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# IMPACT OF FOREIGN DEBT ON GROWTH IN BANGLADESH: AN ECONOMETRICS ANALYSIS

**Poly Farhana**
Department of Economics
University of Chttagong, Bangladesh

**Md Niaz Murshed Chowdhury**
Research Assistant, Department of Economics
South Dakota State University, USA

**ABSTRACT:** *This paper tried to investigate the impact of foreign debt on growth in Bangladesh. The annual data series over the period 1972-2010 has been used. The study has been made by using the ARDL (Auto- Regressive Distributive Lag model) model to check the relationship of growth and debt. According findings there is a significant adverse effect of debt on growth in Bangladesh. In Bangladesh External debt service is a burden for its nation and it makes the GDP slows down. This study recommended that Bangladesh should find out any option of debt cancellation and must increase human development and more infrastructure development. It is also recommended that debt management should be effective and fair, and Exports, FDI and Remittances are helpful for the growth of Bangladesh.*

**KEYWORDS:** ARDL, foreign debt, Export, FDI, Remittance , cointegrartion test and unit Root

## INTRODUCTION

Conceptually External debt is a part of the total debt in a country that owed to lenders outside the country. The debtors can be the government, corporations and citizens of that country. It is said that external debt is an important financial tools and it is a powerful tool of an economy if it is used prudently in investment or development of a country. It can enhance investment levels and increase growth rate in the economy, if the debt servicing cost is low from the returns of the investment, if the cost is high it is slow the growth. Developing countries are facing deficient finance and it have encouraged them to borrow from developed countries, international organizations, and international finance institution. They mainly borrowed to boost their economic growth and for macroeconomic reason like higher investment, higher consumption and education, health. However all of country in the world may choose to go into foreign debt including infrastructure, development or economic stimulation. In 2009 the total external debt for all over the world is about $56.9 trillion (USD). Raising of modern civilization it is very reasonable to borrow money from mutual territories. And global use



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of external debt established many international institutions. Governments of generally in quantities incur external debt of a developing country by government's ability to repay.

External debt has an impact of growth. External debt fulfills the deficit of developing countries and also has negative effect the growth. The basic reason of negative effect is the restriction of donor agencies. In many other countries the effect is positive because the external debt will increase capital inflow and it is used for investment and can increase the growth. It will not only the accumulation of capital it also managerial, technological, technics experts for economic growth. In 1990 many policymakers and researcher increased their concern about high external debt in many developing countries limited growth. Many researchers also find out a non-linear relationship between growth and external debt. And this type of analysis increased the policy makers' attention about the impact of debt on growth.

In the past war period developing countries were diversify their economy from agriculture to industrial and they borrow a lot of finance. But industrial policy gave them poor return and at the same time agricultural price fall and leading to lower tax revenue. Another reason is oil crisis and oil price for borrowing. During last 50 years the external debt is a problem faced by developing countries. On the other hand external debt is related to many other economic components statistics show how it is growing and how it is affect any other components. A high level debt can cripple the government operations because debt burden is long term cost that cannot be reduce times of fiscal stress. According to the IMF Bangladesh ranked as the 47$^{th}$ largest economy in the world in 2010 in PPP terms and 57$^{th}$ largest in nominal terms with a gross domestic product of US$ 269.3 billion in PPP terms. But improvement outcomes are not quite good. Because Bangladesh has low savings, low investment depends on external sources, low income, depends on import goods, low export, political instability, unsustainable development.

In case of Bangladesh it has many problems like savings investment gap, budget deficient and so on and they borrow from internal and external sources to fill up gap. In fiscal year 2010-2011 total external debt of amount USD 21347.44 million that is 24.24% of GDP. Each year a major portion of its budget expenditure get expanded interest payment so the interest payment impact on growth negatively. From survey for unstable Exchange rate and overseas debt increased the countries per capita debt liability the by about $2.3 a year on average (2010). In 2008-2009 per capita debt obligation rises $151.21 where in 2003-2004 is $136.92 Zaid Bakth said that the debt obligation was rising without the citizens knowing why or how the loans are taken.
Figure 1: trend of external debt in Bangladesh



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Total debt service on external debt in US dollar. Bangladesh was last measured at 2012, according to World Bank. Total debt service is the sum of principal repayments and interest actual paid in foreign currency, goods, or services on long-term debt, interest paid on short –term debt and repayment to the IMF.

The portion of country's debt that was borrowed from foreign lenders, these loans including interest must usually be paid in the currency in which the loan was maid .in order to earn the currency the borrowing country may sell and export goods to the lenders country. External debt is borrowed from outside of the country. The external debt is a powerful tool if it is used prudently in investment or development of a country. It can enhance investment levels and increase growth rate in the economy, If the debt servicing cost is low from the returns of the investment .if the cost is high it is slow down the growth. These loans and interests are paid in the currency in which the loan was received. if the debtor country have a strong currency , this does not post a significant threat. This country will be able to pay the debt and service by successfully export goods. On the other hand external debt is too much burden for a weak economy with weak currency. Developing country cannot accumulation capitals as they needs to develop.

1. Aggregate savings are too small their. They cannot finance, as they need. Therefore its hamper the investment. The investment is necessary for a steady rise in productive efficiency.
2. Large source of capital. To enhance growth investment is necessary and the investment creates employment.
3. If the government have a budget deficit it has to borrow from abroad .when total government expenditure exceeds total revenue creates deficit.
4. External debt can help in resolving constraint in foreign resources for development. When the borrower inadequate domestic savings for large infrastructure project and it can enhance the growth There is some reason I given below that is responsible for external debt increase in developing country.



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1. in the post war period developing countries tried to diversify their economy from agriculture to industrialization. For industrialization and import substitution policy they borrow a lot of external debt.
2. in 1970 bank think that government of developing countries don't default. Citibank chairman Walter Wriston said that "lending to government was save ".so the banks were willing to pay.
3. In 1973 oil crisis hit hardly developing countries. They import oil and it is necessary for the industry .so the costs of oil they cannot afford and started borrow.
4. Oil price caused inflation and higher interest rate .so the higher % of interest on debt is hit the developing countries.
5. Industrialization and import substitution policies gave poor returns lack of sufficient skill labor. At the same time agricultural prices had fall and finally the fall in economic growth leading to lower tax revenue.

