

# CHAPTER-I

## INTRODUCTION

### 1.1 Background of the Study

Most economists and a large part of economic theory accept that a positive connection exists between public investment and economic growth. Therefore, if corruption affects investment, it most affects economic growth that in the same time (Davoodi & Tanzi, 2000). This argument asserts that corruption leads to increase the public investment and decrease the government revenue. This means that corruption and economic growth has inverse relationship. Corruption affects in different ways it may affect public investment, size and composition of foreign direct investment and the quality of the investment decisions and investment projects. Corruption decreases the productivity of investment which deduces the rate of return or output consequently corruption negatively affects the rate of growth on the economy. If a country could reduce its corruption level, it would have been able to raise its investment/GDP ratio and encourage foreign investment. The size of total public investment budget is a decision which is taken by strategically placed high level official that can influence the phase of approval of a public investment project by corruption (Wei & Shleifer, 2000) So it can be said that corruptions distorts the decision making process connected with public investment projects. Corruption is the social evil for the nation. When the corruption is in beginning phase, economic growth is increased in that time bribes and enactment activities inspires to mobilize the economic resources. However, it promotes the inequality and injustices in the nation. After a certain time when corruption increases, people feel insecurity. This encourages the criminalization activities in the nation. Consequently it has negative effect of the economic growth and development. When the level of corruption reduces then the macroeconomic variables such as saving, investment, employment, output, consumption etc. are increased.

Corruption is illicit function of national income. According to Marrian- Websters “Corruption is dishonest or illegalbehavior especially by powerful people (such as government officer or police officer). Corruption may include bribery and embezzlement.” Corruption is something of contaminate to economics whilst clearly being economics in its institutional, psychological, cultural and social factors which challenge the narrow assumptions that economics uses to model economics behaviour. It is political and economic practice through which the politicians use their power for

personal purposes, diversion or theft of public fund. Transparency International (TI) defined corruption as abuse of entrusted power for private gain. A bureaucratic taking an overt monetary bribe to bend a rule, thereby providing a service that he was supposed to (Banerjee, Mullainathan, & Hanna, 2012). When the economic and administrative decision prevails, political corruption directly influences the decision about the amount and allocation of government spending, where political decisions usually take place. Both of administrative and political corruption has a direct impact on the amount and allocation of government expense in various areas of economy.

According to Corruption perception Index 2019, Nepal is positioned as the 113<sup>th</sup> corrupting nations out of 180 countries. Whereas it reached 154 in 2011 which was high and a low record was 90 in 2004. Nepal scored 34 points out of 100 on the 2019. Nepal scored 26.80 Points in average from 2004 until 2019 and a record low of 22 Points was in 2010. UNDP measures the Corruption Perception Index 0-100. Here low level of corruption is denoted by Zero and high in Hundred. According to Transparency International low corrupted countries are Newland and Denmark and high in Somalia. In the context of South Asia corruption seems to be low in Bhutan and high in Afganstan. Corruption has a negative impact on economic development and economic growth. Corruption generates unfavorable impacts on long and short term in the economy. Corruption increases the production cost and decreases of national and foreign investment. Informal practices of governance are prevalent and sustain corruption in Nepal. These are unwritten 'rules of the game' that govern the policies in practices. Some well-known institutions are devoting for controlling the corruption like; Commission for Investigation of Abuse of Authority, Central bureau of Investigation and Special Court in Nepal. The Commission for the Investigation of Abuse Authority CIAA field cases against three member of Tax Settlement Commissions (TSC) at the special court on the charge of embezzling Rs10.02 billion the biggest amount of corruption 2017AD in Nepal's history. The anti-graft watchdog has demanded Rs 33 billion in fines for three of them, beside it; it is provisioned 10 years in prison. The international transparency shows that Corruption Perception Index of Nepal is raised within few years rather the problem of corruption is not solved. Various cases of VAT fraud are massive irregularities in the distribution of relief materials of earthquake victims. The government is failure to control the artificial increasing of fuel and basic goods, prices after Madhesh agitation and crisis in Nepal-India trade relation which is the evidence that corruption in Nepal is becoming systemic. However, no study is undertaken to estimate the magnitude of corruption. Therefore, along with the promulgation of the Federal Democratic Republic Constitution

of Nepal 2015 AD, it is time to conduct a nationwide survey to estimate the magnitude of corruption in Nepalese economy and identify the measures to control it. The causes of corruption are the system of governance, insufficient incentives and weak civil society. For a decade and more obtrusively in recent years, the problem of corruption has been the political agenda in Nepal. It is recognized as one of the main cause of Nepal's underdevelopment. It is very widespread manifestations, and is practiced in all levels of government. The Nepali bureaucracy, politician, and the business sector are 274 most seriously affected by, and inextricably involved in corruption. This is really a great challenge to the campaign of modern Nepal (Upadhaya, 2003). Corruption exists in the public and private sectors, profit and non-profit as well as charitable organizations. It subsists both in the developing and also in the developed nations but predominant in the developing countries. Hence, it remains a system of a poorly functioning nation.

