THE IMPACT OF GOVERNMENT DEBT ON THE ECONOMIC GROWTH OF BHUTAN

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ABSTRACT

Title of Thesis	THE IMPACT OF GOVERNMENT DEBT ON THE ECONOMIC GROWTH OF BHUTAN
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The study is motivated by the unprecedented increase in the level of government debt currently prevailing in Bhutan. An understanding of the relationship between government debt and economic growth is considered crucial. For this purpose, the study aims to empirically examine the relationship between the government debt and economic growth in Bhutan. To determine the relationship the data were obtained from different sources such as the World Economic Outlook (IMF), World Bank and National statistics Bureau of Bhutan. Time series data from the period 1990- to 2016 were fitted into the regression equation using various economic techniques. The result of Augmented Dicky Fuller (ADF) and Phillips Perron (PP) unit root test suggest that all the variables are non-stationary at level but exhibit stationary after the first difference. The Johansen co-integration test and Vector Error Correction Model (VECM) is employed to investigate the long run and short run effects of debt on real gross domestic product growth which has been used as a proxy of growth.

The result indicates that the government debt and tourism revenue has a positive long run impact on the growth of GDP whereas unemployment, foreign aid, tax revenue and population growth has a negative relationship with GDPG. The study also analysed the impact of rupee crisis on each variables and the impact on the economic growth as a whole. The study revealed that economic growth of Bhutan was greatly affected from the crisis which occured in 2012. The study recommends that Bhutan should minimize the dependency on debt and that the government need to further boost and pursue internal reforms and sources of revenues as a measure to finance its developmental activities.

Index Terms—Government debt, Economic Growth, co-integration test, vector error correction model.

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Every nation in the world aims to achieve sustained economic growth. For an economy to grow it requires investment in infrastructures and different sectors such as health, education, social welfare, defense, etc. Insufficient resources to meet the level of investment result in borrowing. As opinioned by Sulaiman & Azeez, (2012), a country resort to borrowing when the government is faced with insufficient capital and also as a means to supplement the national savings. Achieving economic growth is a major concern especially for Least Developed Countries (LDCs). Owing to low level of investments and savings the least developed countries face low capital formation which makes it difficult for the economy to grow (Adepoju, Salau, & Obayelu, 2007). The need for government borrowing in order to finance a deficit budget has led to the development of debts both internally and externally. It is not astounding that government debt plays a crucial part in realizing economic growth. Debt assists the fiscal authorities to act their part in stimulating economic growth and stabilizing the economy. Recently in many countries government debt has steadily increased. Therefore, the study of the role of debt in funding the development process is very important.

Debt is a universal and an acknowledged phenomena faced by all countries irrespective of the economy being small or large. Debt is the total amount of money that the government of a country owes. Given a limited resources and insufficient funds, a country struggles in financing its developmental projects and achieving its national objectives. The means by which the government can generate revenue are by increasing taxes and printing more money. However, the revenue, which the government raises in the form of tax alone is not enough to support the developmental activities and on the other hand printing more money is not a wise decision for the

government because it will dissuade the stability of the economy. So for this particular reason a country choose to borrow from both internal and external sources to increase the welfare of the people and to finance the social infrastructures necessary to achieve economic growth (Aluko & Arowolo, 2010). Debt is not only a problem at the micro economic level but it is also a serious issue at macro-economic level. Almost all the countries in the world encounters the effect of debt but the level to which a country faces this effect differs from country to country. According to the statistics portal, in 2016 the debt of the United States reached 107.35% of the Gross Domestic Product (GDP). To name a few, countries like Singapore, Jamaica, Gambia, Belgium, Cyprus and Barbados also reached the same level of public debt. The country with the highest public debt in relation to its GDP is Japan, which recorded a debt of 239.18 % in 2016. Depending on the internal and external borrowing to support its developmental activities, Bhutan's debt also increased drastically and reached an unprecedented level of 113% of GDP in 2016.

In general, the relationship among the government debt and economic development is essential for the policy makers and the public and there are some past studies, which examines this relationship. Since there is no clear-cut answer on the influence of government debt on the economic progress of a country, the bond between government debt and economic growth is much debatable. Past studies and researchers view public debt both as a burden to the society and detrimental to investment and growth as well as beneficial to the economic growth. Different studies in the past has found that incurring debt poses either a positive (Spilioti, 2015) or a negative (Zouhaier & Fatma, 2014) effect on the growth of an economy. Government debt can have both positive as well as negative effect on the economic growth depending on how it is being utilized. If the government debt is utilized for investment oriented projects such as agriculture, electricity generation and infrastructures, it will help in the creation of more employment opportunities which in turn will boost the economy. The borrowed funds can be used to purchase advanced technologies and equipment which are necessary to achieve efficient production of goods and services. Borrowing is an approach to achieve economic growth as it helps in increasing the national income, reducing the level of poverty and improving productive capacity of the country. Borrowing helps in increasing productivity, level

of investment and promotes economic growth through the transfer of managerial and technical skills. Debt is advantageous if the return from borrowing is greater than the debt repayment rate. However, debt can also have an adverse impact on the growth through crowding out and disincentive effect. Debt servicing results in crowding out of public investment thereby hampering the productivity growth. Fosu (1999) opinioned that debt servicing would shift public expenditure away from important sectors such as education and health. And also if debt is used for private and public consumption it will lead to an undesirable influence on the overall economy. For any government, the main reason for borrowing must be for the development of the country rather than on consumption. When the borrowed funds are utilized optimally, then debt need not necessarily transform into a debt burden. At the present scenario, the policymakers should not only be concerned about the association amongst government debt and economic progress but should also consider the level of debt that can affect the economic growth.

Since the start of the First Five Year Plan in 1961, Bhutan have faced mixed economic performance and this empirical study is intended to discover the consequence of the government debt for sustained economic development. Bhutan being a small and an under developed country it has very limited resources. The financial institutions and capital markets are not fully developed resulting in shortage of investable funds. Therefore, the country has been depending on borrowings and foreign grants to finance the development projects such as electricity generation plants, roads, education, health, agriculture, etc. as well as to finance a fiscal deficit. In the past years Bhutan saw an increase in its Government debt and have reached an unprecedented level. In Bhutan, the government debt-GDP ratio was the lowest at 36.90% in 1998 however the situation changed as debt started to grow steadily from 2000. It was reported that the highest total public debt recorded by Bhutan was Nu. 160,562.057 million (US$ 2,370.794 million), which is equivalent to 113% of the GDP. This amount was recorded on 30th June 2016 (Finance, 2017). This increase in Government debt has become a national concern. The different political points of view related to the debt burden have stirred an strong debate both on the efficiency of fiscal policies and on the potential adverse consequences due to increase of public borrowing on the economic growth of Bhutan. Since the debt situation is considered

worrisome, Bhutan's economy is in a dire need to be strengthened and deepened. The rise in the debt will lead to social inequality and widen the gap between the rich and the poor. The main problem of debt accumulation is that it might lead to a debt crisis.

In addition to the increase in the level of government debt, the economy of Bhutan experienced a serious setback in the recent year. In 2012 Bhutan witnessed Rupee (Indian currency) crisis which occurred as a serious threat due to rise in the demand for rupee. India is the main source of debt for Bhutan and to repay this debt it has led to conversion of Bhutanese currency (Ngultrum) to Indian rupees. Apart from this, India being a major trading partner of Bhutan and with more than 50% of essential items being imported from India the holding of Indian rupees is vital for trade to take place. The Bhutanese Ngultrum and Indian Rupee value is at par given the close and friendly relationship between Bhutan and India. The main causes of rupee crisis are the poor financial management, the trade deficits and the lifestyles of the Bhutanese people. Though Bhutan is a least developed country but the lifestyle of most people give a wrong impression to the outsiders that it is a rich country. Bhutanese economy is heavily dependent on import of food and other essential items from India and we virtually manufacture and export nothing. This trade deficit has led to the rise in the demand for rupees and continuous outflow of Indian rupee from the country. The increase in the imports in turn have led to the neglect of our own agriculture sector which would have otherwise can substitute the products being imported. The growth of Bhutanese economy have been affected due to the rupee crisis. If the rupee crisis is not addressed well it will have a long term negative impact on the socio-economic development of Bhutan. The developmental activities in the country will be affected due to the scaling down of the government's planned activities. The convertible currency reserves such as dollars will decline as the reserves have to be used to finance the import of goods from India and from other countries. Decline in the dollar reserves will make it difficult for Bhutan to pay back its debt. In addition the rupee crisis will also affect unemployment rate, inflation and overall it will affect the GDP growth of Bhutan.

Attributing to continuous increase in the level of debt and in an effort to guide the investment and to guarantee that funding decisions are judicious and public debt is kept at a sustainable level, the Government has come up with a comprehensive public

debt policy. The Finance Ministry launched a public debt policy on 7th September, 2016. It is to set a debt ceiling of country's external borrowing and also to manage outflow of rupee (Indian currency) and for better management of funds for hydropower projects (Policy, 2016). Consequently, this study will try to find how the annual growth rate of output (as measured by GDP growth) is the affected by government borrowing in Bhutan. And we will also study the impact on rupee crisis on the each variables under study and in turn the impact on the overall growth of the Bhutanese economy.

1.2 Objective of the study

1. To examine the possible relationship between government debt and economic growth in Bhutan.

1.3 Overview of Bhutanese economy

Bhutan is a small Himalayan constitutional monarchy landlocked in the South Asia. It is located between two of the world's giant countries India and China with approximately 38,394 sq kms and a population of less than 0.80 million approximately. The economy of Bhutan has largely been dependent on Agriculture, forestry and other traditional sectors. The Bhutanese economy is characterized by low-income level, low rate of capital formation, high dependency on agriculture, high growth rate of population, weak infrastructures, underutilized natural resources, low level of technology and skills, and unemployment.

Until a few decades ago, Bhutan remained as an agrarian economy but in the recent years, Bhutan have experienced a rapid economic growth. The economic sectors such as tourism, hydropower, construction, trade and service sectors are the driving forces, which have contributed significantly to this growth (WHO, Bhutan). The two main sources of income for the government are the hydropower sector and the tourism sectors. On an average, the government earns around 45% of the revenue from the hydropower sector. With these revenues, the government has been able to progress in providing improvised social welfares to its people.

The economy of Bhutan has been depending on India for financial assistance since the 1960s. Apart from providing financial assistance, India is also a major trading

partner of Bhutan and is the main source of laborers for development projects especially for road construction. Bhutan also receives support from various multilateral organization in developing and administering educational, social and environment programs in the country without comprising the government's aspiration to safeguard environment and cultural traditions of the country. Bhutan, being one of the least developed countries in the world, is far behind in the Human Development Index (HDI). As per the Human Development Report, 2016 Bhutan's rank is 132 out of 188 countries (UNDP & United Nations, 2016). Like most of the least developed countries of the world, Bhutan too depends on the debt to support its infrastructure projects such as construction of roads, bridges, hydropower plants, etc. The government of Bhutan has been borrowing mostly from Government of India. The government also borrows from other multilateral and bilateral partners such as Asian Development Bank (ADB), International Fund for Agriculture Development (IFAD), Japan International Cooperation Agency (JICA), etc (Finance, 2017). Bhutan continues to make momentous and continuous improvement in achieving the Millennium Development Goals, achievement of vision 2020 and Bhutan's goals of green socio-economic development and vision of self-reliance. In the past years, Bhutan has been witnessing an increasing trend in the level of investment and savings. According to World Bank, gross domestic saving as a percentage of GDP in Bhutan was reported at 27.37% in 2016. Even though there is an increasing trend in the level of savings, it is not sufficient to meet the required investments taking place in the country. There exists a gap between saving and investment and in order to fill this gap, Bhutan resorts to getting finance from outside the country.

1.4 Gross Domestic Product by Broad Economic Sectors

The Gross Domestic Product symbolizes the outcome of all economic activities that occurs in the economy. It is the total sum of the value of all goods and services produced within the geographical boundary of the country, which are then accessible for consumption, exports and investment. The economic progress experienced in the past years has brought about substantial changes in the economic sectors namely primary, secondary and tertiary sector. Primary sectors constitutes activities such as agriculture, livestock, forestry, mining and quarrying. Secondary sector includes

electricity, construction, manufacturing and water supply and service sector comprises trade, transport, hotels, communication, finance, insurance, real estate, etc. Ever since the planned socio-economic development was launched, the country has witnessed improvements in the macroeconomic and human development indicators. According to the Economic Development Policy (EDP), the country experienced increase in real GDP growth rate from 5.9% in the 1990s to 8.53% in the first decade of the present century. Growth in the economy can be witnessed through the improvements made in the technologies, labor productivity, education achievements, health standard, etc. Though Bhutan is an agriculture based economy but over the years the country have been highly dominated by the secondary and tertiary sectors. With the onset of the planned development, significant structural changes has taken place with the economy shifting from primary sector to the secondary and tertiary sectors. The following table presents the GDP growth rate and GDP growth rate by sectors in different years.

