the years.

In the year of 1972, Bangladesh received a net official development assistance of about 223 million. This amount rose to 2.09 billion in 1990. However, after 1990, the amount net flow of ODA to Bangladesh started to fall. With fluctuations, Bangladesh received an overall ODA of 900 million in the year 2000. The country had experienced an overall increase in ODA from 2001 till 2015 (World Bank 2016).

#### **4. Methodology and Data Set**

Our paper aims to look at the nature of relationship between foreign aid and fertility rate and thus time series data from 1980 to 2015 of Total fertility rate (births per woman) and Official Development Aid Received has been taken to study this relationship. To check for stationary variables, the existence of unit root has been tested. Macro and financial variables are popular for being non-stationary. Thus, the Augmented Dickey fuller test has been performed to check for the existence of unit root. One of the variables is found to be non-stationary at levels test and thus regression is not possible without making them stationary. Moreover, co-integration test is performed to check for possible linear combinations among stationary variables since it is standard in most empirical studies. If co-integration can be found then we will run Granger Casualty test to check the probable direction of causality.

In a time series analysis, existence of non-stationary data can possibly lead to deceptive regression unless there is at least one co-integration relationship. For co-integration, the Johansen procedure can be applied. The Johansen procedure provides a combined framework for testing and estimating co-integration relations in the context of Vector Autoregressive (VAR) error correction models. To apply this approach, an Unrestricted Vector of Autocorrelation of this form needs to be estimated:

$$\Delta x_t = \alpha + \theta_1 \Delta x_{t-1} + \theta_2 \Delta x_{t-2} + \theta_3 \Delta x_{t-3} + \dots + \theta_{k-1} \Delta x_{t-k+1} + \theta_k \Delta x_{t-k} + u_t \quad \text{--- (i)}$$

Where  $\Delta$  is the difference operator,  $x_t$  is a  $(n \times 1)$  vector of non-stationary variables (in levels) and  $u_t$  is also the  $(n \times 1)$  vector of random errors. The matrix  $\theta_k$  contains the information on long run relationship between variables. If the rank of  $\theta_k = 0$ , the variables are not co-integrated. On the other hand, if rank (usually denoted by  $r$ ) is equal to one, there exists one co-integrating vector and finally if  $1 < r < n$ , there are multiple co-integrating vectors.

Johansen and Juselius (1990) have derived two tests for co-integration. Those are the trace test and the maximum Eigen value test. The trace test assesses the null hypothesis with at most  $r$  co-integrating vectors. On the other hand, the maximum Eigen value test looks at the null hypothesis which has exactly  $r$  co-integrating vectors in  $x_t$ .

Narayan and Smyth (2006) argues that “in spirit of the bounds test, a model with a time trend is invalid because for the model to be valid there should be only one long run relationship. If someone includes time trend in the model one may end up with more than one possible co-integration relationship: one with a time trend and one without a time trend”. However, in this very study, the time trend has been included just to check whether the co-integration tests are sensitive towards trend.

The co-integration analysis says that there is at least one direction of causality when two variables are co-integrated. The Granger-causality introduced by Granger (1969, 1980, 1988) studies empirical macroeconomics and finance. Engle and Granger (1987) have indicated that the presence of non-stationary variable can result in wrong conclusions in the Granger causality test. A causal long run relationship between non-stationary time series is only possible when the variables are co-integrated.

If  $y$  and  $x$  are the variables of concern, the Granger causality test determines whether current explanation of current values of  $x$  as provided by information in past values of  $x$  can be explained by past values of  $y$ . If past values of  $y$  does not explain current changes in the values of  $x$  then  $y$  does not Granger cause  $x$ . Similarly, investigation needs to be carried out whether  $x$  Granger causes  $y$  by repeating the process. Four likely outcomes are possible in the Granger causality test (1) neither of the two variables Granger cause each other, (2)  $y$  causes  $x$  but not otherwise, (3)  $x$  causes  $y$  but not otherwise and (4) both  $x$  and  $y$  Granger cause each other. In this study, the causality test between foreign aid and fertility rate will be conducted. To sets of equations will be estimated for conducting this study:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \dots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \dots + \beta_l y_{t-l} + u_t \quad \text{--- (iii)}$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \dots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \dots + \beta_l x_{t-l} + v_t \quad \text{--- (iv)}$$

For all possible pairs of  $(x, y)$  series in the group, the reported F-statistics are the Wald statistics for the joint hypothesis  $\beta_1 = \beta_2 = \beta_3 = \dots = \beta_l = 0$

As mentioned earlier, this paper looks at the long run relationship between foreign aid and fertility rate and the direction of causality. A simple relationship in this study has been used. All the econometrics results are available in the next chapter.

## 5. Results

Unit root tests have to be run in order to inspect the order of integration of the data series for all the variables. ADF statistics and corresponding critical values for all the variables in their level and first differenced forms are indicated in Table 1.