## **1.2 Statement of the Problem**

One of the fundamental objectives of macroeconomic policies of both developed and developing countries is to achieve high economic growth rate with zero level of corruption. Every social welfare state wants to maintain peace and security in the nation. If the country suffers corruption it directly affects low and middle income people. However, country is facing high level of corruption which destroyed the institutional framework and it promotes the criminalization activities in that situation the price of goods and services increases. High corruption distorts the all economic activities. High corruption directly hits the lower income group people because they have fixed income. Corruption increases the misallocation of resources which reduces the production due to increase in cost of production. To control corruption, there are many institution established like CIAA, Central Bureau of Investigation(CBI), International Transparency, Office of Audit General(OAG) etc. have adopted anti-corruption activities. When corruption rises it increases the public expenditure. In the other hand if the size of corruption decreases in the economy than it increases the economic growth. It means that when corruption increases it reduces the public revenue. From the above discussion there are mainly question arises. Many studies have been conducted in the international context for the corruption and economic growth, however only few studies have been conducted in Nepal. In this regard further studies are required to measure the corruption. Therefore, this study raises the following questions:

- i. What is the trend of public investment and corruption in Nepal?
- I. What is the relationship between corruption, public investment and economic growth in Nepal?

### **1.3 Objectives of the Study**

The general objective of this thesis is to examine the relationship between the corruption and economic growth in Nepal. The specific objectives are given below:

- I. To analyze the trend of public investment and corruption in Nepal.
- II. To examine the relationship between corruption, public and economic growth in Nepal.

### **1.4 Hypothesis of the Study**

The thesis tests the null hypothesis( $H_0$ ) and alternative hypothesis ( $H_1$ ) to analyze the relationship between corruption, public investment and economic growth.

Null Hypothesis( $H_0$ ): There is no significant relationship between corruption, public investment and economic growth.

Alternative Hypothesis( $H_1$ ): There is significant relationship between corruption, public investment and economic growth.

### **1.5 Significance of the Study**

The finding of this research should be applicable in the several stakeholders. Firstly, it will be applicable for future researchers and scholars in economics especially in the areas of corruption and economic growth. It will be helpful for the further researcher. This study will suggest the areas for further research where the researchers and scholars can explore the knowledge about corruption and at the same time it provides the sources of references materials. Similarly, this study will provide the relationship between the corruption, public investment and growth, and estimate the level of corruption for economic growth in Nepal.

## **1.6 Limitation of the Study**

Like other research this thesis is also not free from limitation. This study is based on secondary data due to time constraint. Primary data collection is not possible because of resource and time constraints. Secondary data collected only 16 years from the 2004 to 2019 AD because of there is mismatch of different variable data availability. Similarly, the study includes only few explanatory variables in this model.

## **1.7 Organization of the Study**

This thesis is organized into five chapters. First chapter is the introduction which includes background of the study, statement of the problem, objective of the study, significance of the study, limitation of the study and organization of the study. Similarly, second chapter is review of literature including theoretical concept, empirical review such as international and national context. Similarly chapter three is about the methodology of the study that includes research design, nature and sources of data, sample period covers, specification of tools and methods of data collection, model specification, hypothesis testing, and residual test. Similarly, fourth chapter is about data presentation and analysis and finally fifth chapter consists with summary, conclusion and recommendation.

## CHAPTER-II

### REVIEW OF LITERATURE

This chapter provides the review of theoretical and empirical literature related to the relation between corruption, public investment and economic growth. The first part is related with theoretical review. Second part related with review of empirical literature which includes both international and national empirical study.

#### 2.1 Theoretical Concept

The old myth that corruption by its “intrinsic nature” is impossible to measure delayed the emergence of serious empirical analysis of corruption. There is consensus that real magnitude of corruption cannot be measured. The theoretical literature on the relationship between corruption and economic growth reveals main three points of view. The first, defeated by (Shleifer & Vishy, 1993); (Mairp, 1998); (Vito, 2013)and (Svenson, 2005) supported the hypothesis that corruption acts as “Sand in Wheel” the growth. It creates dysfunctions the public sector (the efficiency of the legal system, bureaucratic efficiency and political instability that hamper economic growth. This approach considers corruption to lead to theft and embezzlement by public officials, leading to a net capital loss. As a result of this institutionalized corruption, government direct tax revenues to non-productive sectors where bribes are very abundant. As a result, government spending on productive projects, such as public education and health care provision, may decline as they offer fewer possibilities for rent seeking for public servants. The second point of view developed by (Left, 1964), and (Huntington1968) on the contrary considers corruption to be a ‘much needed for the squeaking of wheels of a rigid administration. Corruption would be a “second tier solution”, which would be a competitive auction game which reproduces the efficiency of the competitive market in the presence of incomplete information. The third point of view, initiated by Vent e Lou, (Mauro P. , 1998), Mendez and Sepulveda, Aidt et al, Meon and Weill propose an analysis in terms of multiple equilibrium which suggest a nonlinear relationship between the two variables. This nonlinearity permits the existence of two type of equilibria a “high” equilibrium, determined according to the quality of the framework institutional work types of regime etc.

The literature also contains several different approaches that have been used in modeling corruption. In response to the various shortcomings in the theoretical reviews, we develop neoclassical model of economic growth that explicitly includes human capital accumulation and the direct and indirect effects of corruption on economic growth. The neoclassical growth modeling approach to the question of the impact of corruption on growth is superior to previous studies employing a variety of approaches that ignore the potential indirect effect of corruption on economic growth and development. Our theoretical model suggests that output and growth are influenced by the level of corruption. If, as illustrated in the theoretical mode, corruption influence growth, then if one of the physical inputs in the production function suffers a quality loss in the presence of corruption, then this will also affect growth and steady state level of output. We use of the work of Mankiw, Romer and Weil (MRW1992). This research extends the Solow model to include corruption as a determinant of the multifactor productivity which is the government expenditure in that case, the abuse of public power for private benefits. For simplicity, we will consider as an economy that produces only one good. Output is produced with a well- behaved neoclassical production function with positive and strictly diminishing marginal product of physical capital. According to Koltgaard (1987) corruption can be represented by the equation: $C = E + D - A$  Where, C = Corruption E = Economic Rent D = Discretion A = Accountability According to his model, corrupting can always have a green light when individual exhibit monopolistic and discretionary powers over the control of goods or services of a country with little or no accountability and decides who gets it, when he gets it and how much the receiver gets. We can calculate the degree of corruption to using following formula. Degree of Corruption = Monopoly + Regulation – Transparency – Morality