External debt is an important tool for financing infrastructure in recent year rapid expansion of the debt of developing countries has increased the importance the subject and it is related to many other economic components. Statistics shows how it is growing and how it is affects any other components. This type of questions is making importance this study. A high level debt can cripple the government operations because debt burden is a long term cost that cannot be reduce times of fiscal stress. Debt burden is shifting and welfare loss in countries. Developments studies suggesting developing countries external assets can fill the savings investment gap and it boost their growth. If debt size is too small it cannot effective or it is too large it can also to various economic problems. The donor agencies also impose many restrictions it is a burden for an economy it may causes negative effect. This study tries to establish a relationship between debt and growth. The particular objectives are given below:

1. To investigate the impact of external debt on economic growth in Bangladesh.
2. To figure out how external debt is burden for Bangladesh economy.
3. To investigate the debt sustainability and debt management policy in Bangladesh.
4. To find out the determinants of debt and how it differ from others country.

## LITERATURE REVIEW

Kasidi and Makame ( 2013) tries to examine the relationship of external debt and debt servicing on economic growth and also the long-run co-relation between debt and growth of Tanzania for the period (1990-2010). They concluded that the positive impact of debt on growth and negative impact of debt servicing on growth, and there is no long run relationship between them also no autocorrelation. They suggest that in future take an external debt that is highly sustainable and the rate of return of debt is higher than the service payment rate. The main policy implication is that the govt. should pay more attention to the debt management policy. Ali and Mustafa (2013) attempts to analyze the long run and short-run impact of external debt on economic growth by using time series data. Their result shows that debt impact on growth negatively, which is significant in short run as well as long run. They come up come a decision that external debt effect in Pakistan is permanent as



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well as transitory and the overhang happen in the short run and also long run. The negative effect of short run is stronger than the long run.

Ademola and Olaleye (2013) tried to investigate the relationship between external debt on sustainable growth over the period 1980 to 2010. They conclude that Nigeria debt service payments are a serious problem and it is a main hindrance to inflow of external resources. Because of Nigerians are not capable to pay debt service. Some external factors like World oil price shocks , rising real interest terms and decline terms of trade are deteriorate the external debt . Finally, they suggest that the Govt. should take steps to proper use of debt and address the problem about debt. Faioz (2012) argues that the developing countries are not capable to finance all of its developments expenditure that's why they borrow from external resources. Developing countries foreign debt effect on consumption and spending, savings , investment ,monetary policy. For this reason many countries are faces many problem. This crisis effected the LDCs deeply .But now many LDCs are trying to rid of this problem .Researcher also suggest that developed countries should help the developing countries to grow their economy.

Rahman and Bashar (2012) concluded that Bangladesh depends on external debt to fulfill the budget deficit and savings investment gap. They examined the relationship between external debt and GDP by using the data of period 1972-2010. They found a strong positive correlation between GDP and debt and results are statistically significant. Rabia Atique and Kamran Mallik (2012) compared the impact of external debt and domestic debt on the economic growth in Pakistan separately over period 1980 to 2010. They used OLS approach to cointegration, unit root test, serial correlation test, heteroskedasticity and CUSUM test. They found that external debt amount slows down economic growth more as compared to domestic debt amount. The reason is that debt servicing of external debt. Muzna Gohar, Niaz Ahmed Bhutto, Falahuddin Butt(2010) tried to review and analyze the impact of external debt serving on the growth and development of low income countries . They took annual panel data from 1990 to 2008 of thirty six low income countries and used least square multiple regression method with six variables i.e. growth, external debt servicing, interest rate, savings, net exports, foreign direct investment. Their analysis suggests that the external debt servicing has no direct impact on the growth itself rather it effect the other important factor which is directly responsible for growth and that is investment. They find that external debt servicing has a negative impact on the growth.

M.c. Ekperiware and S.I. Olade ji (2011) dissected the structural break relationship between external debt and economic growth from 1980 to 2009 in Nigeria. Debt relief in 2005 significantly reduces the external debt and external debt services in Nigeria. Nigerian exchange rate, education output, growth significantly developed by debt relief in 2005 as debt relief made resources available for economic growth in Nigeria. Chow test shows that there is a structural change during debt relief in 2005. They also argued that chow test method didn't give the sources of structural break and they recommended that debt relief is better for stable growth. By using panel data of 93 developing countries Catherine Pattillo et.al (2011) attempted to analyze the non-linear impact of external debt on growth. They got hump-shaped relationship between debt and growth when the debt burden is measured relative to GDP. They proclaimed that their paper attempts to provide a analytical answer



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for policy makers. They concluded that debt has a impact on growth and it is stylized fashion. Their results suggest stronger evidence of a hump-shaped relationship between debt and growth in the case of the debt-to-GDP indicator than in the case of the debt-to-exports variable. Uzun, karakoy and Buran (2011) examine the relationship between debt and growth in transition countries. They analyzed by panel autoregressive distributed lag model (ARDL). In 1991 the transiton countries have started market based economy and they need external sources. In this study they investigate the relationship between GDP and external debt to GNI between 1991 and 2009 in the transition countries. They found positive relationship between debt and growth rate of the countries in the long run and the transition countries are still at the positive slope side of the debt Laffer curve.

Alfredo and Francisco (2005) explored the relationship between external debt and growth for a number of Latin American and Caribbean economics. Methodologically they used GMM estimators and a panel data of 20 Latin American and Caribbean's countries. They investigated both the linear and non-linear relationship. They tried to investigate the channel through which external debt affects economic growth, by considering its effect on total factor productivity, capital accumulation and private savings, respectively. The authors found that lower total external debt related with higher growth rates and this negative relationship is driven bye the incidence of public external levels debt not by private external debt levels. In addition, they did not found any evidence of nonlinear effects of these relationships.