**Table 1: Augmented Dickey Fuller Unit Root Test for the Variables**

<b>Panel 1: Levels</b>			
	ADF Statistics (Only Constant)	ADF Statistics (Constant & Trend)	Decision
Fertility Rate	-5.339693	-0.578810	Stationary considering only constant however, non-stationary considering both constant & trend
Foreign Aid	-1.060797	-2.280557	Non-stationary
<b>Panel 2: First Differences</b>			
	ADF Statistics (Only Constant)	ADF Statistics (Constant & Trend)	Decision
Fertility Rate	-	-3.733057	Stationary considering constant & trend
Foreign Aid	-3.280557	-7.554850	Stationary
Note: All regression is estimated with and without trend. Selection of the lag is based on Schwartz Information Criterion (SIC).			

An important issue to consider while conducting the unit root test is to select an appropriate lag length. One approach is inclusion of a relatively long lag length and to select the model by the usual t-test. If the t-statistics using lag p comes out insignificant at some specified critical value then the regression could be estimated repeatedly using a lag length of p-1 until the lag becomes significantly different from zero. Different lags have been taken to check whether the variables are stationary. All lags yield homogeneous results which mean that fertility is stationary at level whereas the variable foreign aid is stationary in the first differenced form.

The unit root tests have non-standard and non-normal asymptotic distribution. This in turn is highly influenced by the inclusion of deterministic terms, for example, constant, time trend etc. The inclusion of an extraneous regressor like the time trend can decrease the power of the test. On the other hand, if true data generating process is trend stationary then failure of inclusion of a time trend can also lead to a reduction in the capability of the test. In addition, the loss in power because of exclusion of a time trend is more severe than a decrease in the power of the test due to including a time trend when it is extraneous (Lopez *et al.* 2005).

It is clear from the unit root tests that the variable 'Foreign Aid' is non-stationary in its level and stationary in the first difference although 'Fertility Rate' is stationary in its

## Mahmud, Nazmul & Amin

level and first difference. The above results also imply that the variables would yield false results unless the variables are co-integrated. These results, however, allow proceeding to the next stage of testing for co-integration. The Johansen co-integration test indicates that two series have one co-integrating relationship for both 1 and 2 orders of VAR. Both the maximal Eigen value test and the trace test indicated one co-integrating relationship at 95% significance level. The Johansen test result of this study is insensitive to the inclusion of intercept and/or trend. Results of Johansen test for co-integration (VAR order 2 and no intercept; no trend) is given in the following table:

**Table 2: Johansen Cointegration Test (Trace Test)**

	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>	<b>Statistics</b>	<b>95% Critical Value</b>	<b>Conclusion</b>
Fertility Rate and Foreign Aid	None	At most one	6.160117	3.841466	One Cointegrating Relationship

**Table 3: Johansen Cointegration Test (Maximum Eigen Value Test)**

	<b>Null Hypothesis</b>	<b>Alternative Hypothesis</b>	<b>Statistics</b>	<b>95% Critical Value</b>	<b>Conclusion</b>
Fertility Rate and Foreign Aid	None	At most one	6.160117	3.841466	One Cointegrating Relationship

As the main purpose of the study is to examine the causal relationship between the concerned variables, to avoid complicity, a simple equation has been regressed by omitting the other exogenous variables which has been reflected by a high coefficient and intercepts value. At the same time, the inclusion of other variables tend to give us more than one co-integrating relationships.

The relationship between foreign aid and fertility can either be uni-directional, bi-directional or it is even possible for the variables to have no causal relationship. The results of the test are shown in the table below:

**Table 4: Granger Causality Test**

Hypothesis	F-Statistics	P-Value	Granger Causality
Fertility rate does not Granger Cause Foreign Aid	4.77459	0.0164	Bi-directional Causality
Foreign Aid does not Granger Cause Fertility Rate	3.79526	0.3048	

The result from the Granger Causality Test indicates that a bi-directional causality runs between the two variables which is a bit different when compared with previous literature. Previous literature does not exclusively look at the situation in Bangladesh. Some of the literature gathered does in fact support that foreign aid can lead to a controlled population for Bangladesh. In addition to that the results gathered from this paper is further evidence that by contributing more foreign aid to social factors, the fertility rate among women can be further brought down to replacement level since the two variables share a bi directional relationship.

This paper has provided us with new knowledge regarding foreign aid and fertility rate. With this new knowledge, new policies can be created directed towards bringing in foreign aid which will automatically have an effect on fertility rate. On the other hand, policies directed towards a decrease in fertility rate will also affect foreign aid received.