## **2.2 Empirical Studies**

### **2.2.1 International Context**

Tanzi and Davoodi (2019) have examined the effects of corruption on the decision making process of investment expenditures, quality of infrastructures, and government revenues. This research based on secondary data collected from IMF; International transparency Index; Government Statistics; World Tables; Business International; and Political Risk Services etc. they used as annual GDP data 1980-95, available for 42 to 95 countries. They used regression analysis to test hypothesizes using cross- country data. The result shows evidence of positive relationship between corruption and public investment, negative relationship between corruption and government revenue, expenditures

on operation and maintenance, and quality of public infrastructures. Their findings suggest that public expenditures rise with increase in corruption, while productivity falls. This study established the channels through which corruption affect economic growth which include public revenue, public expenditures, and quality of infrastructures.

Onogwu (2018) has examined the present evidence of the effects of corruption on public investment and revenue in Nigeria. He adopted Tanzi and Davoodi models to hypothesize high corruption leads to high public investment and high corruptions leads low revenue. This study based on secondary data which is collected from different surveys and countries ranked based on perceived level of corruption over the period 1997 -2017. He used empirical analysis to use the ordinary least square regression model. Corruption distorts the entire decision process associated with public investment. This study shows that higher corruption distorts the entire decision process associated with public investment. This study could not conclude on the effect corruption has on public revenue in Nigeria due to the insignificant of the coefficient of corruption in this model. The researcher investigated the evidence of efforts by Nigeria government to tackle corruption over the years. The increase of public investment while reducing its productivity and thus reduces the economic growth in Nigeria.

Rahman, Kisunko and Kopoor (2000) have investigated the relationship between corruption and growth in Bangladesh. This article checks the robustness and sensitivity of the impact of corruption on growth and investment as well as other dependent variables likes, gross foreign investment, by controlling for policy, geographically and demographic effects as various omitted region specific effect. They used the quantitative magnitude of the impact of corruption on people's life which is normally applying time series analysis. This research we find that countries seniors about improving governance and reducing corruption. Corruption should redefine the role of government, overall the system of incentives and strengthen domestic institutions in order to make sure that the necessary checks and balance are in place.

Fitzsimons (2011) has examined the power of distance is negatively correlated to Transparency International' 2005 corruption perception index with a correlation coefficient of -0.649 significant at the 1% level; and individualism is correlated to CPI with a correlation coefficient of 0.663, again significant at the 1% level. He used the secondary data from different sources. This research used descriptive as well as empirical analysis. In the other hand the tax revenues seem inevitably to determine in transition or reform of an economy. The VIF or Variance Inflation Factor is calculated



as  $1/\text{'tolerance'}$  or  $(1/R_j^2)$  is the  $R^2$ -value for a regression of one the explanatory variables from the right hand side (RHS) of a regression equation,  $j$  on the explanatory variables on the RHS.

Lutz and Nsikumana (2008) have investigated the impact of corruption on public and private investment in African countries as a way of exploring one channel through which corruption undermines growth. The empirical results indicated that corruption affects economic growth directly and through its impact on investment. They used unbalanced panel data from 33 African countries for the period 1982-2001. The countries are selected on the basis of data availability. The main endogenous variables included in estimation are income per-capita, domestic investment in log form. In this research we find that corruption affects public and private investment while it has negative effects on private investment. The positive allocation between public investment and corruption supports the view that corrupt bureaucrats seek to increase capital expenditure to maximize private gain (rent seeking). In contrast, the results confirmed that corruption discourages private investment the cost of doing business while raising uncertainty over expected returns to capital. The results supported the view that corruption hampers growth and call for institutional reforms to improve the quality of governance as a prerequisite for achieving investment led growth.

Zhang (2017) has introduced the some new perspective of corruption and economic growth as a dynamic equilibrium model by Zhang. He derived the model concerned the existence of equilibrium and motion of the dynamics system. He also examines the effects of changes in different parameters on the motion of the economics system. This study concerned with the role of corruption on growth and income and wealth distribution between the official and workers. The economy is composed of the industrial sector and public sectors. The population is classified into officials and workers. Corruption takes places through many channels. Officials take bribes from producers and households.

Arslan and Saglam (2011) have examined the relationship between the corruption and public investment in Turkey for the annual sampled period 1975-2007 by using the (Johansen & Juselius, 1990) co-integration analysis. The results of co-integration analysis provide an evidence of a long-run relationship between corruption and public investment. On the other side, it is concluded that corruption effect public investment positively in Turkey.

Farida and Ahmadi (2007) have extended the Solow Growth Model to include corruption as a determinant of the multifactor productivity using a Cobb-Douglas production function framework. He used empirical analysis in this model. We incorporate corruption as a determinant of government expenditure, investment and foreign aid. This model is to be tested empirically to true the corruptive behavior in Lebanon based on the available time series data. The implications of the results for the further refinement of the model are yet to be explored.

Groenendish (1997) has examined the empirical analysis by using Principal Agent Model on corruption. In this study there are two principal (one of which is corrupting) and agent (who corrupted). The behavior of these principal and agent is analyzed in terms of costs and benefits associated with different activities. This article has dealt with trade off costs, principles have to bear failure costs and inspection/ prevention costs and have to minimize the sum of these costs hundred of the agents concealment and diversion activities.