By using time series data of 24 developing countries over the period of 1976 to 2003 (2005) Safia Shabbir(2011) examines the relationship between external debt and economic growth and highlight the external debt stock leads to crowding out . The result suggests negative relationship between debt and growth. Their findings suggest that if developing countries debts are not sustainable it may effect adversely on growth. It also effect on private investment and causes crowding out. So developing countries should efficiently use the external and it can creates new investment and external investor also interested to invest in developing country. Applying OLS method Aminu, Ahmadu and Salihu(2012) tried to establish the relationship between economic growth ,external debt , and domestic debt in Nigeria of the period 1970 to 2011 . They found negative co-efficient of external debt is insignificant and it is inconsistence with theory on the other hand domestic debt is consistence and positive impact on GDP also significant. They strongly claimed that perfect domestic debt management can grow the economy. They also recommend that GOVT should encourage about domestic savings and domestic investment. Another study about Nigerian economy Boboye and Ojo (1994) made an empirical analysis using OLS on secondary data. In 1992 World Bank declared Nigeria an indebted low-income country because of inability of debt service payment of Nigerian. Some external factors like oil price collapse of commodity prices are effect external debt .For private lending the debt service payment became unmanageable in 1983. All of external and internal factors are given highly burden of external debt and it creats devaluation of National currency . Their suggestion is debt service should not be allowed to rise than foreign exchange earnings.

Jalles tested three factors which are influencing the relationship between external debt and growth in 72 developing countries over the period 1970 to 2005. The factors are: 1. Performance of the govt. 2.control of corruption 3. Level of democracy. They found that the lower level of corruption both



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have positive and negative effect of debt on growth and the results are significant. On the other hand the higher level of corruption have negative effect of debt on growth and it is significant. Cetin and Kalayci (2011) tries to investigate the significant effect of external debt , growth on FDI over period 1982 to 2010. They use Granger causality test. Their result shows that there is a significant relationship between the parameters. That means they have long run relationship. Because of they have strong debt management, higher efficiency on debt and they use debt for economic development and export based industry. Strong debt management Budget surplus and export regime can grow their economy. Menbere (1991) made an empirical analysis about the determinants of External indebtness. He found that some factors are main causes for overseas debt in developing countries in 1980 to 1990. These reasons are: 1. Poverty 2. foreign exchange constrain 3. low rate of return 4. External factors (oil price). According to Haussmann test open countries have more demand for external debt. Cross-section pooled data regression shows negative relation to the demand for external debt . And lastly the result shows that capital flight ,debt service payments , the imports to GDP ratio ,income per capita and the growth rate of GDP are the main determinants of the overseas debt.

Rehana and Malik (2010) indicate that external debt in most developing countries has increased in after 1980s. Increasing debt affects the growth rate. They investigate the impact of rising debt burden on economic growth of South Asian countries .They claimed that their regression support that there is a non-linear relationship between growth and all other indicators of debt burden. All of indicators of debt burden show that the importance of improving the economic management and by improving this the debt burden can be reduced. According to Barbara and Michael (1997) Uganda is a indebted low-income country like many other countries in Sub-Saharan Africa. Uganda borrows from multilateral creditors. Uganda is a indebted low-income country and it borrows for external and internal factors. This paper is about debt source, stricter internal and external factors affecting debt and debt servicing capacity of the nation. They use cum debt model and Cohen model. It borrows from external sources for internal and external factors affecting. They concluded that Uganda should increase domestic savings and invested in productive sector for high growth. Dr Currie (2005) made an empirical analysis test of a new theory of economic growth i.e. relationship between external debt and economic development. He concluded that debt is not used in productive sector that's why country faces debt crisis. He suggests to qualifying every failure or success and developed the system in terms of debt levels. And of course it could grow economy faster.

Safia (2012) states an long run relationship between debt and economic growth in developing countries . She used 70 developing countries over period 1976 -2011. She argues that increase in external debt slows down the economic growth and reduce the level of private fixed capital formation. The regression result of this paper implies that external debt has a long run relationship with growth and affects adversely and it also investigate the debt overhang theory. Albert , Brian and Palitha (2003) made an cointegration analysis between Economic growth and external debt service over the period 1952 to 2002 . They also investigate the existence of debt overhang in Sri-Lanka. Their analysis implies external debt service have negative effect on GNP though it is insignificant in the long run. They did not found short-run relationship among debt service and GNP and existence of overhang theory. Thy concluded that last 50 years in Sri-Lanka has not major obstacles to growth because of total external indebtness is not too high. Maureen (1996) creates an empirical assessment



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about the impact of external debt on economic growth in Kenya. This paper used time series data of the period 1970 to 1995 correlation analysis implies that there is strong negative relation between growth and debt and investment and debt . By error correction shows there is debt overhang and crowding out effect is happen for large amount of debt servicing . So the recommendation of this paper is governance should ensure the efficiency to delivery of services and increases productivity . IMF working paper pointed out that the reduction of external debt increases growth in highly indebted poor countries . They collect data from 55 low-income countries over period 1970 to 1999. Their result suggests that high level of debt destroying affect on growth, Crowding-out effect occurs when the ratio of debt service to GDP rises. Paper also implies debt have a worse effect on growth when it crosses the optimum level. Reduction of debt service increase the public investment and annum growth would rise. Javed and Ahmed (2005) pointed out in their article the role of debt and debt indicators and their relationship with growth ,investment and exports in Turkish economy over period 1983 to 2002 . This paper is consistence with World Bank and IMF. Their regression results implies that positive impact of debt on growth and exports and negative on investment. They also found that in growth equation export to external debt ratio and interest payments to current account have strongly negative effect where interest payment to export and debt service to export have no impact on growth. They suggest that SAP can reduce economic misstatement and encourage regular repayment of external debt and can increase export , investment growth of Turkish economy. According to Schoeman (2008) foreign debt is needed for economic development. Foreign debt has three effects 1. Debt overhang 2. Liquidity constraint 3. Uncertainty effect the on growth. This paper investigates about the level of debt for South Asia. Findings of this paper are that foreign debt has an asymmetric effect on growth, if the foreign debt exceeds 35% of GDP.