Table 1.1 Growth of Real GDP and Real GDP growth by Economic Sectors

	Growth of Real GDP (2006-2016)										
Year	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
GDP (%)	6.8	17.9	4.7	6.7	11.7	7.8	5.1	2.1	5.5	6.6	7.99
Real GDP growth by Economic Sectors in Percentage (%)											
Primary	3.7	2.5	2.5	1.6	1.1	4.0	2.25	2.40	2.37	5.07	3.65
Secondary	8.4	41.6	5.5	4.1	12.7	3.2	6.77	3.90	3.71	8.22	6.79
Tertiary	7.3	5.9	4.8	12.2	15.2	15.7	4.29	0.30	8.91	5.45	10.4

Source – National Statistics Bureau

The average growth of Real GDP during the period 2006 to 2016 was 7.4 percent. In the year 2007 the Bhutanese economy experienced robust growth with 17.9 percent. The growth was attributed mainly by the secondary sector which contributed the highest accompanied by the tertiary sector and lastly by the primary sector. In terms of sector wise growth, the secondary sector grew the fastest at 41.6 percent in 2007. Meanwhile, the growth in tertiary and primary sectors were lower at 5.9 and 2.5 percent respectively. The lower contribution from the primary sector is mainly

attributed by poor performance in the forest and logging sub sector. Under the secondary sector, the leading growth driver was the electricity and construction sub sector and under the tertiary sector significant contribution came from transport, communication, insurance, real estate, business services and finance. According to the Annual Report of Royal Monetary Authority, the Bhutanese economy slowed down in 2013 with 2.1 percent growth of real GDP. Growth in many sectors were slow with even a decline in few main sectors. Above all, the construction, manufacturing and general government sectors exhibited negative real growth. In 2013 the growth was attributed by the secondary sector. However, the contribution from the secondary however has fallen by 2.9 percentage as compared to 5.1 percent growth in 2012. Likewise the role from the service sector had declined from 2011 whereas the primary sector contribution to GDP increased to 0.4 from 0.3 percentage. The Annual Report of the Royal Monetary Authority of Bhutan 2016 stated that the tertiary sector continuously recorded the highest share in the economy with 42.02 percent followed by secondary sector at 41.46 percent and primary sector at 16.52 percent. The report also stated that the tertiary sector contributed the highest to the real GDP growth accounting for 4.55 percent followed by secondary sector at 2.98 percent and primary sector at 0.46 percent. The overall growth of real GDP in 2016 was recorded at 7.99 percent.

1.5 Concept of Economic growth

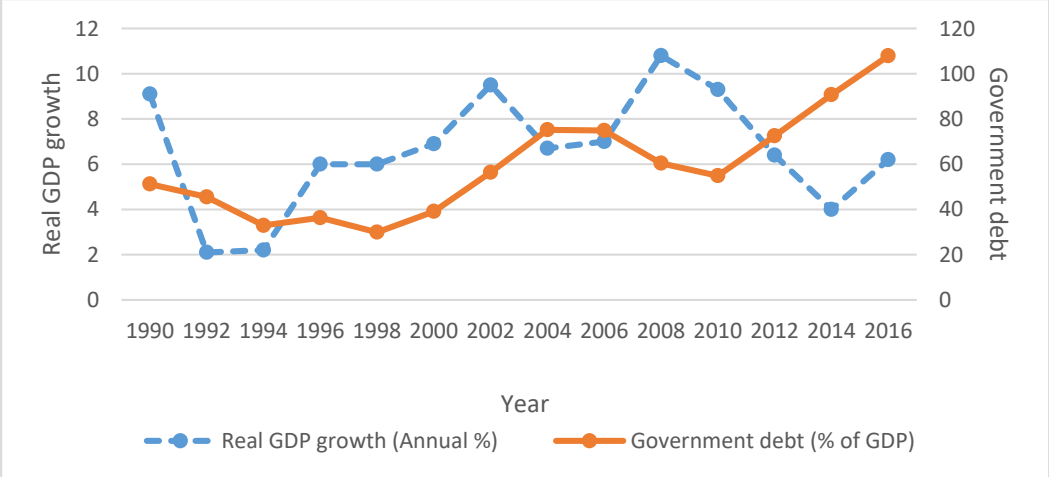
According to Dar & Susan (2013), economic growth is a state whereby the capital accumulation and innovation led by technological progress results in increased prosperity. As per Solow growth model, economic growth is nothing but a rise in the total gross domestic product (GDP) brought by an increase in technical progress, population and investment. In each consecutive year a budding economy produces more amount of goods and services. A growth in an economy indicates an increase in the living standard of the people and minimizing inequalities in income distribution.

1.6 Annual GDP growth and government debt in Bhutan

The relationship between GDP growth rate and government debt as a percentage of GDP overtime is illustrated in Figure 1.1. The variables are combined together in

the chart in order to observe the trend and the patterns of their growth. As illustrated in the figure, the GDP growth rate was higher than the growth of debt in 1990. From the period 1992 to 1994, the growth in debt exceeded the growth in GDP. However between the periods 1994 to 2003, the growth in GDP consistently exceeded that of debt. The upward movement in the level of government debt in 2004 was mainly because of the purchase of new aircraft for Druk Air. The growth of both debt and GDP has been relatively stable from 2004 to 2006. Between 2006 and 2010 there has been a sharp decline in the government debt. In 2010, Bhutan's total government debt reached 54.9 percent of GDP, a decrease of 24.6 percent from 79.5 percent in 2005 (World Bank, 2018). The decline in the government debt and increase in the GDP in 2007 is attributed to commissioning of Tala hydropower project. In 2016, government debt was recorded the highest increase with over 100% with the GDP having only about 6.2 %.

Figure 1.1 Government debt and GDP growth of Bhutan, 1990-2016



Author's own computation using data from the World Bank

1.7 Significance of the study

Given the worrisome debt situation, it would be notable to carry a research work to provide insights about the challenges faced by Bhutan in the realm of its debt crisis and thereby create an enabling environment to stimulate and ensure overall sustained growth of the economy. The impact of government debt on the growth of an economy

has been and is still being discussed in an international level but there has not been a single academic study or research carried out on the same topic in Bhutan. It is the first empirical study looking at the impact of government debt in Bhutan. Therefore, this study would add to the literature on the issue from the Bhutanese perspective.

Since there is no clear cut results on the impact of debt on the growth of an economy, more studies needs to be done in order to understand relationship debt and growth to bridge the gap. The aim of the study is to investigate the effect of government borrowing on the sustained economic development and to analyze the emerging vulnerabilities and threats that government debt has on the economic growth of Bhutan. The outcome of this study will guide the political office holders and policy makers in framing policies aimed at managing the debt crisis situation in Bhutan. The study will also serve as a groundwork for the future scholars who wish to do research on the same topic and work on it for better results.

1.8 Scope of the study

Many studies has been carried on the impact of debt on the growth of the economy because of the conflicting findings in their relationship. Unlike some studies, which uses the panel data for several countries, in this study the time series data is in use since it emphasizes on the association between the government borrowing and economic growth in a specific country, Bhutan. The scope of the research is to find the impact of government debt on the growth of Bhutanese economy from 1990 to 2016.

1.9 Limitation of the study

Since no studies has been carried out till date to study the relationship between debt and growth in Bhutan, so referencing the relevant literature posed a great hurdle. A major challenge for the study is the non-availability of data before the year 1990 which affected the specification of the model and hence the study was restricted to only 27 years. And also the lack of reliable data made the study daunting but has also opened room for many future opportunities. Another major challenge was acquiring data on some other important variables because of which those variables had to be exempted from the study.

1.10 Organization of the paper

This research is divided into five chapters. Chapter 1 is the introduction which includes the background of the study, objectives of the study, overview of Bhutanese economy, significance and the scope of the study. Chapter 2 includes the literatures reviewed on the factors determining economic growth including the government debt. Chapter 3 presents the methodology used in the study. Chapter 4 discusses the analysis and results from the estimation. Chapter 5 presents the conclusion.

CHAPTER 2

LITERATURE REVIEW

This chapter aims at explaining the various theories on economic growth and at identifying and assessing contributions and findings in the past studies done by different researchers and scholars on the impact of government borrowing on growth.

2.1 Theories on Economic Growth

To explain the concept of economic growth, several theories have been postulated. Some of the theories include Classical growth theory, Neo-classical growth theory, Keynesian theory and Endogeneous growth.

2.1.1 Classical growth theory

The theory of Classical growth was proposed in the year 1776 by Adam Smith. According to him the total output in the economy is determined by the amount of inputs such as land, labor and capital. Whereas growth in population, land, level of investment and the total labor productivity defines the growth of output. The division of labor which results in the growth of output, technological accumulation and progress is considered as the key factor for the growth in an economy. Despite of being the main factor of economic growth the market dimension puts a limit to the division of labor. The extension in the market dimension brought about by increase in the division of labor as compared to the output will further induce division of labor and a result boost the economy at a higher level. Apart from division of labor, capital accumulation is also considered as an important aspect which determines the development of an economy. Therefore under the classical growth model the growth rate of an economy is determined by the income distribution.

The output is a function of land (T), labor (L) and capital (K), which is written as follows: $Y= f (K, L, T)$

2.1.2 Keynesian Growth Model

The basis of Keynesian theory are role of money, the effective demand, the transition of savings to investments and multiplication effect. According to Harrod-Domar growth model, the savings and capital output ratio of the country jointly determines the growth rate of output. The model shows a direct bond between savings and the economic growth rate which can be written as follows:

$$Y= f(k,s)$$

Where ‘Y’ denotes the total output, ‘k’ is the capital output ratio and ‘s’ is the ratio of national savings.

2.1.3 Neo- classical growth theory

This theory suggests that technological innovation is more important as compared to the capital accumulation and takes vital influence on the nation’s economy. In this theory, growth is measured by the increase in labor supply, capital and productivity. This model assumes that output (Y) is a function of technology (A), physical capital (K) and labor (L). As a result of technological changes, it leads to an increase in level of productivity and production factors thereby resulting to a rise in the growth rate of output.

2.1.4 Endogeneous growth model

According to the model, in the long run the growth rate of an economy will be determined by the actions taken by the government. The government policies such as fiscal and monetary policies have a major part to play in order to achieve economic growth in the long run. According to Lin (2000), the government debt would increase the GDP per capita but not the real interest rate. However, borrowing would hamper the growth of an economy in case the real interest rate is higher than GDP growth rate.

2.2 Theoretical Framework

The main aim of the study is to find the possible effect of government borrowing on the economic growth of a country.

Various economic theories on growth fail to recognize the main factors that affect the economic growth. So as a measure the following regression model has been recommended:

$$GRGDP = \beta_0 + \beta_1 X_{10} + \beta_2 X_{20} + ... + \beta_n X_n + \varepsilon$$

Where GRGDP is the economic growth rate and X_{10}…Xn are the possible independent variables that may differ from one study to another. The researchers usually include those explanatory variables which best determine the economic growth of that particular economy. For example, Spilioti & Vamvoukas (2015) employed government debt, the gross domestic product per head of population, savings, exports, imports, short term nominal interest rate, population, unemployment, trade and growth rate of population as some of the variables that determined the rate of economic growth (GDP).

To explain the issue of debt on the economic growth, several theories have been postulated by different scholars. The theory includes debt overhang theory, dual gap theory, crowding out effect theory and Solow-growth model.

Debt Overhang theory

Debt overhang occurs when the level of debt surpass the country's debt repayment ability. According to Krugman (1988), Debt overhang is a state in which the anticipated repayment debt amount is more than the borrowed amount. The gathered debt stock comes as hindrance to stakeholders from investing in the private sector as they fear high tax being levied on them by the government. When this happens, the "Debt overhang effect" comes into action. With this debt overhang effect the debt service, which consists of repayments and interest payment, is likely to be a rising function of a country's output level. In a bid to lessen the amount of debt service it is anticipated that any future income accumulated by the prospective investors would be taxed heavily by the government. This will discourage the new investors which will

affect the whole economy and thereby resulting in a decrease in the growth rate of the economy (Ayadi, 2008).

Dual Gap Theory

Many researchers proposed a theory called a ‘dual gap’ theory, which explains about the issue of external debt. The theory justifies the purpose why countries resort to external finance to ensure sustained economic growth. The theory suggests that economic development takes place with the increase in investment level. Investment is a function of savings and in some countries, the domestic savings is not adequate to confirm the progress of the economy. Therefore, countries find it logical to obtain external funds to finance the developmental activities.

The dual gap analysis states that to achieve economic growth a country needs saving and investment and imported goods. However, in order to accomplish the goal of economic growth, the domestic savings may not be enough, which will result in a gap between savings and investment. This saving investment gap will thus induce borrowing to take place. And likewise in order to achieve growth, if the import requirement exceed the export level then it will lead to export and import gap.