Ata and Arvas (2011) have examined the research to describe as the use of power for individual purposes is a complex concept. This study aims off to answer the question of what are economic factors such as economic growth, inflation, economic freedom and income distribution to corruption in a cross- section of 25 Europe countries in the average of 2004-2007 year. The researchers used Maximum likelihood Method is in estimating coefficients of regression model. In this study CPI, GDP, GE, I, GINI the explanatory variables. The empirical results shows that GDP per-capita has positive sign and statistically significant at the 5% level of regression. The point estimate suggests that a point increase in the GDP raises (less Corruption) composition index by 0.361 by 0.036 points. Inflation rate is negative (-) statistically at the 10% level of regression. The entire economic agent is maximizing their individual utility or welfare. Accordingly, selfish interests of economic agent are the basic motive for economic transaction among them.

Kneller and Haque (2014) have investigated endogenous growth model on corruption. The researchers test by using three stages Least Square Method in a panel set up for a system of form of equation or growth public investment, corruption and private investment. This study based on secondary data. The empirical work on corruption has flourished since mid 1990 due to the publication of several cross-country data sets that are widely regarded as providing reliable measures of corrupt organization (Political Risk services; In corrupted and Transparency International using questionnaire survey). This research developed a neo classical growth model where the government

officials are given the task of producing public goods that are used as productive inputs in the production. We found that the corruption increase public investment in this research and corruption reduces the returns to public investment and makes it ineffective in raising economics. This study evaluates the public investment effect on growth, which affected by the presence of corruption in the economy.

Ali and Jan (2017) have investigate the effect of corruption on FDI inflow in south Asia. This research analyzes the impact of corruption FDI in context of South Asian Countries. The sample of the study consists of panel data set for the south Asian Countries to which data are available over time span of 1996-2016. They used theoretical and quantitative analysis. They used OLS regression model, chow test, Heteroscedasticity and sample consists on seven countries. The results of pooled OLS regression show that the coefficient of CPI is -0.61 with P-value 0.03494. The variables of inflation INEL is Negative but significant 10% level and have effect on dependent variables. The political risk has positive sign but significant. The statistical software Gretl was used for analyzing the variables and for the interpretation of the results. The results revealed that if the countries South Asian could be able to reduce the perceived uncertainty of comparative of advice countries like Japan and America.

Nicholas (2015) examined the effect of corruption on economic growth of China. To do this, a regression model is used. He used provincial income a proxy for economic growth. His model follows that of Barrow. To account for differences in provincial growth rate, Special Economic Zone is used as a dummy variable for Provinces designated as such and those that are not. The result shows that there is a strong impact of corruption on economic growth. Specially, a rise in corruption prevention effort by 1% in the nation as a whole will lead to 0.02% increase in national income.

Hawang (2002) study the impact of corruption on government revenue in 44-66 countries. In his study, he shows that if corruption leads to tax evasion, improper tax exemptions or weak tax administration then it will lead to a decrease in government revenue. The researcher went further to posit that the composition of government revenue will be distorted due to corruption; that the proposition of international revenue will raises relative to domestic revenue with corruption. This research also find out that there is a positive and significant relationship between corruption and tax on international trade over current government revenue. In addition, there is negative relationship between corruption and domestic tax revenue and total amount of government revenue over GDP.

Mo investigates the effects of corruption on economic growth in 54 countries. Using Ordinary Least Square estimations, the result shows that a 1% increase in the level of corruption will decrease growth rate by about 0.72%. Thus corruption has a negative impact on economic growth. Evidence from the work suggests that the channel through which corruption affects growth is via political instability accounts for about 53% of the total effect of corruption on economic growth. The study also shows that the level of human capital and share of private investment is negatively affected by corruption.

Beekman; Bulte and Eleonora (2014) analyze how corruption affects incentives to invest or contribute to public goods. This study obtain a proxy for corruption among Liberian community leaders by keeping track of a flow of inputs associated with a development intervention, measuring these inputs before and after giving them in custody to the chief. This research uses the “gap” between these measurements (“missing inputs”) to explain variation in investment behavior of villagers. This study uses the quantitative as well as qualitative empirical method. This study shows that investment behavior is gauged with two simple artificial field experiments. The researcher analyzes the corruption and private incentives in 44 communities in rural Liberia. The main results are that corruption (i) undermines incentives for voluntary contributions to local public goods and (ii) may reduce private investments of individual subjects to rent-seeking by the chief in real life. This research provides weaker evidence that the impact of corruption on investments and contributions to public goods is heterogeneous: this impact may be gender-specific and appears to vary with accessibility of communities.

Gupta, Davoodi and Alonso (2002) have investigated the income inequality and poverty tends to abundant natural resources, low productivity, low average secondary schooling and unequal distribution of land. This study uses the quantitative and qualitative technique. This research is using the OLS regression analysis within the variables. One or two tail tests at the one percent level. The magnitude of effect of composition on income inequality is considerable. This research finds that corruption interferes with the traditional one functions of government: allocation of resources, stabilization of the economy and redistribution of income. These functions influences income distributions and poverty is varying degrees, both directly and indirectly compaction increases inequality. It is harmful both growth and equity.