Aktham ,Omet and Fadwa (2007) investigate the threshold effect of debt on growth .Many of debt indicators increases the debt level and it is effect the growth . The important result in their regression is effect of external debt. It has a positive relation with growth when debt level is below threshold level and it is statistically significant. On the other hand when debt level cross the threshold level the impact of debt becomes negativ. They suggests that increase of export can make the capacity of payback its external debt. Ayadi (2008) argus that when internal savings is not sufficient for development it is needed to external finance. This paper suggests that debt overhang and crowding out theory is in both economies. He concluded that external debt is efficient in South Africa than in Nigeria as South Africa has a better management for its external debt obligations. He also suggests that debtor country should avoid short term financing when floating interest rate exist. According to Medani (2007) Sudan is a highly indebted country and he argues that many debt indicators shows that debt sustainability is difficult to achieve for economic and political condition of local and international. The external debt and debt services have negative effect on growth that means overhang and crowding out effect both are exist in Sudan. He concluded that if Sudan invested in productive sector and perfectly allocates resources than could be reduced poverty and raising the growth rate of the per capita of income.

Thomas (1999) seeks to figure out the answer about why developing country organize big external debt burden in twentieth century. They used 78 countries over period 1976 to 1998 and their findings support the relationship and it high in indebted countries. Regime type is important and impact in



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different manner and stage. They claimed those autocracies consumers are interested to invest for further growth by reducing consumption expenditure and they also interested in SAP.

Dr Majed (2005) tries to examine the effect of the twin deficit on external debt (twin deficit i.e. deficit of govt budget and deficit in current account) over period 1977 to 2004. Their results imply that budget deficit has a positive effect on debt and all of results are significant. Current Account Index also negative impact on debt. He recommended that Jordan economy should reduce external debt high level of GDP by good controls in debt and it also reduces debt burden by cutting govt. unnecessary spending, encourage private savings, and borrow from local sources. Karagol reviewed existing relationship of external debt and growth. He examines the relationship between growth and debt service in a case of Turkey (1956-1996). He find out negative relationship in the long-run. Last 20 years many papers have been published to investigate the relationship. Many researchers found negative relationship, many others find out no casual relationship between them. It seems controversial and never strongly says there is a negative or positive effect on growth. The relationship is differs among countries. So policy should be taken by based on countries interrelationship. Hansen tries to examine what are happen in HIPC when they cannot debt relief resources accumulated. He use cross-country regression for findings impact of external debt and aid. Findings of this suggest that if debt service payments and development assistance both are reduce then there is no impact on growth on the other side keeps fixed the development there may be a negative impact on growth. Safaqat (2007) made an comparison in Pakistan and Bangladesh economy. They examine thirteen factors impact on GDP by using thirty-four years data. Their regression suggests that Bangladesh is in better position than Pakistan. In Pakistan GNE, export , savings ,consumption expenditure have positive effect on GDP , only the total debt stock and debt service export have negative effect on GDP. In Bangladesh GNE, debt stock, total import ,export have positive effect and consumption expenditure have negative effect

Summary of literature review: impact of external debt on growth.

| Author | Data | Country | Results |
|---|---|---|---|
| Kaisidi | 1990-2010 | Tanzania | Negative impact of debt service on growth. |
| Mustafa | 1970-2010 | Pakistan | Negative impact of short term is strong than long-term. |
| Ademola | 1980-2010 | Nigeria | Not capable to pay debt service. |
| Rahman | 1972-2010 | Bangladesh | Strong positive co-relation between debt and growth. |
| Rabia | 1980-2010 | Pakistan | Negative impact of debt on growth. |
| Gohar | 1990-2008 | Low income countries | Negative impact of debt servicing on growth. |
| Pattiloo | | 93 developing countries | Hump-shaped relationship of debt on growth. |



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| | | | |
|---|---|---|---|
| Uzun | 1991-2009 | Transition countries | Positive relationship between debt and growth |
| Alfredo | | 20 Latin and carribians countries | Negative relationship. |
| Safia | 1976-2003 | 24 developing countries | If debt not sustainable it may effect adversely growth. |
| Aminu | 1970-2011 | Nigeria | Negative relationship. |
| IMF | 1970-1999 | Highly indebted countries | Worse effect of debt on growth. |
| Javed | 1983-2002 | Turkish | Positive on growth and negative on investment. |

## DATA & METHODOLOGY

The data for this regression were collected from secondary sources. The data added GDP as a dependent variable and investment, employment, external debt as independent variable. Our study is empirically investigates the effect of external debt on growth in Bangladesh over period 1972 to 2011. Our study depends on secondary data. Secondary data is reliable to increase the validity of the information. Secondary data is modest research. Common sources of secondary data for social science include censuses; organizational records and data collect through qualitative methodologies or researches. Secondary data is useful as it allows the researcher to see the prevailing thoughts about his/her area of study. Secondary data also saves time. We have used time series data for our analysis. We collect data from different sources. Our study is macroeconomic based. So we use time series data for model specification. We collect data over period 1972 to 2011 from different sources. The prime object of this study is to estimate the impact of debt on growth in Bangladesh. For this data is collected for WDI . The period is from 1972 to 2010 .To check the relationship annual data has been used to check the extact relationships. This study select (ARDL) model to investogate the relation. In economics ARDL model is used for lagged values of the explanatory variables. Because the dependent variable responds to X with a lapse of time and it is called lag(gujrat). The current growth is respond with the lagged value of debt ,employment and investment.

Why external debt affect growth negative :

The GDP trend in Bangladesh had increasing trend.It is nearly 3 times between 1995 and 2010 , but the GDP is mainly developed by industrial sector and garments. But in case of Bangladesh GDP only asses a part of peoples economic activities . Family bassed production and rural production are out of GDP also self-employment. There is another



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Our purpose is to check the relationship between external debt, employment, and investment with GDP. Many factors are affecting the GDP we just taken three factors and ignore others for avoiding model difficulties. We show the descriptive statistics of all variables and check the stationary of all variables. We would like to provide a short definition of our variables that is given below:

**GDP =** GDP at purchasers prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in current US dollars .We having taken the log of GDP for our model. GDP is our dependent variable.

**Gross capital formation :** INV proxy of gross capital formation ( formerly gross domestic fixed investment) include land improvements, plants , machinery and equipment purchases and the construction of roads ,railway, and the like including school, offices ,private and commercial industries building. We expected it has positive relationship with GDP.

**External debt:** External debt stocks, total DOD (current US$) . Total external debt is debt owed to nonresidents repayable in currency goods or services, total external debt is the sum of public, publicly guaranteed and private nonguaranteed long-term debt use of IMF credit and short debt. We expected debt impact on GDP negatively.