## **6. Policy Recommendations**

After conducting our research, the hypothesis that a unidirectional relationship runs between foreign aid and fertility runs in Bangladesh can be rejected based on the empirical work in this paper. Towards the beginning of our research, we set out to find answers to two specific questions:

1. To examine the long run co-integrating relationship of foreign aid and fertility rate in Bangladesh.
2. To detect causal relationship between the variables

By conducting our research, we can now conclude that this paper identifies that a bi directional relationship exists between the two variables which can be significant in the long run. Furthermore, the result from the Granger Causality Test indicates that a bi-directional causality runs between the two variables. A major part of foreign aid is allocated towards projects. The Government should use more of foreign aid to address socio-economic development issues through NGOs so that fertility rate can be brought down to replacement level. Moreover, because of the existence of a bi-directional relationship, a decrease in fertility might be able to bring in more foreign aid for the country. If the women of the country are empowered and get involved in employment, donor countries will pay attention and give more aid.

Primary education is a Millennium Development Goal (MDG). For Bangladesh while the enrolment in primary education is still at an impressive rate, 90.509 % (World

## **Mahmud, Nazmul & Amin**

Bank 2015), the drop rate is also high. As a result, not as much people are pursuing secondary education. If a portion of foreign aid that goes into the development sector is invested in secondary education, the fertility rate can go down as secondary education will play a big role in empowering the women.

Foreign aid to projects that work with accommodation and job creation can also play a role of a change-maker. One major reason, families in the rural areas in countries like Bangladesh consist of many children because the parents believe their children will contribute in the income of the household- and they do from a very early age. In fact, for this reason, many families refrain from sending their children to school because they see it as a trade-off: the hours spent in school can be used as hours of labor. If enough jobs are created and accommodations are improved in the rural areas, parents will not feel this desperate need to extend their family in order to increase their standard of living.

This will also help the population density problem of Bangladesh. More than the rate of increase of population, the population density is the problem. In order to ensure that the distribution of population is made more or less even across the country and so that the rural to urban population is not unacceptable; a portion of the population migrates to metro cities like Dhaka because of dreams of jobs and more money. By giving them a chance to do that in their own cities, metro cities will become less populated and it will change the congestion too.

Finally, during the family planning programmes in Bangladesh, married women were supposed to receive a visit from a female welfare assistant every two weeks. However, after 1997, the number of visits has dropped. Female welfare assistants started visiting once a month. The project has shifted from door to door counseling to fixed site counseling. Visitations from female welfare assistants should start again since it had a high success rate in the past. Moreover, given the conservative nature of the country, a lot of women are not comfortable stepping out of their homes to discuss about their families. Pills are the most common type of contraception used in Bangladesh. However, women discontinue it after a couple of months. In fact, a lot of women are still using traditional contraception methods which have high failure rates. Thus, counseling should be provided so that better adoption and continuation rates can be achieved.

## **7. Conclusion**

The Organization for Economic Co-operation and Development (OECD) has defined the total fertility rate in a specific year as the total number of children that would be born to each woman if she were to live to the end of her child-bearing years and give birth to children in alignment with the prevailing age-specific fertility rates. Assuming no net migration and unchanged mortality, a total fertility rate of 2.1 children per woman ensures a broadly stable population. In comparison to this standard, the fertility rate of women in Bangladesh is very much close to the universally accepted rate. According to the OECD/World Bank, population in Bangladesh increased from 1990 to 2008 by 38% as opposed to 34% growth in India and 54% growth in Pakistan (World Bank 2009).

While the rate of population growth is not that high for Bangladesh, it is already a densely populated country; financial aid should be used to ensure a better living

## Mahmud, Nazmul & Amin

condition for those who are already suffering. Bangladesh doesn't need to adapt a scheme similar to China's "one child policy," however, with proper family planning techniques, the rate at which population is growing can still come down. If foreign aid is invested in a project that can spread knowledge about this among young couples, both in urban and rural areas, but mainly in rural, these women will be able to make educated decisions.

Relating back to the Malthusian Trap, the balance between food supply and population can be restored with the help of foreign aid. The proper technological advancements can enhance the standard of living and make people feel more financially stable, and make them feel more content with their lives and boost up their self-esteem and confidence. This paper has brought in new answers relating the variables foreign development aid and fertility rate for Bangladesh. We believe this paper can lay the groundwork for further research to be conducted in the future. By digging deep into this bi directional relationship, the government can come up with specific policies targeted towards bringing down the fertility rate further so that Bangladesh can grow sustainably. However, this research had some limitations. It is based on a bivariate model using a small sample size. In future, a multivariate model can be used to understand the newly discovered causal relationship in depth and expand the knowledge of the variables in perspective of Bangladesh and other aid accepting South Asian countries.