Hindriks, Keen and Mutho (1999) have investigated the impact of evasion and corruption is unambiguously regressive under tax schemes of broadly the kind often observed. This study based on primary sources. This research used the qualitative research. This research used to assumption to justify through the proof from the mathematical theorem. This research finds that the poor have little gain from evading taxes and are at the same time vulnerable to over reporting of their income; for the rich the converse is true. Including the honesty in the collection of progressive taxes can be costly, implying additional sources of inefficiency associated with the pursuit of equity goals. Since the poor the most vulnerable to extortions paying tax in- Spector's commission on low income report-runs an especially large risk of inducing abuse and corruption. While heavy penalties on inspectors caught conning in the evasion simply leads them to ask for and receive larger bribes, heavy penalties tor extortion reduce bribe- taking and may have key role to play in combatingcorruptions.

Acemoglu and Verdier (1998) have investigated the effect of corruption on airport productive efficiency using an unbalancedpanel data of selected European airports between 2003 and 2009. The researchers apply robust cluster random effect model after calculating the net variable factor productivity using multilateral index. The result shows strong evidence of negative impacts of corruption on airport operating efficiency. However the effect depends on the form of ownership of the airport. Airport under the public- private ownership are more likely to experience lower levels of efficiency when located in corrupt countries. Inrelatives terms, they operate less efficiency than fully and or majority government owned airports in high corrupt country. Economic regulation, competition level and other airport's features are the control variables in their work.

Benjamin and Rohini (2011) examined the review of evidence of corruption in developing countries with special focus on bribes to government officials and theft of government resources by public officials. This study tries to answer the questions of how much corruption is there, what are the" efficiency consequences of corruption and what is the determinant of the level of corruption in developing countries. There is a strong evidence of the response of corruption to 'standard economic incentivetheory'. However, the effects of anti- corruption policies attenuate as officials find alternatives strategies to pursue rents.

Beglstsia and Tsyplitska (2018) have examined the weak institutions that prevent the formation of free and competitive markets and the deepening of international economic relationships and political

integration, and it restrains economic development. This main objective of this research is detecting the correlation between the country's level of corruption and its economic efficiency, as well as improving the state's economic policy directions in the prevention of and fight against corruption. This study shows that the evaluating the economic causes of corruption; the ways of eliminating corruption; and the degree of state corruption and its impact on economic efficiency. This study based on theoretical and scientific aspects of corruption analysis and its influences on the economy. This study deals with the economic causes of corruption at micro and macro levels. The authors made the analysis of the relationship between the level of Ukraine's corruption and its economic development indicators, the reciprocal dependency between the country's economic situation and the level of its corruption. The researcher concludes that the questions relating to the anticorruption struggle should not contain only the punitive approach that can be seen in the formation of various institutions. Another important consideration is the set of institutional and socio-economic conditions that form a favorable environment for corruption. This in turn contributes to the deterioration of the economic situation of the state.

Chand and Moene (1999) have investigated to analyze how bonus payments to tax officers can promote less corruption and how to rampant fiscal corruption was brought under control and revenue performance remarkably improved. The researchers use quantitative and empirical study on corruption. They used the mathematical model to justify the assumption. The resulting serves deals with importers and officially recorded imported plummeted. The model set out above analytical support to the basic strategy that was perused in Ghana to retain corruption and to improve performances. It brings out clearly the importance of attending, in an integrated manner, both to the conditions of services of fiscal officers and the organization setup. Simply providing bonuses is not enough: corruption at higher levels of management has to be contained to allow bounces to become more effective. The analysis of model shows that once this process is initiated a virtuous circle can result improves the progressive shrinkage of the gap between reported and true tax liabilities thereby reducing the incentive for corruption.

De Rosa, Gooroochaum and Gorge (2013) examine the effects of corruption on productivity in Central and Eastern Europe. Enterprise data from 28 countries was used to test this. The effects of red tape and this help we understand 'bribe tax' as 'time tax' imposes on firms. The result shows that only the bribe tax has a negative impact on firm level productivity with insignificant effect of time

tax on productivity. The researcher finds that bribery will be harmful for firm level productivity in a county with weaker insitutions and high level of corruption.

Lambsdorff (1999) have been investigated the wave of empirical studies the causes and consequences of corruption. This study perceived the data on the corruption from a cross- section of countries have been faithfully introduced into empirical research lately. This study reviews a large variety of studies on the consequences and causes of corruption. It includes research on the impact of corruption on investment, GDP, institutional quality, government expenditure, poverty and international flows of capital, goods and aid. Research on the causes of corruption focuses on the absence of corrupiton, policy distortions, political systems, public salaries as well as an examination of colonialism, genger and other cultural dimensions. This research concludes that corruption commonly goes along with policy distortions, inequality of income and lack of competition. These empirical results are nontheless helpful in indentifying areas which are prone to corruption or which indicate its existences.

### **2.2.2 Nepalese Context**

In Nepalese context, only few studies have been carried on corruption and economic growth. In this section we review the literature related to corruption, public investment and revenue for Nepal.

Shrestha (2007) has investigated the corruption in infrastructure provision and service delivery at Municipal level in Nepal. The main objective of this research is to prepare overview of corruption in infrastructure and service delivery. This study is based on secondary data and the second source is information, interviews were conducted with municipal officials on one side and constrictors and private operators on the other. The importance of the studying corruption in the construction of public latrines, common water taps, roads and electric plants and in the way access is allocated in order to understand and combat commotion in such type of village and neighborhood level infrastructure.

Bhusal(2016) conducted a study Corruption and Financial Flow in Nepal. The main objective of this research is to explore the concept of illicit financial flow and present status of illicit financial flows of developing countries and Nepal. This research is based on secondary data which is published global integrity. He used analytical and explanatory method in this research. This research investigate the poorest developing countries including south Asian countries will continue to rely on tariff

revenues as a major source of revenues given weak domestic taxation, and as long as such duties are levied, smuggling will continue. The subject of illicit flows (like corruption) is clouded by a lack of terminological clarity, which obstructs an effective policy debate.