Crowding Out Effect Theory

For any given level of future indebtedness a decrease in the debt service will result in the rise in the level of investment. Bhattacharya, Clements, & Nguyen (2003) opinioned that debt service obligations are expected to crowd out investment in the economy and squeeze economic performance. The crowd out effect is a situation in which a country use its revenue for debt service payment. If most of the resources are soaked up to service external debt this will limit the portion of resources available for investment and growth in the domestic economy. As an outcome of debt liquidation constraints the influence of debt servicing on growth is detrimental since it lessens government spending in the economy. The liquidity constraints is a consequence of debt service requirements which move the attention to repayment of the debt rather than focusing on developing the domestic economy. The total level of public expenditure in the economy is affected attributing to less public expenditure on the social infrastructures.

Solow Growth Model

Capital and labor are the important factors of production in a Solow growth model. Here the effect of debt on the growth of an economy can be observed through its implication on the domestic saving which is sequentially utilized as investment. By viewing the different effects of crowding out and debt overhang theories on Solow growth model the overall influence of debt on Solow growth model can be examined. According to the debt crowding out theory, the government utilize its revenue to meet the debt service payment as an effort to repay the debt obligation. Public investment is hindered in those countries where revenues from export earnings are used for debt service repayment rather than on investment purpose in the economy. This will hamper the growth and in the Solow growth model the investment and production curves will shift downward. On the other hand, under the debt overhang theory, the government will heavily tax the prospective investor in order to minimize the accrued debt. This move by the government will in turn discourage private investment and divert the resources in paying the huge debt service instead of making productive usage in social infrastructures. The level of total investment in the country as a whole will decrease and thus in the Solow growth model there will be a downward shift in both investment and production curves.

2.3 Empirical Review

2.3.1 Government debt and economic growth

Recently, the discussion on debt has captured a lot of attention from the public and policymakers because of the impact it caused on the growth an economy. A series of researches have been carried out to discover the influence of government indebtedness on the development of the economy and also to find out the relationship between these variables. However, the findings of those studies were either conflicting, unclear or differed from each other depending on the countries being examined, the time period, the methodology and the variables incorporated in the model. Empirical studies found both positive and adverse effect of government debt on determining the economic performance of a country and some studies found the causality connection amongst debt and growth of an economy. Government debt is a

means of financing infrastructural projects and achieving sustained economic growth. Countries usually resort to external finance in order to enhance their economic performance. Debt has been recognized both as a blessing and as a curse on the economic growth.

The empirical review has been carried out in order to assist us in using a suitable methodology and to see how variables under study have been measured. Empirical literature is therefore reviewed according to specific grouping.

Time Series Studies

Regardless of employing different methodology techniques the results of some past studies that has been reviewed under this section were found to be consistent to the theory. Using ordinary least square (OLS), Rais & Anwar (2012) assessed the connection between debt and economic growth of Pakistan from 1972 to 2010. The public debt outstanding had surpassed the country's GDP and the country faced poor socio economic problems. The findings of the study supported the debt accumulation arguments under the neoclassical theory. Cholifihani (2008) inspected the impact of public debt on the economic growth using VEC and time series data from 1980 to 2005. The study reported that the alteration in the capital stock enhanced the growth in the short run whereas in the long run debt service hindered economic growth in Indonesia. Anning, Frimpong, & Kwame (2015) by using simple ordinary least square method and time series data from 1990-2015 found that in Ghana debt is negatively associated with growth because of the presence of corruption and inefficient management of the debt. They suggested that revenue should be increased through tax reform programs instead of borrowing. Using Johansen co-integration and VECM techniques, Audu (2004) investigated the impact of debt on the economic growth for the period 1970 to 2002 in Nigeria. The study found that the economic growth and public investment are negatively affected by the burden of debt service. Sheikh, Faridi, & Tariq (2010) confirmed in Pakistan a positive association between domestic debt and economic growth over a period 1972 to 2009. The reason of this positive relationship is because the borrowed funds has been used to fund those expenditures of government which contributes to the growth of economy. Bhatta (2003) analyzed the effect of government debt on the economic growth in Nepal for the period

between 1980 and 2001 using OLS. The empirical result showed that debt had a positive impact on the economic performance. Nepal is a mixed economy and a land locked economy with high dependence on foreign aid and agriculture. Balago (2014) studied the link between external debt and economic growth from the year 1981 to 2012. Using the OLS Regression, the research concluded that external debt and the gross domestic product are positively related. This finding supported the previous study done in Nigeria by Azeez (2012). In the study by Dritsaki (2013) the researcher found the presence of both short run and long run relationship amongst government indebtedness, export and economic growth in Greece. In the short run, the Granger causality result showed that there does not exist a causal association among government debt and exports. However, there was a unidirectional Granger causality from growth to debt in the long run. Karagöl (2002) examined the impact of external debt on the economic growth of Turkey over the period 1956 to 1996. The Granger casuality test revealed a unidirectional casuality from debt to economic growth indicating that debt is important for growth of the country. Rahman (2012) empirically examined the effect of debt on the growth Malaysian economy. The study employed quarterly data from 2000 to 2011. The results from Vector Error Correction Model (VECM) and Vector Auto Regression Model (VAR) found that there is no significant impact of debt on the growth of Malaysian economy in both short run as well as in the long run. Ada (2016) empirically studied the association between external debt and economic growth for Nigerian economy. Employing ARDL bound testing approach from 1970 to 2003, the study found that external debt has a negative influence on the gross domestic product.

Panel and Cross Sectional Studies

In the empirical study by Fosu (1996) on the impact of public debt on the economic growth in Sub Sahara Africa for the period 1970 to 1986 using the OLS regression, the study revealed that the debt burden led to reduction in the GDP by 33%. In a study of 80 developing countries, Cordella, Ruiz-Arranz, & Ricci (2005) found that the countries with good policies and institution faced negative impact from debt when it crossed 30 percent of GDP. But, however once it exceed 80 percent, the effect becomes irrelevant. As compared to the countries with bad policies and

institution, these threshold levels are higher. Kourtellos, Stengos, & Ming (2013) in their study concluded that in countries with Low- Democracy regime, high public debt led to lower growth when compared to countries with High-Democracy regime. Gómez & Sosvilla (2015) explored the influence of public debt on the economic performance for EMU (European Economic and Monetary Union) countries. They found that debt had a negative effect on the output in the long run with a prospect of positive impact in the short run depending on the final allocation of the debt i.e. on productive or unproductive expenditure. Schclarek (2004) investigated the effect of debt on growth for a number of developing and industrial economies over the period 1970 to 2002. The empirical result provides that lower external debts are related with high growth rates in developing economies. And on the other side there was no significant relationship between debt and growth for the industrial economies. Fincke & Greiner (2013) investigated the link between debt and economic growth. The analysis is based on the panel data covering seven developed counties over the period 1970 to 2012. In their study, they estimate a random effects model and pooled regression model and their results reveal that there exists a negative connection between debt and economic growth. Employing data of 30 years, Spilioti (2015) found that government debt, gross domestic product and gross national saving are the important factors which contributed significantly to the growth in Euro Area countries. Saad (2012) in his study on the relationship between external public debt, exports and economic development in Lebanon found that there exist a unidirectional Granger causality from external debt to exports and then from exports to economic growth. The effect of government debt on economic development depends on how the debt is being used. Cecchetti, Mohanty, & Zampolli (2011) found the estimated threshold for government debt to be around 85%. The debt beyond the threshold was detrimental to the economic growth whereas the moderate level boosted growth. A high level of public debt can adversely affect economic growth through sluggish growth of capital stocks and productivity (Woo & Kumar, 2015). Reinhart & Rogoff (2010) found that at 60% debt level it has less impact on the economic growth whereas beyond 90% the economic performance slowed down. Using the augmented VAR model approach in G7 countries, Kempa (2016) investigated the causality direction between debt and economic growth and the study showed that rather than

debt causing growth it was the other way round. In a study on African external debt problem in comparison to Nigeria and Morocco, Edo (2002) concluded that investment was severely hampered by external debt and that fiscal expenditure, balance of payment and global interest rates mainly attributed to the accumulation of debt in these two countries. In an effort to remove the problem, he suggested measures such as development of capital markets, export promotion and privatization.

2.4 Factors determining the Economic growth

Under this section, the author attempts to review the literature based on the important variables, which are expected to be the significant factors affecting the economic growth. The variables are:

2.4.1 Unemployment

According to the International Labor Organization (ILO) unemployment is defined as a situation in which people are without jobs, looking for work and have actively sought work in the past four weeks. In simple words unemployment can be defined as a scenario in which the people are willing and able to work and make themselves to work at a prevailing wage but there is no work for them. Human resource is regarded as an important determinant for economic growth as they can exploit the natural resources, accumulate capital and build the social, economic and political organizations. A country can achieve growth as long as it can improve the skills and knowledge of its people and utilize them efficiently. A high unemployment rate is associated with high inequality and high poverty level which in turn is regarded as the root cause for low economic growth. A high unemployment rate is also expected to increase the economic cost which hampers the economic growth. High level of unemployment indicates that the resources are not used efficiently and there is a low aggregate demand. Not only is the consumption level low but there is also a decrease in private investment in both human and physical capital which in turn hampers the present growth and production capacities in the future. Increased unemployment lowers the self-confidence and self-esteem of an individual thereby causing unrest and conflict in the society and reduced performance in the labor market thus deterring the growth of an economy in the long run.

A number of studies in the past have empirically investigated the relationship between unemployment and output. There is no clear link between unemployment and growth as there were findings of both positive and negative relationships. A high unemployment rate imposes some negative consequences on economic wellbeing of an individual and as a whole on the economic prosperity of a country. Using the Error Correction Model and Johansen co-integration test, Akeju & Olanipekun (2014) explored the link amongst unemployment rate and economic growth in Nigerian economy. They discovered the presence of short run and long run negative connection between the two variables and thereby suggested that FDI attraction should be increased to create employment. Shahid (2014) explored the impact of inflation and unemployment on the economic growth using time series data from 1980 to 2010. The study found that a reverse relationship existed between the unemployment and economic growth in Pakistan. In a study by Donga, Hayatudeen, & Umaru (2014) using OLS and time series data for the period 1986- to 2010, the researcher found that unemployed human resources have a positive impact on the growth of Nigerian economy. In economics this type of growth is known as 'Exclusive growth' as this growth do not reflect in the living standard of the people. Ademola & Badiru (2016) studied the influence of unemployment and inflation on the economic growth of Nigeria for the period 1981 to 2014. Employing Ordinary Least Square the study concluded that unemployment and inflation positively contributed to the economic performance.

2.4.2 Tourism

Tourism industry has been recognized as an agent that helps in supporting and sustaining the economic growth of a country. It is considered as one of the main revenue generator for an economy as it helps in earning foreign currencies and creating employment opportunities and serves as a source of technical assistance (Dieke, 2003). Tourism sector is closely associated with the pace and level of economic growth and in particular with the activities such as transport, constructions, trade, agriculture, etc. Researchers at the present time considers tourism as an essential tool for the growth of an economy. Through the creation of tourism businesses, tourism can help in alleviating poverty and reducing unemployment in the

economy. In the study by Hajdinjak (2014) using Vector Autogression (VAR) for the period 1980 to 1991, it was concluded that tourism have a positive impact on the national gross production which thereby contributed to the economic growth in Croatia. Using data from 1993 to 2001, Soukiazis (2005) found that Tourism in Portugal can improve growth if the supply characteristics is enhanced. 1% increase in tourism accommodation capacity is associated with 0.01% increase in per capita income. Fayissa, Nsiah, & Tadesse (2009) investigated the connection between tourism and economic growth in Latin American Countries using panel data set from 1995 to 2004. Their findings concluded that tourism revenue contributed positively to the economic growth of the country. Tourism sector can raise national income, reduce unemployment and enhance the country's balance of payment. Using time series data from 1979 to 2010 for Iran economy, Nemati and Raisi (2014) found that tourism have a positive influence on the economic growth. Due to tourism sectors, employment opportunities are created which in turn help in raising the standard of living of the people. Tourism is an important engine for economic growth and plays a significant role in reducing poverty (Robu & Balan, n.d.).

2.4.3 Foreign Aid

Foreign aid is the transmission of capital, goods and services from the developed economies to the developing or under developed economies in order to boost the economy. It helps in eradicating poverty and promotes growth through important programs such as education, agriculture, health, etc. Foreign aid is considered as a source through which scarce financial capital can be raised. Aid leads to GDP growth by alleviating the recipient country's resource constraints. It also helps in transferring advanced and modern technologies and upgrading the stock of human capital. However there are also negative impact of foreign aids in the aid recipient countries as the large part of the fund is diverted towards debt servicing and in non-development public administration. Furthermore, the effect of aid on the economic growth especially in alleviating poverty is minimized because of political unrest, repeated changes in policies, inefficiency of institutions, etc taking place in the economy.