**Employed Person:** People who r counted as employed if they have full-time jobs. We collect the civilian employed population. The employed are grow gdp of a country. They produce goods and services and earn a lot .We expect that there is a positive relationship between employment and GDP.

**Table 3.1: Descriptive statistics of Data Series**

| | Lngdp | Lndebt | lnemp | lninv |
|---|---|---|---|---|
| Mean | 24.12185 | 22.79899 | 17.45115 | 25.77052 |
| Median | 24.16787 | 23.30371 | 17.59044 | 26.00414 |
| Maximum | 25.42930 | 23.94065 | 17.83728 | 28.29775 |
| Minimum | 22.56195 | 18.80256 | 16.84564 | 21.29561 |
| Std. Dev. | 0.700345 | 1.139357 | .338070 | 1.735384 |
| Skewness | -0.192228 | -1.587233 | -0.592074 | -0.624571 |
| Kurtosis | 2.442565 | 5.490313 | 1.783230 | 2.703568 |
| Jarque-Bera | .764235 | 27.13149 | 4.804560 | 2.747044 |
| Sum | 964.8741 | 911.9597 | 698.0459 | 1030.821 |
| Sum sq. Dev | 19.12885 | 50.62723 | 4.457351 | 117.4508 |

According to SPIEGEL and STEPHENS the value of $b_1 = 0$ and $b_3 = 3.$ indicate that the distribution is perfectly normally distributed. In this table we can see that the frequency distribution of all variables. Positive Kurtosis is for leptokurtic and negative Kurtosis is platykurtic. In this table the



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lngdp , lnemp , lninv are platykurtic and lndebt is leptokurtic. The skeness is less then 1 of all variables except the lndebt . So we can say that the skewness and playtykurtic frequency distribution of variables indicates that the distribution is not normal.

## ANALYSIS OF RESULT

### Unit Root Test of the Variables:

We use the ADF (Augmented Dickey-Fuller) test by EViews7 to check the unit root of the time series. The test procedure given below:

Suppose we test the unit root series of GDP

$H_0$ = *GDP series have a unit root (time series is non-stationary)*

$H_1$ = *GDP series have not a unit root (time series is stationary)*

If we can reject the null hypothesis than the series is a stationary time series. On the other hand accept null hypothesis the series is a non-stationary time series.

ADF test statistics is the value of the trend coefficient. If the computed t statistics is less then the critical value of tau statistics then accept the null hypothesis. That means there is a unit root and the time series are non-stationary.

**Table 4.1: The results of the unit root test of the variables:**

| Variable | | Computed t statistics I(0) | Critical value of t at 5% level | Decisions | | Computed t statistics I(1) | Decisions |
|---|---|---|---|---|---|---|---|
| GDP | | 2.86 | - 3.53 | $H_0$ accept | | - 4.14 | $H_0$ reject |
| EMP | | - 1.57 | - 3.53 | $H_0$ accept | | - 5.66 | $H_0$ reject |
| DEBT | | - 4.47 | - 3.53 | $H_0$ reject | | - 1.97 | $H_0$ accept |
| INV | | 4.16 | - 3.53 | $H_0$ accept | | 2.72 | $H_0$ accept |

Here dependent variable GDP and independent variable EMP, INV are non-stationary at I (0) that is they have a unit root. Only the independent variable DEBT is stationary at I(0). GDP and EMP are stationary at I (1) . INV is stationary at I(2). The non-stationary variable and their regression may produce a spurious regression. But if the independent variables are co-integrated with the dependent variable then the regression will not spurious. So we need to check the Co-integration among the variable.

### Co-integration test:

### Kwiatkowski- Philips Schmidt- Shin test (1992)

$H_0$ = *The residual series is stationary*



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$H_1$ = *The residual series is not stationary*

**Table 4.2: The Results of Co-integration of all data series**

| Model residuals | KPSS test statistics | Asymptotic critical value At 5% level | Results |
|---|---|---|---|
| Constant | 0.091 | 0.463 | Accept $H_0$ |
| Conclusion | The residual series does not have a unit root , then decision is that the independent variables are co-integrated with the dependent variable . | | |

**Table 4.3: The Results of Co-integration of all data series**

| Model residuals | Test statistics value | Critical value of 5% level | Results |
|---|---|---|---|
| Constant | - 3.35 | - 2.94 | Reject $H_0$ |
| Conclusion | The residuals series does not have a unit root , then decision is that the independent variables are co-integrated with the dependent variable . | | |

So we can say that the variables are co-integrated. Despite of the non-stationary if they are co-integrated the regression may not spurious.

**Spurious relationship test of the model:**

**Table 4.4: The result of Spurious Relationship of the Model:**

| Model | R- squared | Durbin-Watson |
|---|---|---|
| Values | 0.993775 | 1.089231 |
| Dicision | There is no spurious relationship in the model. The model is not spurious. | |

**4.3. Models Analysis:**

**Model 1:**

$$\ln(gdp_t) = \beta_0 + \beta_1 \ln emp_t + \beta_2 \ln emp_{t-1} + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} + \beta_5 \ln debt_t + \beta_6 \ln debt_{t-1} + \beta_7 \ln debt_{t-2} + \beta_8 \ln debt_{t-3} + \beta_9 \ln inv_t + \beta_{10} \ln inv_{t-1} + \beta_{11} \ln inv_{t-2} + \beta_{12} \ln inv_{t-3} + e_t \quad \ldots..(1)$$

*Here,*



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$\ln emp_t$ = *Employed person* , $\ln emp_{t-1}$ = *One year lagged of Employed person,* $\ln emp_{t-2}$ = *Two year lagged of Employed person,* $\ln emp_{t-3}$ = *Three year lagged of Employed person,* $\ln debt_t$ = *External debt,* $\ln debt_{t-1}$ = *One year lagged of External debt,* $\ln debt_{t-2}$ = *Two year lagged of External debt,* $\ln debt_{t-3}$ = *Three year lagged of External debt,* $\ln inv_t$ = *Investment,* $\ln inv_{t-1}$ = *One year lagged of Investment,* $\ln inv_{t-2}$ = *Two year lagged of Investment,* $\ln inv_{t-3}$ = *Three year lagged of Investment*