Shaha(2018) Conducted the research on the historical trend of corruption and economic growth in Nepal. He argued that lack of transparency, lack of good governance, incentive, lack of surveillance weak civil society, lack of accountability are major factors of corruption in Nepal. He used the descriptive and analytical method. The major determinants of corruption are economic growth trade liberalization, inflation and Human Development Index. The results show that there is negative relationship between the corruption and economic growth.

Dix (2011) argued that the dominant formal and informal institutions and actors relevant for strengthening integrity in Nepal's development. This study uses qualitative and descriptive analytical method. The main objectives of this study is to assess the current environment in which corruption occurs in Nepal, extent lessons from that past government and donor anti- corruption interventions and came up with realistic recommendations for strengthening, accountability transparency and integrity in Nepal. Commissioned by Norwegian Embassy in Nepal with support from UNDP, the study seeks to understand the context in which corruption occurs, to examine what can be done to promote integrity, transparency and accountability and suggest possible entry points for prioritized anticorruption interventions. This study finds that a change in amore pluralist governance's regime would be required to significantly control corruption in the Nepal. Although, this could begin by looking for opportunities to create a shift in norms Nepal is in post war transitional period which is conducive action and effectives and ethical leaders have the potential to investigate these changes.

Truex (2011) investigates the social norms can reduce the costs of corrupt behavior and push a society towards a high- corruption equilibrium, but what determines individual attitudes towards corruption. This research analyze how does the acceptance vary across different types of corrupt behaviors. This research is based on the primary data. This research used the descriptive and analytical survey methods. This research finds that an original survey of Kathmandu residents shows substantial variation in attitudes toward different types of corrupt behavior. Overall respondents generally agreed that large- scale bribery was unacceptable, but there was relative discord over behaviors involving petty corruption, gift giving, and favoritism. Education consistently emerged as the primary determinant of these attitudes, with more educated respondent's showings less accepting attitudes across the range of corrupt behaviors. These finding suggests that improving access to



education in developing countries may reduce the presence of corruption norms and ultimately corruption itself, although further research is needed to test the strength of these relationships outside of Nepal.

### **2.3 Research Gap**

To estimate the relationship between the corruptions, public investment and economic growth are the one of the importance issue in Nepalese context. It is necessary to estimate the how much level of corruption badly impact to the corruption to the economic growth. There are many empirical studies in international context to analyze the relationship between corruption, public investment and economic growth. However, Nepalese context, there are only few theoretical studies in this field. Mo investigates the effects of corruption on economic growth. The result shows if 1% level of corruption increases, it will decrease growth rate by 0.72%. Thus corruption has a negative impact on economic growth. Aid et al. shows that a regime specific relationship between corruption and economic growth. Bhusal investigate the poorest developing countries including south Asian countries will continue to rely on tariff revenues as a major source of revenues given weak domestic taxation, and as long as such duties are levied, smuggling will continue. Kneller and Haue(2004) developed the neo classical growth model where the government official are given the task of product the public investment effect on growth. Nicolas (2015) used provincial income as a proxy for economic growth in China. A rise in corruption prevention effort by 1% in the nation whole will lead to 0.02% increase in national income. The objective is to examine the relationship between the corruption and public investment which can be fulfill through different econometric model like Ackefuller Unit root test, Granger Causticity test,Engle- Granger Co-integration Test and Error Correction model etc

## CHAPTER-III

### RESEARCH METHODOLOGY

This chapter discuss about the methodology of research which can be used in research. The major heading of this research are research design, nature and sources of data, data analysis sample period and model simplification.

#### 3.1. Research Design

The descriptive statistics including mean, median, standard deviation etc. of the variables are calculated and presented in table. This research we analyzed the trend of corruption and economic growth by using table and graphs. Granger causality test is performed to test the direction of causality between Nominal GDP and Corruption Perception Index (CPI). Finally quadratic equation is estimated by using OLS method which estimates the relation between corruption, public investment and public revenue. So this study is descriptive as well as analytical in terms of research design.

#### 3.2. Nature and Sources of Data

The study based on secondary data and information. The secondary time series data have been collected from various sources like various issues of Economic Survey which is published by Ministry of Finance, national account of Nepal and statistical year book published by Central Bureau of Statistics (CBS), Commission for the Investigation of Abuse of Authority, Office of Auditor General and the website of World Bank.

**Table3.2.1 Sources of Data and Measurement**

<b>Variables Description</b>	<b>Unit</b>	<b>Sources</b>
Corruption Perception Index	Index number	Transparency International
Gross Domestic Product(Real GDP)	Rsmillion	Various issues of Economic Survey, CIAA, OAG & National Account, CBS, NRB

Gross Fixed Capital Formation (GFCF) Public Investment	Rsmillion	Various issues of Economic Survey, CIAA, OAG & National Account, CBS
Public Revenue	Rs million	
Consumer Price Index	Index number	Quarterly Economic Bulletin, NRB

### 3.3. Sample Period Covered

The study covers the annual dataset of 16 years from the FY 2004AD to 2019 AD. This time period is chosen due to the unavailability of data of all variables before this time period.

### 3.4. Tools and Methods of Data Collection

The required data and information were collected by the researcher himself by visiting concerned institutions and collected various published documents of these institutions like Quarterly from Commission for the Investigation Abuse of Authority (CIAA), Nepal Rastra Bank (NRB), Office of Auditor General(OAG), Economic Survey Reports from Ministry of Finance (MoF), National Accounts of Nepal and Statistical Year Book of Nepal from CBS. Similarly, the data used from World Bank (WB) report were collected by visiting the website of World Bank.