The influence of foreign aid on the economic growth is ambiguous as there are studies which supports both negative and positive impacts. In their investigation about the association between foreign aid and economic growth, Hatemi-J & Irandoust (2005) asserted that foreign aid contributed positively to the economic growth. For the study they used panel data set from 1974 to 1996 and also concluded that foreign aid enhanced the domestic savings which in turn can have a positive effect on the real income. In the study by Mitra (2013) on the influence of foreign aid on the economic growth in Cambodia employing time series data from 1971 to 2009 and using VECM, the study concluded that the impact of foreign aid on the economic growth is positively significant in the long run. Amongst other studies, Hansen (2001) also reports a positive association between foreign aid and GDP growth. On contrary, there are some studies which shows a negative impact of foreign aid on the growth. The study carried out by Mallik (2008) concluded that foreign aid has a negative effect on the growth of real GDP per capita. The study was carried for six poorest African countries by employing the co-integration approach.

2.4.4 Tax

A tax is a compulsory payment levied by the government on the income earned and properties owned by an individual and business sectors. It is nothing but the transfer of income and resources from the private to the public sector in order to accomplish some of the nation's objectives such as stable prices, high employment rate, equal distribution of income, favorable balance of payment, development of priority sectors, etc. The government decides the level of tax to be paid by the concerned group and the items that are to be taxed. The tax which is the key source of revenue for the government is determined based on the activities and projects that the government plans to implement. Tax is expected to affect the size of government expenditure, individual's consumption pattern, level of business activities, propensity to invest and save and as a whole the overall growth of an economy. The main objectives of taxation is to increase the government's revenue, to control income and employment and to regulate the economic activities. Imposing high tax on higher incomes tend to reduce the return to investment in human capital, which in turn will distorts educational decisions thereby causing a fall in the economic growth. The

studies in the past that investigated the relationship between tax revenue and economic growth found mixed results. Using panel data from 70 countries, Lee & Gordon (2005) examined the impact of corporate tax, personal income tax and the value added tax on growth rate of GDP per capita. They found that only corporate tax rates had a negative significant effect on the economic growth. Acquah & Ojong (2014) studied the impact of tax revenue structures on the economic growth of Nigeria for the period 1980 to 2002. Employing ordinary least square method the study revealed that increase in tax revenue from the federal and state government had a positive impact on the growth whereas increase in internally generated revenue resulted in declined growth.

2.4.5 Population

Demographic characteristic has a important impact on the performance of the economy. Increased population has been viewed as an obstacle to the economic growth as it causes dependency burden whereas less population has led to shortage in the man power or labor. The impact of population on the growth of an economy is ambiguous as there is no clear cut decision on whether population growth is a driving factor of economic growth or it weakens the growth.

In the study by Savas (2008) using ARDL approach, the researcher pointed out that there is a strong positive association between population and economic growth which indicates a 'post Malthusian regime' in the Central Asian Economies. This positive relationship is reinforced by Furuok (2009). Using ADF unit root test and Johansen co-integration test for the period 1950 to 2007 the finding of the study supports the population-driven economic growth hypothesis. In contrary, Klasen (2007) discovered a negative impact of population on the economic growth in Uganda. Employing panel data the study concluded that high population growth put a considerable break on per capita growth prospects in Uganda. However, some empirical studies also revealed that there is no long run connection between population and economic growth. Using co-integration analysis Mushtaq (2006) investigated the presence of a long-run association between population and per capita income in Pakistan for the period 1960 to 2001. The study found that population growth do not cause growth in per capita income nor it is caused by it. Thornton

(2001) studied the long run relationship between population growth and economic growth in seven Latin American countries. Using economic techniques such as unit root test, the Johansen maximal likelihood and granger causality, the study concluded that there is no long run relationship between the these two variables.

2.4.6 Savings

Saving is an important factor of economic growth. An increase in saving results in an increase in investment, which in turn leads to higher capital accumulation. A higher capital accumulation thereby generates economic growth. Many studies have examined the connection between savings and economic growth. Many studies suggest that savings is certainly related with the economic growth and vice versa. Using Autoregressive Distributed Lag Model, Najarzadeh, Reed, & Tasan (2014) found that savings and economic development showed a positive and significant impact and long run causality in Iran for the period 1972 to 2010. In the study by Using the cointegration and causality test, Lean (2015) investigated the relationship between saving and economic growth in China for the period 1955 to 2004. The study found that there exists a bilateral causality between domestic savings growth and the economic growth in the short run whereas there was a presence of unidirectional causality from the economic growth to savings growth in the long run. Jagadeesh (2015) employed the Auto Regressive Distributed Lag model to examine the relationship between the domestic savings and economic growth in Botswana from 1980 to 2013. The finding showed that savings has a positive impact on the Gross Domestic product.

2.4.7 Foreign Direct Investment

The impact of Foreign Direct Investment on the economic growth is debatable. Some studies argue that foreign direct investment is considered as the engine of economic growth. Adams (2009) studied the impact of foreign direct investment and domestic investment on the economic growth. Employing data from 1990 to 2003 and using OLS and fixed effects estimation approach it was found that domestic investment is positively connected with economic growth in Sub –Saharan Africa whereas FDI showed the same result only while using OLS estimation. Szkorupová

(2014) dealt with the impact of foreign direct investment on the economic growth in Slovakia from 2001 to 2010. For this purpose, the researcher used co-integration and vector error correction method. The study concluded and supported that foreign direct investment has a positive impact on the economic growth of a country.

On the other hand some studies concluded that the foreign direct investment has a negative correlation with the economic growth of the recipient country (Rahman, 2015). Saqib, Masnoon, & Rafique (2013) investigated the effect of FDI on the Gross Domestic Product of Pakistan employing the time series data from 1981 to 2010. Using the least square method the study concluded that Pakistan's economic growth is negatively affected by the FDI because of the limited capacity to retain the transfer of knowledge and technology for further development.

2.4.8 Inflation

Inflation is an increase in the price of goods and services. Different researchers have different views hence the relationship between these two macroeconomic variables is arguable. This relationship have drawn attention from policy makers, macroeconomists and central bankers. For the structuralists, they are of the opinion that inflation helps the economy to grow, whereas monetarists believe that inflation has an adverse effect on the economic growth. Ahmed (2005) studied the relationship between inflation and economic growth in Bangladesh for the period 1980 to 2005 by using the co-integration and error correction model. The result of the paper have shown that there is a statistically significant long-run adverse relationship between inflation and economic growth. The study also found out the threshold level of 6 percent above which the inflation is detrimental to the economic growth. In the study by Mamo (2012) for the period 1969 to 2009 it was found that inflation has a negative and a significant relationship with the economic growth in 13 SSA countries. Empirical literature also shows a positive relationship between inflation and economic growth. Behera (2014) studied the relationship between inflation and economic growth for six South Asian countries from the period 1980 to 2012. The result indicated that there is positive relationship between inflation and economic growth. In addition the cointegration result showed that there is no long run relationship between inflation and economic growth except for Malaysia.

2.4.9 Export and Import

The relationship between export and economic growth is also quite unclear because past studies have shown both positive and negative relationship between these two variables. In Ethiopian economy the export have contributed to the economic growth of the economy and it has been found that the impact is greater in the long run as compared to the short run (Chemeda, 2001). To confirm the relationship, the researcher used the co-integration test and time series data from 1950 to 1986. Employing time series co-integration analysis Li, Chen, & San, (2010) found that export was undesirable while import contributed greatly towards the economic growth of China. Saaed & Hussain, (2015) examined the impact of import and export on the economic growth of Tunisia for the period 1977 to 2012. To understand the long run relationship the study used Johansen cointegration approach and Granger causality. The results of Granger Causality showed unidirectional causality between exports and imports and between exports and economic growth. Moreover, there is evidence to support that growth -led import strategy as well as export led import boosted the growth.

Several studies have been carried out in the past by different researchers investigating the impact of debt and other important factors on the economic growth. However in most of the studies the researchers analyzed and focused on one specific variable to examine the impact unlike the study being carried on which involves more than one important factors. For instance in our study we employed several factors such as debt, unemployment, tourism revenue, foreign aid, tax revenue and population growth. The studies which employed more than one variable mostly used the Ordinary Least Square approach and the ARDL approach whereas in our study we adopt the VECM approach and also the variables employed in our study are different. The factors which best describes the economic growth of Bhutan have been used in the study. Apart from studying the impact of debt and other variables on the GDP growth we also study the impact of rupee crisis which occurred in Bhutan in 2012 on each variables under study and in turn on the overall economic growth of Bhutan. The contribution of this study is that it will guide the planners in Bhutan since is first study to be carried on which examines the impact of debt on economic performance of

Bhutan. No studies till date has been carried on to study the impact of government debt on the GDP growth in Bhutan.

The following table will help us to understand the reason for including and excluding some of the important variables in our study.

Table 2.1 Reasons of the variables

Variables	Reasons
Debt	Bhutan, a small and a least developed country with limited resources and insufficient funds, has been struggling to finance the developmental activities. To keep up with the pace of development and to finance the social infrastructures necessary to achieve economic growth the government has been borrowing and the debt has been rising tremendously over the past years. So the debt have been selected as the main explanatory variable so as to find out whether it has a positive or a negative impact on the GDP growth of Bhutan.
Unemployment	Human resource is regarded as an important determinant for economic growth as they can exploit the natural resources, accumulate capital and build the social, economic and political organizations. Unemployment has been considered as a serious issue in Bhutan and the government has been trying to address this problem through various measures. A high unemployment rate is associated with high inequality and high poverty level which in turn is regarded as the root cause for low economic growth. A high unemployment rate is also expected to increase the economic cost which hampers the economic growth. The study will examine the impact of unemployment on the economic growth of Bhutan.
Tourism revenue	It is considered as one of the main revenue generator for Bhutan as it helps in earning foreign currencies and creating

Variables	Reasons
	employment opportunities. Through the creation of tourism businesses, tourism can help in alleviating poverty and reducing unemployment in the economy. So the study use tourism revenue as one of the variables to study the impact on the GDP growth of Bhutan.
Foreign Aid	Foreign aid is considered to be an important determinant of economic growth as it helps in eradicating poverty through important programs such as education, agriculture, health, etc. Foreign aid also helps in raising scarce financial capital. Bhutan have been receiving aid from many countries and international organizations. So foreign has been selected in the study to examine the impact on the economic growth of Bhutan.
Tax Revenue	Tax is expected to affect the size of government expenditure, individual's consumption pattern, level of business activities, propensity to invest and save and as a whole the overall growth of an economy. Tax lead to an increase in the government's revenue. Imposing high tax on higher incomes tend to reduce the return to investment in human capital, which in turn will distorts educational decisions thereby causing a fall in the economic growth. So tax revenue has been selected as one of the explanatory variables in the study so as to investigate its impact on the GDP growth of Bhutan.
Population growth	Over the years Bhutan has been experiencing a decline in the population growth. Slow growth of population is not desirable as it will lead to inadequate supply of workforce required for the economic growth. Too high a growth of population is also

Variables	Reasons
	not preferable given the less inhabitable land in Bhutan. So for this particular reason the study employ population growth to examine its effect on the economic growth of Bhutan.
Savings	Saving is also considered as an important determinant of economic growth. An increase in saving results in an increase in investment, which in turn leads to higher capital accumulation. A higher capital accumulation thereby generates economic growth.
Foreign Direct Investment	Foreign Direct Investment plays a significant role in achieving the economic growth. FDI helps to create employment, transfer technology and enhance competitiveness thereby leading to economic growth.
Inflation	Inflation is an increase in the price of the goods and services prevailing in an economy over a period of time. It happens usually when there is increase in the demand and decrease in the supply of goods and services. When inflation occurs many groups in the economy are affected in both positive and negative ways thereby affecting the overall growth of an economy.
Import and Export	Import means when a country buy goods from outside the country. And export is selling the goods outside the geographical boundary of a country. When a country's import is more as compared to the export of the goods the country will experience a trade deficit whereas if export exceeds the import then it runs a trade surplus. Both import and export are considered as an important determinants of economic growth.

Variables	Reasons
	Bhutan has been experiencing trade deficit over the years since the country imports almost everything from India and other countries and export virtually nothing.

There are many other factors which determines the economic growth of a particular country. In the study only some factors are taken into consideration as they best describes the economic growth of Bhutan. Some other important factors such as savings, Foreign Direct Investment, Inflation, Export and Import had to be excluded because of the fact that the data was not available and also given the limited period of study (27 years), adding more number of variables could lead to the loss of degree of freedom and misleading results.