### References

- Ahmad, K, Ali, A & Chani, M.A 2014, 'Does Foreign Aid to Social Sector Matter for Fertility Reduction?', *An Empirical Analysis for Pakistan*, *Bangladesh Development Studies*, Vol. 37, No.4, Pp. 99-116.
- Akmam, W 2002, 'Women's Education and Fertility Rates in Developing Countries, With Special Reference to Bangladesh', *Eubios Journal of Asian and International Bioethics*, Vol. 12, No. 4, Pp. 138-143.
- Ashraf, QH, David NW& Wilde, J 2013, 'The Effect of Fertility Reduction on Economic Growth', *Population and Development Review*, Vol. 39, No. 1, Pp. 97-130.
- Asian Development Bank 2016, 'Basic Statistics Report', Asian Development Bank.
- Azarnert, LV 2009, 'Foreign Aid, Fertility and Population Growth: Evidence from Africa' Working Paper, Bar-Ilan University.
- Bahar, D 2009, 'Aid and Fertility' CID Graduate Student Working Paper Series No. 38, Center for International Development at Harvard University.
- Bangladesh Bureau of Statistics 2015, 'Population Projection of Bangladesh Dynamics and Trends: 2011-2061', Bangladesh Bureau of Statistics, Dhaka.
- Bangladesh Planning Commission, 2015, 'Bangladesh Progress Report', The Government of the People's Republic of Bangladesh
- Bauer, A, Hasan, R. Magsombol, R & Wan, G 2008, 'The World Bank's New Poverty Data: Implications for the Asian Development Bank', ADB Sustainable Development Working Paper Series Number 2, Regional and Sustainable Development Department, Asian Development Bank, Manila.
- Cuberes, D & Kevin, T 2011. 'Aid and Fertility: What Does the Cross-Country Evidence Show?' Working Papers 2011024, The University of Sheffield, Department of Economics.

## Mahmud, Nazmul & Amin

- Dao, MQ 2012, 'Population and Economic Growth in Developing Countries', *International Journal of Academic Research in Business and Social Sciences*, Vol. 2, No. 1, Pp. 6-17.
- Engle, R, & Granger C 1987, 'Cointegration and Error Correction: Representation, Estimation and Testing', *Econometrica*, Vol. 55, No. 2, Pp. 251-76.
- Granger, CWJ 1969, 'Investigating Causal Relations by Econometric Models and Cross- Spectral Methods', *Econometrica*, Vol. 37, No. 3, Pp. 424-438.
- Granger, CWJ 1980, 'Testing for Causality: A Personal Viewpoint', *Journal of Economic Dynamics and Control*, Vol. 14, No. 2, Pp. 329-352.
- Granger, CWJ 1988, 'Some Recent Developments in a Concept of Causality', *Journal of Econometrics*, Vol. 39, No. 1-2, Pp. 199-211.
- Johansen, S, & Juselius, K 1990, 'Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money', *Oxford Bulletin of Economics and Statistics*, Vol. 52, No. 2, Pp.169–209.
- Keane, J, Kennan, J, Cali, M, Massa, I & Velde, DWT 2010, 'Case Study for the MDG Gap Task Force Report', *Overseas Development Institute*.
- Kemal, MA & Jilani, A 2016, 'Impact of Foreign Aid in Education on Educational Outcomes', PIDE Working Paper Series, 139, Pakistan Institute of Development Economics
- Lopez, C, Murray, CJ & Papell, DH 2005, 'State of the Art Unit Root Tests and Purchasing Power Parity', *Journal of Money, Credit and Banking*, Vol. 37, No. 2, Pp.361-369.
- Mine, GP 2013 'The Impact of Female Education on Fertility: Evidence from Turkey' GCC Working Paper Series.
- Mitra, SN, Al-Sabir, A, Saha, T & Kumar, S 2001, *Bangladesh Demographic and Health Survey 1999-2000*, NIPORT, Dhaka, Bangladesh.
- Naryan, PK, & Smyth, R 2005, 'Electricity Consumption, Employment and Real Income in Australia: Evidence from Multivariate Granger Causality Tests', *Energy Policy*, Vol. 33, No. 9, Pp. 1109-1116.
- Quibria, MG 2010, 'Aid effectiveness in Bangladesh', Morgan State University.
- Rahman, M, DaVanzo, J & Razzaque, A 2003, 'When Will Bangladesh Reach Replacement-level Fertility? The Role of Education and Family Planning Services', Working Paper.
- Rashid, MK, Anwar, M & Torre, A 2014, 'Foreign Aid and Fertility : An Empirical Analysis for Pakistan', *World Applied Sciences Journal*, Vol. 29, No. 5, Pp. 660-666.
- World Development Indicators 2001, World Bank.
- World Development Indicators 2009, World Bank.
- World Development Indicators 2015, World Bank.
- World Development Indicators 2016, World Bank.
- World Development Indicators 2017, World Bank.
- World Health Organization 2016, 'Family Planning in South-East Asia: Factsheets', World Health Organization.