### 3.5. Data Organization and Processing

The collected data and information were organized in different groups and sub-groups and processed as per the objectives and hypothesis of the study. The real GDP, Corruption Perception Index, gross fixed capital formation, public investment, public expenditure and total revenue are the major variables. The data are collected from different surveys and countries are ranked based on perceived level of corruption over period 2004-2019

### 3.6. Specification of Tools and Method of Data Analysis

The study used different statistical tools such as mean, median, standard deviation, Skewness and kurtosis to analyze the descriptive statistics of the variables. The tables and graphs were used to analyze the trend of corruption and economic growth. Augmented Dickey Fuller(ADF) test has

employed to test the stationary of the variables, Engle-Granger Co-integration test is used to examine the co-integration among the variables, Error Correction Model (ECM) as used to estimate the short run relationship between nominal GDP and other explanatory variables, Granger causality tests, quadratic equation approach through OLS were used. Similarly, diagnostic tests by using Breusch-Godfrey LM test for serial correlation, Breusch-Pagan-Godfrey test of heteroscedasticity, Jarque-Bera (J-B) test for normality, CUSUM and CUSUM squares test are using in this thesis. The study uses the E-views, “Econometric Views” software for data analysis and examines the relationship between corruption public investment and economic growth.

### 3.6.1 Unit Root Test

This empirical analysis is based on time series data, assumes that the underlying time series should be stationary. Time series data is said to be stationary if its mean, variance and covariance do not vary over time. But it is now a well-known fact that most of the macroeconomics time series are non-stationary (Dickey-Fuller, 1979, Gujarati, 1995). If we apply the regression model in non-stationary data it gives a spurious relationship which makes hypothetical test results unreliable. Hence, to avoid a spurious relationship, detecting the stationary or non-stationary of time series is crucial. Similarly, diagnostic tests by using Breusch-Godfrey LM test for serial correlation, Breusch-Pagan-Godfrey test of heteroscedasticity, Jarque-Bera (J-B) test for normality.

#### Augmented Dickey Fuller Test (ADF)

This test was developed by Dickey and Fuller in 1970 and named after them as Dickey-Fuller test. The Augmented Dickey-Fuller Test as follows:

The equation for no intercept and no trend is,

$$\Delta Y_t = \gamma_i Y_{t-1} + \sum_{i=1}^k c_i \Delta Y_{t-i} + e_t \dots \dots \dots (i)$$

The equation for only intercept and no trend is,

$$\Delta Y_t = \alpha_1 + \gamma_i Y_{t-1} + \sum_{i=1}^k c_i \Delta Y_{t-i} + e_t \dots \dots \dots (ii)$$

The equation for both intercept and trend is,

$$\Delta Y_t = \alpha_1 + \gamma_i Y_{t-1} + \alpha t + \sum_{i=1}^k c_i \Delta Y_{t-i} + e_t \dots \dots \dots (iii)$$

Where  $\Delta Y_t$  = First difference.

The null hypothesis of ADF is  $\gamma_i = 0$  against the alternative hypothesis of  $\gamma_i < 0$ . If we do not reject null, the series is non-stationary whereas rejection means the series is stationary. If the series is

stationary without any differencing, it is said to be I(0) or integrated with order 0. Similarly, if the series is stationary after a first difference is said to be I(1) or integrated of order 1.

**3.6.2 Engle- Granger Cointegration Test**

This test is used to perform the co-integration between the variables when the variables are non-stationary at level but stationary at first difference. Engle and Granger (1987) suggested a cointegration test, which consists of estimating the co-integration regression by OLS, obtaining the residual  $U_t$  and applying the unit root test for  $U_t$ . According to this test, following hypothesis is tested:

Null Hypothesis ( $H_0$ ):  $U_t$  has unit root at level i.e.  $U_t$  is non-stationary at level.

Alternative Hypothesis ( $H_1$ ):  $U_t$  has no unit root at level i.e.  $U_t$  is stationary at level.

If the Augmented Dickey- Fuller test statistic is greater than Engle-Granger critical value then we reject null hypothesis and accept alternative hypothesis i.e.  $U_t$  is stationary at level. If  $U_t$  is stationary at level then the variables are co-integrated and exist a long-run relationship between them. Similarly, the regression model will not be spurious or nonsense when  $U_t$  is stationary at level.

To test the Engle-Granger Co-integration, first of all we derive the following long-run model by using OLS method:

$$Ln = LnPI\beta_0 + \beta_1LnCPI + \beta_2LnNGDP + \beta_3LnGFCF + \beta_4LnCPI2 + \beta_5LnGE + \beta_6M2 + U_t \dots \dots \dots (1)$$

Where,

LnGDP = Natural log of Nominal Gross Domestic Production.

LnCPI = Natural log of Corruption perception Index.

LnGFCF = Natural log of Real Gross Fixed Capital Formation.

LnM2 = Natural log of Broad Money Supply.

LnGE = Natural log of Government Revenue.

LnPI = Natural log of Public Investment.

$U_t$  = Error correlation Term (ECM)/ Residual Term.

After deriving the model (1), we calculated the value of Error Correlation Term as given below:

$$ECM_t = U_t = LnRGDP - (\beta_0 + \beta_1 LnCPI + \beta_2 LnCPI2 + \beta_3 LnM2 + \beta_4 LnPI + \beta_5 LnGFCF + \beta_6 LnGR + \beta_7 LnGE) \dots \dots \dots (2)$$

After calculating the values of ECM for different periods then we test the stationary of ECM. If the error correlation term or residual is stationary at level then the variables in equation (1) are cointegrated and exist a long-run relationships among them. Similarly, stationary test of ECM is also used to test whether the long-run model is spurious or not. The symptom of spurious regression if R-squared value is greater than Durbin-Watson statistics. But the model is not spurious when the residual (ECM) is stationary at level even R-squared is less than Durbin-Watson Statistics.