CHAPTER 3

RESEARCH METHODOLOGY

This section includes the methodology of the study, data description, model specification and the techniques for estimation.

3.1 Research Methodology

In this study we adopt co-integration analysis employing the Augmented Dicky Fuller (ADF) and Phillips Perron (PP) unit root test, Johansen co-integration test and Vector Error Correction techniques of estimation which provides coefficient estimates of time series data used in the analysis.

3.2 Model Specification

To investigate the impact of government debt on the economic growth, we use seven variables such as growth rate of gross domestic product, government debt, unemployment rate, tourism revenue, foreign aid, tax revenue and population growth. Two kinds of equations can be derived once we confirm that the variables are co-integrated.

3.2.1 The long run equation

With some modification, we adopt a simple macroeconomic model used by Ada, (2016). The model is specified as given below:

$$GDPG_t = \beta_0 + \beta_1 DEBT_t + \beta_2 UNEMP_t + \beta_3 TOUREV_t + \beta_4 FRAID_t + \beta_5 TAXREV_t + \beta_6 POPG_t + \varepsilon_t$$

Where,

GDPD is growth rate of Gross Domestic Product

DEBT is Government debt

UNEMP is the unemployment rate

TOUREV is the tourism revenue

FRAID is the foreign aid

TAXREV is the tax revenue

POPG is the population growth

β_0 is the intercept of relationship in the model,

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are the coefficients of the explanatory variables

ε is the error term and t represents the time.

3.2.2 The short run equation or VECM

The Vector Error Correction Model (VECM) is adopted to estimate the relationship between government debt and economic growth and is specified as given below:

$$\Delta GDPG_t = \beta_0 + \sum \beta_1 \Delta(GDPG)_{t-1} + \sum \beta_2 \Delta(DEBT)_{t-1} + \sum \beta_3 \Delta(UNEMP)_{t-1} + \sum \beta_4 \Delta(TOUREV)_{t-1} + \sum \beta_5 \Delta(FRAID)_{t-1} + \sum \beta_6 \Delta(TAXREV)_{t-1} + \sum \beta_7 \Delta(POPG)_{t-1} + ECT_{t-1} + \varepsilon_{t-1}$$

Where,

Δ is the difference operator

ECT is the error correction term to capture short run dynamics which is derived from long run relationship.

3.2.3 Time trend and Time Dummy

In the study we also analyse the impact of the various explanatory variables especially the government debt on the economic growth of Bhutan before and after the Rupee (Indian Currency) crisis which occurred in the year 2012. To capture the effects of rupee crisis on the GDP growth the models are specified as follows:

Time trend

$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 TOUREV + \beta_4 FRAID + \beta_5 TAXREV + \beta_6 POPG + \beta_7 T$

Where T = 1990, 1991, 1992……2016

The underlying hypothesis is as follows:

H_0: $\beta_7 = 0$, there is no trend in the data.

Time Dummy

The dummy variable 'R' shows the rupee crisis that evolved in Bhutan since 2012 to 2016. It captures the impact on each variable such as debt (R*DEBT), unemployment (R*UNEMP), tourism revenue (R*TOUREV), foreign aid (R*FRAID), tax revenue (R*TAXREV) and population growth (R*POPG) and in turn captures the impact on the overall growth (i.e. GDP growth) of the Bhutanese economy. R=0 before the crisis for the period 1990 to 2011 and R=1 after the crisis from 2012 to 2016. The underlying hypothesis is also given for each model.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 R*DEBT + \beta_3 UNEMP + \beta_4 TOUREV + \beta_5 FRAID + \beta_6 TAXREV + \beta_7 POPG$$

Hypothesis:

H_0: $\beta_2 = 0$, the impact of Debt on GDP growth of Bhutan is the same for both before and after the rupee crisis.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 R*UNEMP + \beta_4 TOUREV + \beta_5 FRAID + \beta_6 TAXREV + \beta_7 POPG$$

Hypothesis:

H_0: $\beta_3 = 0$, the impact of unemployment on GDP growth of Bhutan is the same for both before and after the rupee crisis.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 TOUREV + \beta_4 R*TOUREV + \beta_5 FRAID + \beta_6 TAXREV + \beta_7 POPG$$

Hypothesis:

H_0: $\beta_4 = 0$, the impact of tourism revenue on GDP growth of Bhutan is the same for both before and after the rupee crisis.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 TOUREV + \beta_4 FRAID + \beta_5 R^* FRAID + \beta_6 TAXREV + \beta_7 POPG$$

Hypothesis:

H_0: $\beta_5 = 0$, the impact of foreign aid on GDP growth of Bhutan is the same for both before and after the rupee crisis.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 TOUREV + \beta_4 FRAID + \beta_5 TAXREV + \beta_6 R^* TAXREV + \beta_7 POPG$$

Hypothesis:

H_0: $\beta_6 = 0$, the impact of tax revenue on GDP growth of Bhutan is the same for both before and after the rupee crisis.

$$GDPG = \beta_0 + \beta_1 DEBT + \beta_2 UNEMP + \beta_3 TOUREV + \beta_4 FRAID + \beta_5 TAXREV + \beta_6 POPG + \beta_7 R^* POPG$$

Hypothesis:

H_0: $\beta_7 = 0$, the impact of population growth on GDP growth of Bhutan is the same for both before and after the rupee crisis.

3.3 Data description

The study aims to examine the effect of the government debt on the economic growth using the annual time series data for Bhutan that spans from the period 1990 to 2016. A total of seven macroeconomic variables are used in the analysis. The definitions and sources of each of the variables are described in the following table.

Table 3.1 Definitions and sources of variables

Variables	**Definition**	**Source**
GDPG	Real GDP growth rate. It captures the change in value of final goods and services produced in an economy for a particular period of time.	World Economic Outlook (IMF)
DEBT	Government Debt which shows the effect of debt on the growth rate of GDP.	World Bank
UNEMP	Rate of unemployment (Annual %)	World Bank
TOUREV	Total revenue earned from tourism sector.	National Statistics Bureau, Bhutan
FRAID	Foreign grants	National Statistics Bureau, Bhutan
TAXREV	Revenue earned from tax.	Annual Report, Royal Monetary of Bhutan.
POPG	Growth rate of population.	World Bank

The following table describes each of the variable's expected signs on the economic growth.

Table 3.2 Variables and expected sign

Variable name	**Unit**	**Expected sign**	**Empirical Papers**
GDPG	% per year	Dependent Variable	Dependent variable

Variable name	Unit	Expected sign	Empirical Papers
DEBT	% of GDP	+/-	Audu (2004), Rahmen (2012), Anning et al. (2015), Cholifihani (2008), Rais & Anwar (2012), Bhatta (2003).
UNEMP	% of total labor force	-	Akeju & Olanipekun (2014), Shahid (2014), Ademola and Badiru (2016).
TOUREV	% of GDP	+	Hajdinjak (2014), Soukiazis (2005), Fayissa, Nsiah, & Tadesse (2009), Nemati & Raisi (2014).
FRAID	% of GDP	+/-	Hatemi-J & Irandoust (2005), Mitra (2013), Hansen (2001), Mallik (2008).
TAXREV	% of GDP	+/-	Lee & Gordon (2005), Acquah & Ojong (2014)
POPG	% per year	+/-	Savas (2008), Furuok (2009), Klasen (2007), Mushtaq (2006), Thornton (2001).

The GDPG is the dependent variable and is taken as a proxy for economic growth. It denotes the percentage change in the GDP growth rate from the previous year to the next. In any given interval countries experience either a positive or a negative growth so the expected value is negative as well as positive. However a rise in the level of growth rate is anticipated. The main important explanatory variable is the government

debt (DEBT) which is owed by the government to both internal and external sources. The unit of measurement for this variable is percentage of GDP. Studies in the past have found both positive and adverse impact of debt on the economic growth. According to International Monetary Fund, 2015 the Japanese economy grew even with a high level of debt with more than 200 percent of its GDP. Debt can be used to invest in the different sectors of the economy and infrastructures which will help in contributing to the growth of the entire economy. On the other hand studies found that a high level of debt was linked with mismanagement of funds, high level of investment risk and corruption. So for this reason the expected sign for government debt is both positive and negative. UNEMP is the total unemployment rate in a given year. Unemployment indicates the cost of salaries in the country which is expected to affect the future investments. Unemployment is associated with high poverty rates and high inequalities which affects the economic wellbeing of an individual and country as a whole. So the predicted sign is negative. TOUREV is the revenue earned from the tourism sector. Tourism sector helps to reduce unemployment rate and improves the balance of payment. And it is also considered as the main source for earning foreign currencies. Thus the expected sign for this variable is positive. FRAID is the foreign aid and grants received by the country. Studies found that foreign aid assisted in providing access to advanced technology, reducing the foreign exchange gap, managerial skills and easy access to foreign markets. On the other hand, foreign aid also have a negative impact on the growth of an economy through misuse and misallocation of the funds being received. So therefore, the predicted sign of the coefficient is positive as well as negative. TAXREV is the revenue earned by the government through the tax collection. The main purpose of tax is to raise revenue for the government for expenditure purposes, to make the economy stable, to redistribute income, for efficient allocation of resources and as a whole to support the growth of an economy. On the other hand taxation can create distortion and in turn have a negative impact on the growth of an economy through its influence on human capital, physical capital and total factor productivity. According to some researchers in the past, personal and corporate income tax were found to be more harmful on the growth (OECD, 2008). Therefore the predicted sign for this variable is positive as well as negative. POPG is the growth rate of total population. High population growth can

raise the need for goods and enhance the technological development. It can increase the labor productivity, income per capita and living standard resulting in economic growth. On the other hand high population is related with households being poor and drive them towards poverty and also will lead to low attainment of poverty alleviation. So the predicted sign for population growth is both positive and negative.

3.4 Conceptual framework

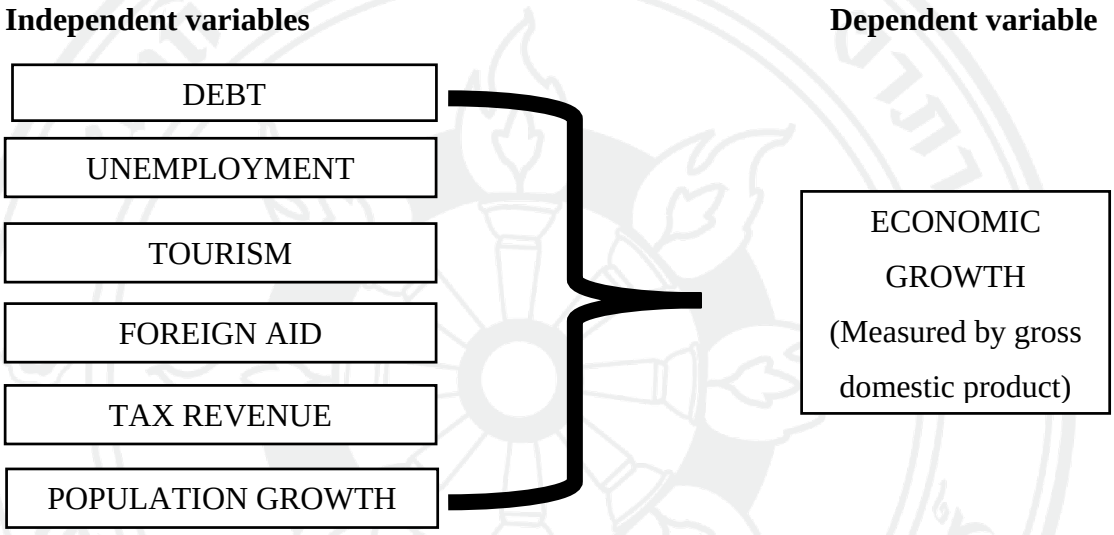


Figure 2.1 Conceptual Framework
Source- Author

3.5 Techniques of Estimation

Many macroeconomic time series are usually non-stationary which can give nonsense correlation and spurious regression. Therefore, it is important to test and correct various pitfalls of time series data. The first step in analyzing time series data involves testing for stationary of the series to ensure that the series have a zero mean and constant variance. That is, the time series data should be tested for stationary before we can attempt to fit an appropriate model. Spurious regression is, therefore, not desirable. Thus we need to test the series for unit root.

3.5.1 Unit root test

To analyze the time series data, we first test the non-stationarity of data. To avoid spurious regression problem, a stationarity test is conducted to confirm if a time series

is stationary or not. We employ the Augmented Dickey-Fuller (ADF) unit root tests to test for the stationarity of the series. A time series data is said to be stationary if there is constant mean, variance and covariance overtime i.e. it does not change overtime. The decision rule for the unit root test is that if the ADF test statistics values are greater than the critical value in absolute terms at 5% level we reject the null hypothesis i.e. the variable is non stationary and there is a presence of unit root and therefore accept the alternative hypothesis (no unit root and stationary). However if the ADF test statistics are less than the critical value at 5% then we accept the null hypothesis i.e. there is unit root and the variables are non-stationary. The series are said to be integrated of order one, meaning that they must be modeled in first difference to make them stationary.