Table 4.5: The result of the model (1)

| Dependent Variable: LNGDP<br>Method: Least Squares<br>Sample (adjusted): 1975-2011<br>Included observations: 37 after adjustments | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| $\ln emp_t$ | -0.203514 | 0.150909 | -1.348589 | 0.1901 |
| $\ln emp_{t-1}$ | 0.991322 | 0.212408 | 4.667058 | 0.0001 |
| $\ln emp_{t-2}$ | -0.400366 | 0.262126 | -1.527382 | 0.1397 |
| $\ln emp_{t-3}$ | 0.015940 | 0.149268 | 0.106786 | 0.9158 |
| $\ln debt_t$ | -0.229627 | 0.209385 | -1.096676 | 0.2837 |
| $\ln debt_{t-1}$ | 0.341887 | 0.276758 | 1.235326 | 0.2287 |
| $\ln debt_{t-2}$ | -0.490067 | 0.233743 | -2.096603 | 0.0467 |
| $\ln debt_{t-3}$ | 0.136611 | 0.092448 | 1.477713 | 0.1525 |
| $\ln inv_t$ | 1.790791 | 0.296267 | 6.044512 | 0.0000 |
| $\ln inv_{t-1}$ | -1.623817 | 0.425978 | -3.811975 | 0.0008 |
| $\ln inv_{t-2}$ | 0.969408 | 0.280671 | 3.453891 | 0.0021 |
| $\ln inv_{t-3}$ | -0.582461 | 0.175337 | -3.321950 | 0.0029 |
| *c* | 8.036056 | 1.129448 | 7.115031 | 0.0000 |
| R-squared | 0.993775 | Mean dependent var | | 24.22312 |
| Adjusted R-squared | 0.990662 | S.D. dependent var | | 0.619819 |
| S.E. of regression | 0.059894 | Akaike info criterion | | -2.522628 |
| Sum squared resid | 0.086096 | Schwarz criterion | | -1.956630 |
| Log likelihood | 59.66862 | Hannan-Quinn criter. | | -2.323087 |
| F-statistic | 319.2765 | Durbin-Watson stat | | 1.089231 |
| Prob(F-statistic) | 0.000000 | | | |



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The table shows the regression result of the model. The goodness of fit $R^2$ means that the independent variables explain 99% of the variation in the dependent variable. Table shows that the beta values, t-values, p-values. Beta values are the co-efficient of the variable means the impact of independent variable on the dependent variable. The co-efficient of many variables are not expected signs, and many variables are not statistically significant. One and three years lag of emp ,recent and two year lag of debt , recent year and two year lag of inv are have expected sign. Most significant variables are $\ln emp_{t-1}$ , $\ln debt_{t-2}$ $\ln inv_t$ , $\ln inv_{t-1}$ , $\ln inv_{t-2}$ , $\ln inv_{t-3}$ . View this problem we have run another model. We dropped the insignificant variables and got a model which is more efficient from original model. The parsimonious model have significant variables and reasonable $R^2$

**DIAGNOSTIC TEST OF THE MODEL:**

**Test for autocorrelation:**

LM test is conducted to test for autocorrelations. The general version is to estimate the equation:

$$y_t = \beta_0 + \beta_1 x_t + \rho e_{t-1} + v_t$$

And test for the null

$$H_0 : \rho = 0$$

Proceeding in this way generates t = 2.439, p-value= 0.02.

Since p-value is less than 0.05, LM test rejects the null hypothesis of no autocorrelations at 5 % level of significance.

From our model the estimate equation is:

$$\ln(gdp) = \beta_0 + \beta_1 \ln emp + \beta_2 \ln emp_{t-1} + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} +$$

$$\beta_5 \ln debt + \beta_6 \ln debt_{t-1} + \beta_7 \ln debt_{t-2} + \beta_8 \ln debt_{t-3} + \beta_9 \ln inv + \beta_{10} \ln inv_{t-1} +$$

$$+ \beta_{11} \ln inv_{t-2} + \beta_{12} \ln inv_{t-3} + \rho e_{t-1} + v_t \quad \ldots\ldots\ldots\ldots\ldots (2)$$

There p-value is less than 0.05, t = 2.337, LM test rejects the null hypothesis of no autocorrelation at 5% level of significance .so the model have autocorrelation.



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Using software:

$H_0$ = *There is no serial autocorrelation*

$H_1$ = *There is serial autocorrelation*

**Table 5.1. The result of serial correlation LM test :**

| Models | F- calculative value | F- critical value at 5% level (1, 23) | Results |
|---|---|---|---|
| Constant and trend | 5.464318 | 4.27934 | Accept $H_0$ |
| Dicision | Test cannot reject the null hypothesis. Because of F cri < F cal and we accept the null hypothesis. That is there is serial autocorrelation in the model. | | |

**Test for heteroskedasticity :**

We use Breusch-Pagan-Godfrey test to detect the heteroskedasticy .

$H_0$ = *There is heteroskedasticity*

$H_1$ = *There is no heteroskedasticity*

**Table 5.2. The Results of Heteroskedasticity**

| Models | Calculative F-statistics (12,24) | Critical value of F at 5% level | Results |
|---|---|---|---|
| Values | 1.470751 | 2.18338 | Reject $H_0$ |
| Decision | Critical value > Calculative value of F-Statistics and we can reject the null hypothesis .That is there is no heteroskedasticity. | | |