3.5.2 Lag length Selection criteria

In order to estimate the Johansen co-integration and vector error correction model (VECM) it is essential that an optimal lag length be selected. For this purpose we adopt four criterions such as Final Prediction Error (FPE), Akaike's Information Criterion (AIC), Hannan and Quinn Information Criterion (HQIC) and Schwarz's Bayesian Information Criterion (SBIC).

3.5.3 Co-integration test

To test for co-integration, we use Johansen co-integration procedure. Johansen's co-integration test is to check for the possibility of a long run linear relationship amongst time series variables in the models developed for the Bhutanese economy. Johansen's methodology uses trace test statistic and the maximum Eigen-value test statistics to identify the number of co-integrating vectors. The decision rule for the co-integration test is that if the trace statistics or maximum eigen value is greater than the critical value at 5% level we reject the null hypothesis (no co-integration) and accept the alternative hypothesis (there is co-integration).

3.5.4 Vector error correction model

The Vector Error Correction Model (VECM) is a restricted VAR model designed for use with non-stationary series that are known to be co-integrated and constructed

to examine long run and short run dynamics of co-integrated series. It shows the speed of adjustment from short-run to long run equilibrium. The co-integration term is known as the error correction term.

CHAPTER 4

EMPIRICAL RESULTS

4.1 Descriptive Statistics

In this section, the descriptive statistics of the variables used in the study are presented. The study used annual data from 1990 to 2016 covering a period of 27 years. The GDP growth (GDPG) is the dependent variable which has been used as a proxy for economic growth and the explanatory variables includes the Government Debt (DEBT), unemployment (UNEMP), tourism revenue (TOUREV), foreign aid (FRAID), tax revenue (TAXREV) and population growth (POPG).

To understand the structure of the data descriptive statistics were calculated. As shown in Table 4.1, the descriptive statistics shows how the data behaved. The table contains the mean, standard deviation, minimum, maximum, etc.

Table 4.1- Descriptive statistics

Variable	GDPG	DEBT	UNEMP	TOUREV	FRAID	TAXREV	POPG
Mean	6.637	59.059	2.655	3.099	18.362	14.056	1.829
Standard Deviation	2.522	22.221	0.816	1.390	4.136	5.896	0.683
Minimum	2.1	27.1	1.3	1.126	9.976	5.789	0.3
Maximum	12.6	107.9	4	5.470	27.050	24.703	2.8
Variance	6.363	493.778	0.667	1.932	17.107	34.764	0.466
Skewness	0.266	0.389	-0.208	0.300	-0.066	0.168	-0.168
Kurtosis	2.899	2.279	1.752	1.762	2.605	1.828	2.204
Observation	27	27	27	27	27	27	27

Source- summarized by Author

Over the period under study, the economy of Bhutan grew by an average of 6.6 percent. The minimum growth was recorded at 2.1 percent and the maximum growth

was 12.6 percent. As shown by the standard deviation the growth rate varied at 2.5 percent. The country's debt averaged 59.05 percent reaching a maximum and minimum percent of 107.9 and 27.1 respectively. The standard deviation was 22.2 percent indicating that the level of government debt varied over the years. The unemployment rate averaged at 2.6% with a minimum and the maximum level of 1.3 and 4 percent respectively. The average of tourism revenue was 3.09 percent and the maximum and minimum level were 5.4 and 1.1 percent respectively. The foreign aid, tax revenue and population grew by an average of 18.3, 14.05 and 1.8 percent respectively. Skewness shows the distribution of the series around its mean or measures the degree of asymmetry of the series. The skewness of normal distribution is zero. If the variables are positively skewed it indicates that the distribution has a long right tail and if the variables are negatively skewed it means the distribution has a long left tail. As shown in the table the variables such as GDPG, DEBT, TOUREV and TAXREV are positively skewed while UNEMP, FRAID and POPG are negatively skewed. Kurtosis measures the peak or flatness of the distribution of the series. A series is normally distributed if the Kurtosis value is three. Kurtosis level above three implies that the distribution is peaked (leptokurtic) and if its less than three, it means the distribution is flat relative to normal i.e. platykurtic. The result in the table shows that all the variables are flat or platykurtic.

4.2 Diagnostic Testing

4.2.1 Correlation test

Pairwise correlation test is used to test if the independent variables of the least square econometric analysis on the time series data have correlation to each other or not. The correlation between the variables is presented in Table 1 of appendix A. Many literature are of the view that the pairwise correlation value should not be greater than 0.8.

The correlation matrix shows that all variables are not highly correlated to GDP. We find that the correlation between the two key variables i.e. growth rate of GDP and debt is 0.09, which indicates that when the debt increases, the growth rate of GDP also increases. This shows that there is a positive correlation between these two

variables. The other variables are also directly correlated to GDP since all the value are positive.

4.2.2 Multicollinerity test

A regression model is considered best linear unbiased estimator (BLUE) if there is no perfect linear relationship between the explanatory variables. Another important assumption that we need to consider is that there should not be multicollinearity among the variables. Multicollinerity means when two or more variables are highly related. To check for the presence of multicollinearity, we use variance inflation factor (VIF). A tolerance of less than 0.10 and/or a VIF of 10 and above indicates a multicollinearity problem. The result for the multicollinearity test is given in table 2 of appendix A. As depicted in the test result our regression model do not have multicollinearity problem.

4.3 Test for Relationship between Debt and Economic Growth

4.3.1 Unit Root Test

The time series data for the period of study covering 1990 to 2016 were tested for its stationary. The stationary test is mandatory as most of the time series data are non-stationary and running the test will help us to avoid spurious regression outcomes. We conduct the unit root test by employing the Augmented Dicky Fuller (ADF) test at both level and first difference. The stationary of data is crucial for the Johansen cointegration test.

The ADF test for unit root in Table 3 of appendix A shows that all the variables such as GDPG, DEBT, UNEMP, TOUREV, TAXREV and POPG are non-stationary at their level (i.e. it is not possible to reject the null hypothesis of unit root) except for FRAID which is stationary at level. The results indicated in Table 4 of appendix A confirms that the non-stationary variables at levels are made stationary at first difference and therefore integrated of order one I(1). The I(1) stationary condition allows to conduct the test for co-integration among the variables in the study.

4.3.2 Lag Length Selection Criterion

The lag length selection criterion is presented in Table 5 of appendix A. Four lag length selection criteria such as Final Prediction Error (FPE), Akaike's Information Criterion (AIC), Hannan and Quinn Information Criterion (HQIC) and Schwarz's Bayesian Information Criterion (SBIC) are employed for the study. As shown in the table the most suitable lag length was found to be 2. After finding the suitable lag length, the Johansen co-integration test is adopted.

4.3.3 Johansen Co-integration Test

There is a possibility of co-integration among the variables since all the variables are integrated at I(1). So we perform the co-integration test to find out whether there exists a long run relationship among the variables or not. In this study we use the Johansen co-integration approach to test for the probability of at least one co-integrating vector between variables in the models for the Bhutanese economy. To check if there exist co-integration among the variables, the trace statistics and max-eigen statistics must be higher than the critical value at 5% significance level.

The results of Johansen co-integration test consisting of both trace statistics and Max-Eigen value is presented in Table 6 of appendix A. The number of co-integrating vectors are determined by these tests. The null hypothesis is tested against the alternative hypothesis. For the null hypothesis, H_0: $r = 0$, $r \leq 1$ and $r \leq 2$, the result indicates that the trace statistics of 202.8440, 134.2671 and 87.5707 are greater than the critical value of 124.24, 94.15 and 68.52 respectively at a significance level of 5 percent indicating that the null hypothesis of no co-integration vectors against the alternative hypothesis is clearly rejected. From the result, we can see that trace statistics shows an evidence of three co-integrating equations at 5% critical level. Likewise for the null hypothesis, H_0: $r=0$, $r \leq 1$ and $r \leq 2$ the result of Max-Eigen statistics indicates the rejection of the null hypothesis as the value of 68.5769, 46.6964 and 41.9081 are greater than the critical value of 45.28, 39.37 and 33.46 at 5 percent level of significance. Both trace statistics and max-Eigen statistics result indicates that there are three co-integrating equation(s). Therefore, the result of Johansen co-integration test suggests that economic growth, debt, unemployment,

tourism revenue, foreign aid, tax revenue and population growth are co-integrated indicating that these variables move together in the long run.

4.4 Vector Error Correction Model (VECM)

The VECM helps us to measure the parameters of co-integrating equation as well as the short term adjustment parameters. The short term adjustment coefficient (i.e. coefficient of the lagged error-correction term) shows the speed at which the long-term disequilibrium in the dependent variable is being adjusted in each short term period. In order to show that the system has been brought back to equilibrium, it is expected that the error-correction term should have value between zero and one (Johansen & Juselius, 1992).

4.4.1 The Long Run Relationship

The result of long run normalized cointegration equation is presented in table 7 of appendix A. The coefficients of β are expressed in the equation that follows:

$$GDPG = 0.09DEBT - 2.9UNEMP + 5.3TOUREV - 1.02FRAID - 0.4TAXREV - 2.6POPG$$

The long run result indicates that DEBT and TOUREV has a positive relationship with GDPG while UNEMP, FRAID, TAXREV and POPG has a negative relationship. The coefficients are all statistically significant at 1% except for TAXREV which is significant at 5%.

The positive coefficient of DEBT indicates that debt contributes to the economic growth of Bhutan. Debt can be used to invest in the different sectors of the economy and infrastructures which will help in contributing to the growth of the entire economy. This result is supported by the study done by Egbetunde (2012). He investigated the relationship between public debt and economic growth in Nigeria employing VAR model. The findings showed that there is a positive long run association between debt and economic growth.

The coefficient for UNEMP is negative and statistically significant at 1% which implies that change in the unemployment rate will deter the economic growth. The reason for this negative relationship is due to the fact that unemployment is associated

with high poverty rates and high inequalities which affects the economic wellbeing of an individual and country as a whole. This finding is supported by Akeju & Olanipekun (2014) and Shahid (2014).

The finding shows that TOUREV is an essential contributor to the economic growth. It suggest an immediate intervention from the government to revisit the tourism policy to address the high prevailing tourist tariff in order to receive more number of dollar paying tourists in the country. This positive relationship between tourism and growth is supported by Fayissa (2007) and He & Zheng (2011).

The coefficient for FRAID is negative and significant which indicates that foreign aid will slow down the GDP growth in the long run. The money received can be misused and misallocated which will affect the growth of the eonomy. This empirical finding is supported by Mallik (2008) and Sothan (2017).

The TAXREV coefficient is negative and statistically significant at 0.01 level. It shows that in the long run increase in tax will cause a reduction in the real GDP growth rate. This empirical finding is supported by Kneller, Bleaney, & Gemmell (1999), Lee & Gordon (2005), Dackehag (2012) and Widmalm (2001).

The negative coefficient of POPG indicates that in the long run increase in the population will deter the economic growth. It is because with rising population more resources will have to be spent on it and it also increase the pressure on the country's limited resources. This in turn will have an adverse effect on the growth of the economy. The negative relationship between population growth and economic growth is supported by Klasen (2007).

The outcome of the result indicates that all growth equation determinants supports our hypothesized signs and are all statistically significant.

4.4.2 An analysis of Short Run co-integration

The Error Correction Term (ECT) or co-efficient given by the short-run model measures the speed of adjustment in response to a deviation from the steady state equilibrium relationship. The results indicating the speed of adjustment is presented in Table 8 of appendix A and the equation can be written as given below:

$$\Delta GDPG_t = 0.46 + 0.08\Delta GDPG_{t-1} + 0.02\Delta DEBT_{t-1} - 0.1\Delta UNEMP_{t-1} - 1.9\Delta TOUREV_{t-1} + 0.1\Delta FRAID_{t-1} - 0.03\Delta TAXREV_{t-1} + 0.3\Delta POPG_{t-1} - 0.15ECT_{t-1}$$

The result shows that the error correction coefficient is 0.15 which indicates that previous year's disequilibrium are corrected in each year at a convergence speed of 15%.

4.4.3 An Analysis of Time trend and Time Dummy

Time trend

The result of the time trend (Rupee crisis) model is presented in table 9 of appendix A. The coefficients of β are expressed in the equation that follows:

$$GDPG = 0.08DEBT - 3.3UNEMP + 3.9TOUREV - 0.8FRAID - 0.01TAXREV - 2.7POPG - 21.6T$$

The result shows that the time trend variable is statistically significant at 1%. The coefficient of -21.6 indicates that during the time period of the study the GDP growth of Bhutan declined by an average of 21.6 per year.

Time Dummy

The results are presented in Table 9, 10, 11, 12, 13 and 14 of Appendix A. The coefficient of β is are expressed in the equation that follows:

1. Dummy with DEBT

$$GDPG = 23.99 + 0.1DEBT - 0.24R*DEBT - 3.28UNEMP + 4.69TOUREV - 0.97FRAID - 0.21TAXREV - 2.87POPG$$

Before the rupee crisis, the coefficient of DEBT is positive and statistically significant at 1%. The coefficient is 0.1 indicating that a one percent increase in debt

would bring about an increase in GDP growth by 0.1 percent. The positive relationship between debt and growth is due to the fact that debt has been used for investment purposes in the different sectors of the economy and for the development of the infrastructures which in turn helped to boost the entire economy. This result is supported by the study done by Egbetunde (2012). However, after the rupee crisis, the effect of DEBT is significantly negative. The result shows that the rupee crisis lead to an unfavorable impact of the debt on the economic growth of Bhutan. The coefficient of -0.14 i.e $\beta_1+\beta_2$ indicates that a one percent increase in debt would bring about a decrease in the growth of GDP by 0.14 percent. The negative relationship is due to the reason that the government of India is the main source of the debt for Bhutan. And to address the issue of rupee shortage the Bhutan government is forced to reduce the plans and programs which in turn affect the developmental activities taking place in the country. This negative impact of rupee crisis on debt slowed down the GDP growth of Bhutan.

2. Dummy with UNEMP

$$GDPG = 24.6 + 0.1DEBT - 3.8UNEMP - 9.01R^{*}UNEMP + 3.86TOUREV - 0.87FRAID + 0.09TAXREV - 3.08POPG$$

The equation shows that before the rupee crisis, unemployment has a negative influence on the GDP growth of Bhutan. The UNEMP coefficient of -3.8 indicates that one percent increase in the unemployment rate accounted for 3.8 decrease in the economic growth of Bhutan. The reason for this negative relationship is because unemployment is associated with social disruption, high poverty rates, high inequalities, political instability, loss of human resources, etc which affects the economic wellbeing of an individual and country as a whole making it difficult for an economy to grow. This empirical finding is supported by Akeju & Olanipekun (2014) and Shahid (2014). The rupee crisis raised the adverse effect of unemployment on economic growth of Bhutan. The coefficient of -12.81 implies that one percent increase in the unemployment would bring about 12 percent decrease in the GDP growth. The results is statiscally significant at 1%. With the occurance of rupee crisis

economic activities in Bhutan has slowed down thereby causing an increase in the unemployment rate. More unemployment thus lead to the negative impact on the GDP growth of Bhutan.

3. Dummy with TOUREV

$$GDPG = 21.47 + 0.08DEBT - 3.33UNEMP + 4.05TOUREV - 4.13R^{*}TOUREV - 0.85FRAID - 0.03TAXREV - 2.68POPG$$

The result shows that before the rupee crisis, the coefficient of TOUREV is positive and statistically significant at 1%. This result suggested that revenue from tourism helped to boost the economic growth of Bhutan. The coefficient implies that one percent increase in tourism revenue is associated with 4.05% increase in the GDP growth of Bhutan. This positive relationship is supported by Fayissa (2007) and He & Zheng (2011). However, the rupee crisis lead to a negative impact of the tourism revenue on the GDP growth of Bhutan. The coefficient is negative and statistically significant at 1%. The coefficient after the rupee crisis is -0.08. The reason of the negative impact can be attributed due to the fact that most of the essential goods are imported from India. With the occurance of rupee shortage the import of goods from India reduced and thereby price of the goods and services increased because of which it added more expenses for the tourists visiting Bhutan. The rise in the inflation rate and reduction in number of the Indian tourists slowed down the hospitality industry in Bhutan thereby causing a downturn in the GDP growth of Bhutan.

4. Dummy with FRAID

$$GDPG = 9.03 + 0.12DEBT - 2.68UNEMP + 5.98TOUREV - 0.48FRAID - 1.39R^{*}FRAID - 0.6TAXREV - 0.68POPG$$

Before the rupee crisis, the coefficient of FRAID is statistically significant and has a negative impact on the GDP growth of Bhutan. The coefficient is -0.48 indicating that one percent increase in foreign aid leads to a decrease in GDP growth by 0.48%.

The reason of this negative relationship could be that the foreign aid has not been put in an effective use or invested in productive activities which could otherwise boost the economic growth. This negative relationship between foreign aid and economic growth is supported by Mallik (2008) and Sothan (2017). The rupee crisis supplemented the unfavorable effect of foreign aid on the economic growth of Bhutan. The result implies that the impact of foreign aid is significantly negative on the GDP growth. One percent rise in foreign aid leads to decline in GDP by 1.87 percent. The reason could be that the large part of the fund is diverted towards debt servicing rather than on the development activities.

5. Dummy with TAXREV

$$GDPG=17.53+0.09DEBT-3.21UNEMP+4.26TOUREV-0.73FRAID-0.08TAXREV-1.0R*TAXREV-2.23POPG$$

The significantly negative coefficient corresponding to TAXREV shows negative effect of tax revenue on the economic growth in Bhutan before the rupee crisis. The coefficient of -0.08 suggest that one percent increase in revenue generation from tax decreases GDP growth by 0.08% in Bhutan. The reason can be due to the fact that tax revenue in Bhutan has been declining over the years due to exemption of sales tax and custom duties. Similar negative findings are supported by Lee & Gordon (2005), Dackehag (2012) and Widmalm (2001). The rupee crisis raised the negative effect of tax revenue on the economic growth of Bhutan. The coefficient is -1.08 which depicts that a one percent increase in tax revenue will bring about 1.08 percent decrease in the GDP growth.

6. Dummy with POPG

$$GDPG=14.62+0.09DEBT-3.08UNEMP+4.6TOUREV-0.64FRAID-0.19TAXREV-1.78POPG-14.68R*POPG$$

The coefficient of POPG is negative and statistically significant at 1%. The coefficient of -1.78 depicts that one percent increase in the population growth brings about 1.78 percent decrease in the economic growth of Bhutan. The reason is because increase in the population growth is related with households being poor and drive them towards poverty and also will lead to low attainment of poverty alleviation which thereby affects the economic growth. The negative relationship between population growth and economic growth is supported by Klasen (2007). The rupee crisis increased the negative impact of population growth on the GDP growth of Bhutan. The coefficient of POPG after the rupee crisis is also negative and statistically significant which indicates that increase in the population growth is associated with decline in the GDP growth of Bhutan.

The overall result shows that the rupee crisis which Bhutan witnessed in 2012 has an important and significant impact on each of the variables under study and the economy growth as a whole. Therefore, the result implies the rejection of the null hypothesis for each model.

Summary of the result

Hypothesis	Result
There is no trend in the data.	Reject
The impact of debt on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject
The impact of unemployment on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject
The impact of tourism revenue on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject
The impact of foreign aid on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject
The impact of tax revenue on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject
The impact of population growth on GDP growth of Bhutan is the same for both before and after the rupee crisis.	Reject

CHAPTER 5

CONCLUSION AND POLICY IMPLICATION

5.1 Discussion

In this study we tend to contribute to the existing literatures that shows the impact of various factors such as government debt, unemployment, tourism revenue, foreign aid, tax revenue and population growth on the GDP growth of Bhutan from the year 1990 to 2016.

The empirical findings for government debt is consistent with the pervious study that were carried on to investigate the impact on the economic growth. Over the past years the government debt of Bhutan has been increasing as compared to its GDP. The result in this study showed that government debt has a positive impact on the economic growth of Bhutan. The finding of the study is similar to the study carried out by Sheikh, Faridi, & Tariq (2010) which confirmed a positive association between debt and economic growth in Pakistan over a period 1972 to 2009. The reason of this positive relationship is because the borrowed funds has been used to fund those expenditures of government which contributes to the growth of economy. However with the occurance of rupee crisis in 2012 the GDP growth of Bhutan has been severely affected. The reason is because India is the main source of debt to Bhutan.

Human resource is regarded as an important determinant for economic growth. Unemployment has been considered as a serious issue in Bhutan and the government has been trying to address this problem through various measures. A high unemployment rate is associated with high inequality and high poverty level which in turn is regarded as the root cause for low economic growth. A high unemployment rate is also expected to increase the economic cost which hampers the economic growth. The findings of this study showed that unemployment has a negative significant impact on the GDP growth. This similar finidng is supported by Akeju &

Olanipekun (2014) where they explored the link between unemployment rate and economic growth in Nigerian economy.

The revenue from tourism sector is considered to be the second highest source of revenue for the government of Bhutan. The findings from the study shows that the tourism revenue indeed contributed to the GDP growth of Bhutan. Similar findings is supported by studies carried on by Hajdinjak (2014) and Soukiazis (2005).

Bhutan have been receiving aid from many countries and international organizations. Foreign aid is considered to be an important determinant of economic growth as it helps in eradicating poverty through important programs such as education, agriculture, health, etc. However the finding showed that foreign aid has a negative impact on the GDP growth of Bhutan. The finding is contrast to the study carried on by Mitra (2013) in which he concluded that foreign aid contributed positively to the economic growth in Cambodia.

Tax is expected to affect the size of government expenditure, individual's consumption pattern, level of business activities, propensity to invest and save and as a whole the overall growth of an economy. Imposing high tax on higher incomes tend to reduce the return to investment in human capital, which in turn will distorts educational decisions thereby causing a fall in the economic growth. The findings of the study show that Tax revenue has a negative contribution towards the economic growth of Bhutan.

It is not preferable for a country to experience slow growth of population as it will lead to inadequate supply of total labor force required for the economic growth. Given less inhabitable land in Bhutan too high a growth of population is also not desirable. The finding showed that population growth has a negative impact on the economic growth of Bhutan. This negative relationship is supported by Klasen (2007).

5.2 Conclusion

Several empirical studies have been carried out by eminent researchers to understand the effect of government debt and other factors on the economic growth. Most of the studies focused only on the impact of one specific factor on the economic growth such as impact of debt on growth, Unemployment on growth, population on

growth, etc. However in this study we employ together several important factors apart from government debt to study its effect on the GDP growth of Bhutan.

Since economic theories provided no clear cut association between debt and economic growth, researchers generally depend on the empirical studies. However, the findings varied from study to study because some focused on a specific country, while others studied the effect using the multi-country data. The findings from the study belonged to three distinct groups -positive impact, negative impact and no impact. While the studies based on single country data pointed out positive impact of government debt on economic growth, studies with cross country data showed mixed results. The findings differed because of the fact that different researchers used different economic techniques and variables to understand the effect of government debt on the growth of an economy.

There has been mixed findings on this particular issue. The main focus of the study is to investigate the relationship between government debt and economic growth in Bhutan. This issue is important given the fact that the total outstanding debt of Bhutan was recorded at 113% of its GDP in 2016. The rapid growth of government borrowing caused an alarm among policy makers on its repercussion on growth .Since no past studies have been carried out to understand the relationship between debt and economic growth in Bhutan, the study will help the planners to understand and get some ideas on this issue. In such type of financial state, an explanation requires studying the impact of public spending on real GDP growth. Growth rate of GDP was used as a proxy for economic growth since it measures the productivity of a country. The study also use a set of other growth variables such as unemployment, tourism revenue, foreign aid, tax revenue and population growth.

The study employed unit root test, Johansen cointegration and VECM approach to achieve the set objective. The empirical findings shows that all the variables under study such as GDP growth, debt, unemployment, tourism revenue, foreign aid, tax revenue and population growth are co-integrated. This indicates that these variables move together in the long run. All the variables showed statistically significant results. The result indicates that before the rupee crisis debt and tourism revenue contributed positively to the economic performance whereas unemployment, foreign aid, tax revenue and population deterred the economic growth.

However after the rupee crisis all the variables had a much bigger impact on the GDP growth. The impact of debt and tax revenue were the most severe as they had a negative impact on economic growth as compared to the positive impact before the crisis. All the results are statistically significant at 1%.

5.3 Policy Implication and Recommendations

Given the significance of the results in this study, we draw some policy recommendation from the findings of our study, such as:

1. The negative relationship between government debt and economic growth calls for policy which will help to reduce the adverse impact of debt on the GDP growth. We recommend that government make an effort to boost and pursue internal reforms and sources of revenue as a measure to finance its developmental activities rather than depending on debt.
2. There is no doubt that unemployment is a serious issue in Bhutan and has a negative impact on the GDP growth. To reduce the unemployment problem it is recommended that the education system in Bhutan be improved in order to create well educated and self-reliant citizens. The government should also make agriculture related work more attractive so that the ordinary people can take up farming and start their own business.
3. The Government should discover more tourism activities to encourage more inflow of foreign tourist in the country as it contributes to GDP growth in Bhutan. The government need to encourage or concentrate more on the domestic production and promote exports to reduce the dependency on imported items.
4. The government should use the foreign aid for productive purposes such as developing and improving infrastructure facilities, health, education, agriculture, etc that will in turn boost the economic growth.
5. The impact of tax revenue on the economic growth of Bhutan is found to be negative so we recommend that rather than losing tax revenue from exemptions, an efficient management of taxation be put in place in order to attain fiscal self-sufficiency.