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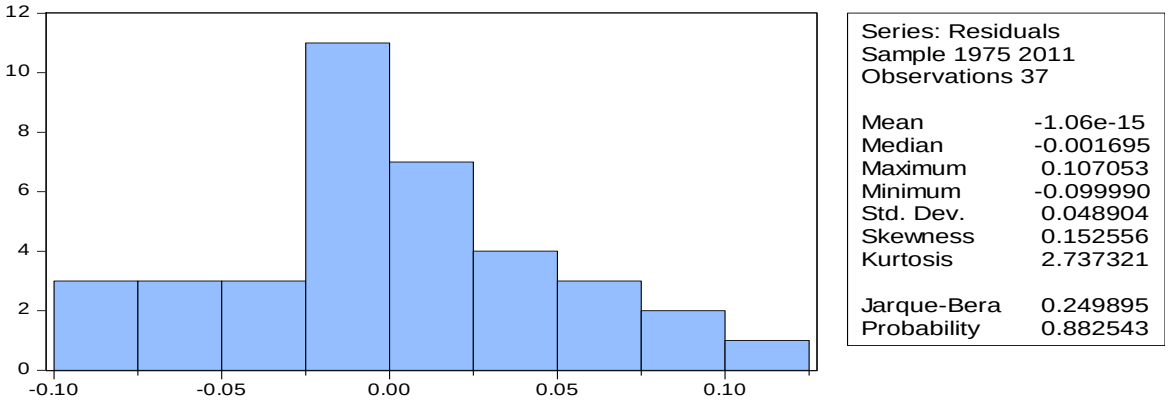
**Table 5.3. The Results of Heteroskedasticity( According to ADF)**

| Models | Obtained $\lambda^2$ | Critical value $\lambda^2$ at 5% level | Results |
|---|---|---|---|
| Values | 15.67897 | 21.0261 | Reject $H_0$ |
| Decision | Critical $\lambda^2$ value > obtained $\lambda^2$ value .and we reject the null hypothesis . at the 10%, 5% , 1%, .025% level it is reject. So there is no heteroskedasticity. | | |

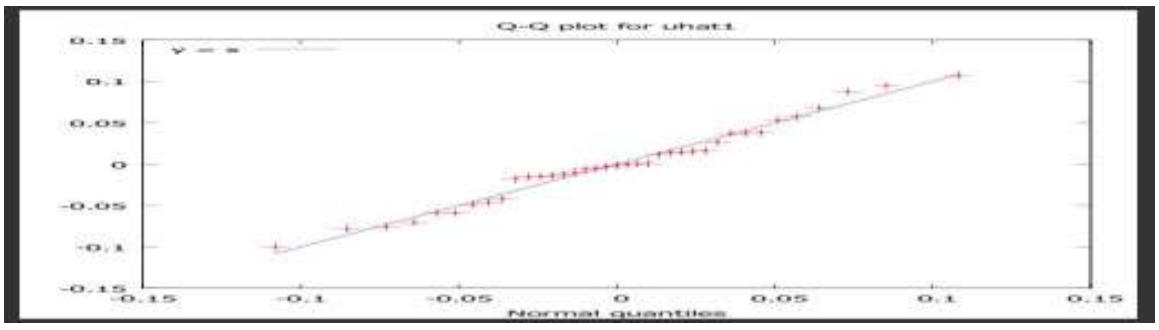
### 5.3. Tests for normality:

**Figure 5.1. Histogram of residuals:**




We can see that the probability is 88 percent. Therefore we do not reject the hypothesis that the error terms are normally distributed. But we should keep in mind that the sample size 37 may not be large enough.

**Figure 5.2. Normal P-P Plot of Regression Standardized Residual**



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If the variable is normally distributed the NPP will be approximately a straight line. And our residuals P-P plot indicate that the normality assumption is exist.

**JB test for the normality:**

JB=n[S $^2$/6+ (K-3)$^2$/24]

n = sample size, s = skewness , k=kurtosis . . Residuals skewness and kurtosis in our model is 0.152 and 2.73. The computed $\lambda^2$ = 0.24 and the critical value of $\lambda^2$ at the 5% level of significance is 5.99. Here the critical value is greater then the calculative value so we can accept the null hypothesis that is the residuals are normally distributed.

**Test for functional form:**

Ramsey reset test shows that the delta 1 is significant is 33% level…so it is insignificant for the model.

$$\ln(gdp) = \beta_0 + \beta_1 \ln emp + \beta_2 \ln emp_{t-1} + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} + \beta_5 \ln debt + \beta_6 \ln debt_{t-1} + \beta_7 \ln debt_{t-2} + \beta_8 \ln debt_{t-3} + \beta_9 \ln inv + \beta_{10} \ln inv_{t-1} + \beta_{11} \ln inv_{t-2} + \beta_{12} \ln inv_{t-3} + \delta_1 (\ln gdp)^2 + e_t \ldots\ldots\ldots(1)$$

$\delta_1$ Is significant at 33% level and it is statistically insignificant. So our model is free from specification error. Our functional form is right.

**Parsimonious model analysis:**

The insignificant variables are dropped and the parsimonious model was specified. For correct standard error we use HAC for parsimonious model. The results are given below:

Model: 3

$$\ln(gdp) = \beta_0 + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} + \beta_7 \ln debt_{t-2} + \beta_{12} \ln inv_{t-3} + v_t \ldots\ldots\ldots\ldots(3)$$



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**Table 5.4. : The Result of the Model 3**

| Dependent Variable: LNGDP<br>Method: Least Squares<br>Sample (adjusted): 1975 2011<br>Included observations: 37 after adjustments<br>HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000) | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| $\ln emp_{t-2}$ | 0.894153 | 0.201875 | 4.429239 | 0.0001 |
| $\ln emp_{t-3}$ | 0.373139 | 0.124500 | 2.997101 | 0.0052 |
| $\ln debt_{t-2}$ | -1.318291 | 0.195548 | -6.741520 | 0.0000 |
| $\ln inv_{t-3}$ | 0.867639 | 0.086088 | 10.07855 | 0.0000 |
| c | 10.04735 | 1.486217 | 6.760352 | 0.0000 |
| R-squared | 0.971086 | Mean dependent var | | 24.22312 |
| Adjusted R-squared | 0.967472 | S.D. dependent var | | 0.619819 |
| S.E. of regression | 0.111787 | Akaike info criterion | | -1.419352 |
| Sum squared resid | 0.399884 | Schwarz criterion | | -1.201661 |
| Log likelihood | 31.25802 | Hannan-Quinn criter. | | -1.342606 |
| F-statistic | 268.6873 | Durbin-Watson stat | | 1.535023 |
| Prob(F-statistic) | 0.000000 | | | |

In parsimonious model all variables have expected sign and they all are statistically significant. $R^2$ is also good. 0.89, co-efficient of two years lag of employment means that a one percent increase in employment will increases the GDP by .89 percent. Same three years lag of employment a one percent increase in employment will increases the GDP by .37 percent. And the co-efficient 1.31 of two years lag of debt implies that a one percent increase in debt will decrease the GDP by 1.31 percent. Similarly the three years lag of investment co-efficient .86 means that a one percent increases in investment will increase the GDP by .86 percent.