6. The increase in the population growth has a negative and a significant impact on the economic growth of Bhutan. In order to eradicate poverty, the government has to outline policies and long term strategies to address the unemployment problem prevailing in the country.

For the future researchers who wish to examine the impact of government debt on economic growth in more detail, it is recommended that other important variables such as inflation, foreign direct investment, savings, exchange rate, export earnings, etc be included as it will help to understand the underlying factors that affect the growth of an economy in a better way. Moreover, it is recommended that different econometric techniques be employed other than the ones used in the study. And most importantly to make the model strong and more reliable the time period of the study should be increased to more than thirty years.

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APPENDICES

APPENDIX A

Autocorrelation Test

Table 1 - Pairwise correlation matrix

	GDPG	DEBT	UNEMP	TOUREV	FRAID	TAXREV	POPG
GDPG	1.0000						
DEBT	0.0900	1.0000					
UNEMP	0.0118	0.1256	1.0000				
TOUREV	0.1600	0.7325	0.1268	1.0000			
FRAID	0.0604	-0.249	-0.0427	-0.0098	1.0000		
TAXREV	0.2350	0.6160	-0.1173	0.8084	0.0328	1.0000	
POPG	0.4091	0.0826	-0.1754	-0.0121	0.1154	0.2475	1.0000

Source- Authors' Computation

Multicollinearity Test

Table 2 - Variance Inflation Factor

Variables	VIF	1/VIF
DEBT	2.58	0.388063
UNEMP	1.19	0.838917
TOUREV	5.05	0.198152
FRAID	1.18	0.845932
TAXREV	4.04	0.247725
POPG	1.28	0.778679
Mean VIF	2.55	

Source- Author's computation

Table 3- ADF Unit Root Test at level

	Augmented Dicky Fuller (ADF)		
Variables	**Level**	**p-value**	**Remarks**
GDPG	-2.831**	0.0539	Non Stationary
DEBT	-0.14	0.9453	Non Stationary

UNEMP	-2.713***	0.0719	Non Stationary
TOUREV	-0.990	0.7570	Non Stationary
FRAID	-4.915*	0.0000	Stationary
TAXREV	-1.929	0.3184	Non Stationary
POPG	-1.371	0.5962	Non stationary

(*), (**) and (***) indicates the level of significance at 1%, 5% and 10% respectively.
Source- Authors' computation

Table 4 - ADF Unit Root Test at First Difference

	Augmented Dicky Fuller (ADF)		
Variables	**First Difference**	**p- value**	**Order of integration**
GDPG	-5.180*	0.0000	I(1)
DEBT	-4.934*	0.0000	I(1)
UNEMP	-6.445*	0.0000	I(1)
TOUREV	-5.137 *	0.0000	I(1)
TAXREV	-7.195 *	0.0000	I(1)
POPG	-3.418 **	0.0103	I(1)

(*) and (**) indicates the level of significance at 1% and 5% respectively
Source- Authors' computation

Table 5 - Lag Length Selection Test

Lag	**FPE**	**AIC**	**HQIC**	**SBIC**
0	93064.1	31.3059	31.4005	31.6472
1	4619.47	28.1401	28.8974	30.8704
2	561.647*	24.892*	26.3118*	30.0112*

**indicates the lag selected by the criterion*
Source- Authors' computation

Table 6 - Johansen Cointegration Test Result

Model	**Null hypothesis**	**Trace statistics**	**Critical value (5%)**	**Max- Eigen statistics**	**Critical value (5%)**
	r = 0	202.8440	124.24	68.5769	45.28
	r ≤ 1	134.2671	94.15	46.6964	39.37

Lag length: 2#	r ≤ 2	87.5707	68.52	41.9081	33.46
	r ≤ 3	45.6626	47.21	22.8182	27.07
	r ≤ 4	22.8444	29.68	16.9463	20.97
	r ≤ 5	5.8981	15.41	5.2588	14.07
	r ≤ 6	0.6393	3.76	0.6393	3.76

Both trace statistics indicates and Max- Eigen statistics indicates three co-integrating equations at 0.05 level.
 # indicates the lag length
Source- Authors' computation using stata

Table 7 - Long Run Normalized Cointegration Equations

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
DEBT	-0.0990*	0.0305	-3.24	0.001	-0.1590	-0.0391
UNEMP	2.9059*	0.6030	4.82	0.000	1.7240	4.0879
TOUREV	-5.3202*	0.7133	-7.46	0.000	-6.7184	-3.9220
FRAID	1.0285*	0.1720	5.98	0.000	0.6912	1.3657
TAXREV	0.4470**	0.1744	2.56	0.010	0.1052	0.7889
POPG	2.6644*	0.8302	3.21	0.001	1.0371	4.2916
_cons	-25.3677					

Asterisks (*) and (**) denotes significance at 1% and 5% respectively.

Table 8 - Short Run Co-integration Equations

	Coef.	**Std. Err.**	**z**	**P>|z|**	**[95% Conf. Interval]**	
Constant	0.4695	0.7140	0.66	0.511	-0.9300	1.8690
ΔGDPG	0.0884	0.4480	0.20	0.843	-0.7897	0.9667
ΔDEBT	0.0225	0.0717	0.31	0.753	-0.1180	0.1632
ΔUNEMP	-0.1164	1.2169	-0.10	0.924	-2.5017	2.2687
Δ**TOUREV**	-1.9165	1.7315	-1.11	0.268	-5.3104	1.4772
ΔFRAID	0.1831	0.2367	0.77	0.439	-0.2808	0.6470
ΔTAXREV	-0.0304	0.1705	-0.18	0.858	-0.3647	0.3038
ΔPOPG	0.3921	1.8757	0.21	0.834	-3.2841	4.0684
EC(CointEq1)	-0.1547	0.3595	-0.43	0.667	-0.8594	0.5499

Results of Time Trend and Time Dummy Models

Table 9- Result of Time Trend

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
DEBT	-0.0884*	0.0014	-60.07	0.000	-0.0913	-0.0855
UNEMP	3.3733*	0.0278	121.12	0.000	3.3187	3.4279
TOUREV	-3.9991*	0.0304	-131.47	0.000	-4.0588	-3.9395
FRAID	0.8715*	0.0081	107.08	0.000	0.8555	0.8874
TAXREV	0.0136**	0.0058	2.35	0.019	0.0022	0.0251
POPG	2.7669*	0.0342	80.70	0.000	2.6997	2.8341
R_dummycrisis	21.6925*	0.1085	199.79	0.009	21.4796	21.9053
_cons	-21.8673					

Asterisks (*) and (**) denotes significance at 1% and 5% respectively.

Table 10 – Dummy with DEBT

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DEBT	-0.1003*	0.0013	-74.33	0.000	-0.1029	-0.0977
R_DEBT	0.248*	0.0011	220.57	0.000	0.2462	0.2506
UNEMP	3.2886*	0.0257	127.74	0.000	3.2381	3.3390
TOUREV	-4.6951*	0.0280	-167.19	0.000	-4.7501	-4.6400
FRAID	0.9734*	0.0075	128.29	0.000	0.9585	0.9882
TAXREV	0.2175*	0.0053	40.80	0.000	0.2070	0.2279
POPG	2.8727*	0.0314	91.46	0.000	2.8112	2.9343
_cons	-23.9973					

Asterisks (*) denotes significance at 1%

Table 11- Dummy with UNEMP

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DEBT	-0.1029*	0.0034	-29.85	0.000	-0.1097	-0.0962
UNEMP	3.8192*	0.0652	58.56	0.000	3.6914	3.9470
R_UNEMP	9.0183*	0.0983	91.71	0.000	8.8256	9.2111
TOUREV	-3.8619*	0.0720	-53.62	0.000	-4.0031	-3.7208
FRAID	0.8753*	0.0193	45.18	0.000	0.8373	0.9133
TAXREV	-0.0944*	0.0137	-6.89	0.000	-0.1213	-0.0675
POPG	3.0883*	0.0792	38.99	0.000	2.9331	3.2436
_cons	-24.6012					

Asterisks (*) denotes significance at 1%

Table 12- Dummy with TOUREV

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DEBT	-0.0883*	0.0017	-50.66	0.000	-0.0917	-0.0849
UNEMP	3.3340*	0.0330	100.78	0.000	3.2691	3.3988
TOUREV	-4.0530*	0.0360	-112.46	0.000	-4.1237	-3.9824
R_TOUREV	4.1384*	0.0247	167.23	0.000	4.0899	4.1869
FRAID	0.8587*	0.0096	88.75	0.000	0.8398	0.8777
TAXREV	0.0326*	0.0068	4.74	0.000	0.0191	0.0461
POPG	2.6831*	0.0406	66.01	0.000	2.6034	2.7628
_cons	-21.4705					

Asterisks (*) denotes significance at 1%

Table 13- Dummy with FRAID

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DEBT	-0.1203*	0.0114	-10.53	0.000	-0.1427	-0.0979
UNEMP	2.6842*	0.2115	12.69	0.000	2.2696	3.0989
TOUREV	-5.9850*	0.2356	-25.40	0.000	-6.4469	-5.5232
FRAID	0.4825*	0.0619	7.78	0.000	0.3610	0.6039
R_FRAID	1.3912*	0.0503	27.63	0.000	1.2925	1.4899
TAXREV	0.6006*	0.0458	13.09	0.000	0.5107	0.6905
POPG	0.6876*	0.2619	2.63	0.009	0.1743	1.2010
_cons	-9.0336					

Asterisks (*) denotes significance at 1%

Table 14- Dummy with TAXREV

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
DEBT	-0.0915*	0.0047	-19.25	0.000	-0.1008	-0.0822
UNEMP	3.2180*	0.0885	36.33	0.000	3.0444	3.3917
TOUREV	-4.2660*	0.0978	-43.59	0.000	-4.4578	-4.0742
FRAID	0.7369*	0.0257	28.60	0.000	0.6864	0.7874
TAXREV	0.0886*	0.0190	4.66	0.000	0.0513	0.1259
R_TAXREV	1.0004*	0.0157	63.48	0.000	0.9695	1.0313
POPG	2.2389*	0.1097	20.40	0.009	2.0238	2.4540
_cons	-17.5385					

Asterisks (*) denotes significance at 1%

Table 15- Dummy with POPG

Beta	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
DEBT	-0.0967*	0.0067	-14.33	0.000	-0.1099	-0.0835
UNEMP	3.0823*	0.1251	24.62	0.000	2.8369	3.3276
TOUREV	-4.6015*	0.1392	-33.04	0.000	-4.8745	-4.3286
FRAID	0.6443*	0.0366	17.57	0.000	0.5724	0.7162
TAXREV	-0.1902*	0.0271	-7.00	0.000	-0.1370	-0.2435
POPG	1.7862*	0.1547	11.54	0.000	1.4828	2.0896
R_POPG	14.6865*	0.3259	45.05	0.000	14.0476	15.3254
_cons	-14.6269					

Asterisks (*) denotes significance at 1%

APPENDIX B

Post Estimation Diagnostic Test

Under this section we carry out some diagnostic test to check if the model is fit or not. In other words we confirm if the model in the VEC is valid and stable.

Autocorrelation test

Table 1 - Lagrange Multiplier test result

lag	**chi2**	**Prob > chi2**
1	45.9302	0.59834
2	45.6412	0.61009

H_0 : no autocorrelation

The result indicates that even at 2 lags there is no autocorrelation.

Test for Normality of Residuals

Table 2 - Jarque-Bera test result

Equation	**chi2**	**Prob > chi2**
Δ GDPG	0.074	0.96375
Δ DEBT	1.096	0.57819
Δ UNEMP	0.124	0.94010
Δ TOUREV	0.283	0.86813
Δ FRAID	0.979	0.61290
Δ TAXREV	7.705	0.02123
Δ POPG	8.396	0.01502
ALL	18.656	0.17851

We adopt Jarque- Bera test to test for the normality of residuals. The result indicates that all the series are normally distributed except for DEBT.

Test for stability of Model

Table 3 - VEC stability test result

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
1	1
1	1
-.5132643 + .5036019i	.719066
-.5132643 - .5036019i	.719066
-.7023539	.702354
.2386023 + .5168092i	.56923
.2386023 - .5168092	.56923
.4956053	.495605
.02987906 + .2966238i	.298125
.02987906 - .2966238i	.298125

The VECM specification imposes 6 unit moduli

To check for the stability condition we adopt the VEC stability test. Since the values are 1 or less than 1 it indicates that the model is correctly specified.

BIOGRAPHY

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