According to debt overhang theory the co-efficient of debt has negative sign. In case of Bangladesh debt impact on GDP negatively and high level of debt makes GDP slow down. In addition, the investment and employment have a positive impact on GDP.The p-values of the variables are significant and they are less then 0.01. And the F-statistic (268.68) prob (0.00) also significant and its mean the overall significant of the model. The Durbin-Watson (1.53) also near about 2 .
So the regression model is given below:

$$\ln gdp = \mathbf{10.04} + \mathbf{0.894}\ \ln emp_{t-2} + \mathbf{0.373}\ \ln emp_{t-3} - \mathbf{1.318} \ln debt_{t-2} + \mathbf{0.867} \ln inv_{t-3}$$



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This result shows that emp, inv and debt directly effect the GDP. The debt is highly negative impact on growth in Bangladesh. Investment which is most important factor of GDP and impact positively also significantly, and the employment of Bangladesh has positive effect on GDP.
F-test for significant

$$H_0 = \beta_1 = \beta_2 = \beta_5 = \beta_6 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = 0$$

$$H_1 = \beta_1 = \beta_2 = \beta_5 = \beta_6 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} \neq 0$$

$$F = \frac{R^2{}_{new} - R^2{}_{old} / df}{\left(1 - R^2{}_{new}\right) / df}$$

$$R^2{}_{new} = 0.971$$

$$R_{old}{}^2 = 0.993$$

Computed F is 2 , F critical value at 5% level 2.35 ,10% level 3.36 and 25% level 2.77 with df (8,24). So we cannot reject the null hypothesis .We conclude that if we drop a group of variables from the original model , $R^2$ decreases from .993 .971 .But it is seen that the drop ed a group of variables does not significant decreases the explanatory power of parsimonious model.

**Specification test of the model:**

We use the Ramsey reset test that model is given below:

$$\ln(gdp) = \beta_0 + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} + \beta_7 \ln debt_{t-2} + \beta_{12} \ln inv_{t-3}$$

With the FITTED^2 model is run and the model is:

$$\ln(gdp) = \beta_0 + \beta_3 \ln emp_{t-2} + \beta_4 \ln emp_{t-3} + \beta_7 \ln debt_{t-2} + \beta_{12} \ln inv_{t-3} + \delta_1 FITTED^2$$

$\delta_1$ Is statistically insignificant, so we can say that there is no problem with the functional form and the omitted variables. It is significant at 80% level of significance. It is not statistically significant.

In this section three models are run to find the exact result. The first models variables are not significant and the co-efficient sign are not perfect. So there is a chance to run another model. We have 2nd model it was also rejected for insignificant causes. Model 3Is an improved result compared with rejected models? It shows every variable significant at 1% level. The regression analysis shows that there was a negative relationship between External debt and GDP by 1.3%. It indicates when External debt is increases 1% there was a decrease of GDP by 1.3% because of the debt services. That



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is higher level of debt discourages economic growth. The debt service is collecting from resources than on investments. High level of debt will decrease the public services or infrastructures. Investment and employed labor increase the level of output in the country. Being developing countries the debt is not perfectly work in Bangladesh.

## CONCLUSION

The main objective is this paper was to find out the impact of external debt on growth. We also use investment and employed person to find out their impact on growth. The major conclusion of this study can briefly be summarized as follows:

We have a sophisticated result that shows that external debt stock adversely affect the GDP growth. So the external debt needs special care about taken. Debt is need for development and growth in Bangladesh but it is urgent to be more concern about its uses and the services of debt. In our study we find the external debt costs heavily to the poor people. But in this country the peoples need a healthy and prosperous life. A healthy life can promote development and development brings welfare and faster growth. For MDGs target every year Bangladesh need extra finance. This amount is more than aid and loans. If Bangladesh achieve the MDG then the debt is more effective. Every year debt service has major allocation in budget but Bangladesh needs more allocation in education and health sector. So Bangladesh need must debt relief and writes-off. Because of increasing trend of external debt is a mirror of increasing of burden. It impact growth adversely.

Many international and domestic organizations suggest debt cancellation is must for Bangladesh. Bangladesh govt. should attention to their citizen's development. The poor development poverty makes the debt unsustainable. It hampers the growth negatively. Being a low-income country Bangladesh hasn't more resources to pay debt service. It is a great burden for the country. It reduces the investment and as well as job opportunity and ultimately reduce the growth. Our analysis result also shows that there is a significant impact of debt on growth. The debt stock is effect a negative effect. The debt service affects the economic growth of Bangladesh because the infrastructure sector is very poor and it takes a long time to implement the main objective of debt. And the debt service payment is collect from another sector. It is clear that high-level external debt discourage the economic growth. Capital formation and employed population have positive affect on the economic growth. Bangladesh hasn't effective debt management and utilization of external debt. According to this paper some recommendation is provided to solve the negative impact of external debt on growth. External debt policy in Bangladesh should be long-term and effective and exports should be diversified for foreign currency.

The debt management should find out the optimum return sector of debt. The savings should be properly invested it is a best option of alternate of debt. Bangladesh should reduce dependency on impact and use the nation's resources properly. More research should be done for best use or policy of external debt. Debt management should take policies and make several strategies to ensure sustainable debt. In addition, Bangladesh should ensure basic needs of people. Then equal distribution of resources, strong infrastructure, reduces poverty, achieving MDG. Some policy can be undertaken



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to attract FDI and Bangladesh should create favorable environment for investment of foreigners. Country has to mobilize and channelize their private investment and resources to these productions that can help to boost up the amount of exports.

The Govt. of Bangladesh has to pay attention to collect debt management data and its item of expenditure. Nations should have to focus on to increase domestic savings for higher investment. Especially in Bangladesh political stability is must needed. On the other hand the corruption should reduce by close monitoring. The country needs to channelize their external debt in a way that can create new opportunity of investment and attract more investors in country or fully debt cancellation to achieving the MDGS.

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