### 3.6.3 Error Correction Model (ECM)

When all variables are stationary only after first difference and co-integrated to each other then we estimate the error correction model to account for the short-run dynamics of the growth model and estimate the speed of adjustment short-run disequilibrium to long-run equilibrium. The ECM model is given below:

$$D(LnPI) = \beta_0 + \beta_1 D(LnCPI) + \beta_2 D(LnGE) + \beta_3 D(LnM2) + \beta_4 D(LnGDP) + \beta_5 D(LnGFCF) + \beta_6 CPI2 + \beta_7^* ECM_{t-1} + V \dots \dots \dots (3)$$

Here, D(LnNGDP), D(LnCPI), D(LnPI), D(LnM2), D(LnGFCF), D(LnCPI2) and D(LnGE) are first differences of LnNGDP, LnCPI, LnPI, LnM2, LnGFCF, LnGE, and LnCPI2 respectively.

$\beta_0$  = Constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ , and  $\beta_7^*$  are the short run coefficients.

V = white noise error term

$ECM_{t-1}$  is one period lag residual of equation (1). The coefficient of  $ECM_{t-1}$  provides the speed of adjustment which should be negative and significant

### 3.6.4 Granger Causality Test

If variables are co-integrated, then there may exist a relationship between the variables. The relationship is either unidirectional or bidirectional. Granger (1969) developed causality test method to investigate a causal relationship between variables. In the present study the PI is a dependent variable and consumer price index is a core exogenous variable. So the present study has tested for Granger-causality relationship between CPI and PI. To perform a Granger-causality test between CPI and PI, the following models have been used:

$$LnPI = \alpha_0 + \sum_{i=1}^n \beta_{1i} LnCPI_{t-i} + \sum_{j=1}^n \gamma_{1j} LnPI_{t-j} + \mu_{it} \dots \dots \dots (1)$$

And  $LnCPI = \alpha_0 + \sum_{i=1}^n \beta_{2i} LnPI_{t-i} + \sum_{j=1}^n \gamma_{2j} LnCPI_{t-j} + \mu_{2t} \dots \dots \dots (2)$

The following hypothesis has been tested to find the direction of causality between Nominal GDP and CPI.

First hypothesis for Granger Causality test:

Null Hypothesis (H<sub>0</sub>):  $\beta_{1i} = 0$  i.e. LnCPI does not Granger cause LnPI.

Alternative Hypothesis (H<sub>1</sub>):  $\beta_{1i} \neq 0$  i.e. LnCPI does Granger cause LnPI.

Second Hypothesis for Granger Causality test:

Null Hypothesis (H<sub>0</sub>):  $\beta_{2i} = 0$  i.e. LnPI does not Granger cause LnCPI.

Alternative Hypothesis (H<sub>1</sub>):  $\beta_{2i} \neq 0$  i.e. LnPI does Granger cause LnCPI.

According to this method the level of corruption is estimated by setting the first order partial derivative of equation (iv) with respect to CPI equals to zero.

$$\frac{\partial(\Delta LnPIFC)}{\partial(\Delta LnCPI)} = 0 \text{ This gives, } \Delta LnCPI^* = -\frac{\gamma_1}{2\gamma_2}$$

### 3.7 Residual Test

Diagnostic test of the residuals are very important test for the study of ordinary least square (OLS) method. There are various assumptions of OLS like non-autocorrelation, homoscedasticity, normality etc. The model should satisfy these properties for better results of OLS method. So the present study also tested the serial correlation, heteroscedasticity, normality and stability of the model.

### 3.7.1. Autocorrelation

The lag correlation of the residual series is called autocorrelation. To check the autocorrelation the LM test has used. Under this test following hypothesis is tested:

Null Hypothesis (H<sub>0</sub>): There is no serial autocorrelation

Alternative Hypothesis (H<sub>1</sub>): There is serial autocorrelation.

The rejection and non-rejection of null hypothesis depends upon the p-value. If the p-value is greater than 5 percent (p>0.05) then we cannot reject the null hypothesis i.e. there is no serial autocorrelation of the model.

There are two hypotheses about the relationship between corruption and economic growth. These are:

Hypothesis-1: Other thing equal, high corruption leads to high public investment

Hypothesis-2: High CPI index(less corruption) leads high economic growth

To justify the hypothesis, we used the Least Square (OLS) method of regression. We used natural log of per capita GDP and Public investment as a share of GDP as a control variable. These variables also affect government revenues.

We adopt Tanzi and Davoodi Model to test the above hypothesis.

Model 1: we regress

$$\ln PI_t = \alpha_1 + \beta_1 \ln CPI_t + \beta_2 \ln GDP_t + \varepsilon_t \dots \dots \dots (1)$$

Model 2:

$$\ln GDP = \alpha + \beta_1 \ln CPI + \beta_2 \ln PI + \beta_3 \ln G + \beta_4 \ln CPI + \beta_5 \ln GFCE + \beta_6 PI \dots \dots \dots (2)$$

Where,

#### **Dependent Variable**

GDP=Nominal GDP at Producer price

#### **Independent/ control Variables**

CPI= Corruption Perception Index



CPI=Consumer Price Index

PI= Public Investment

GFCF=Gross Fixed Capital Formulation

Ln= log

.

### 3.8 Definition of Variables

- a) Corruption Perception Index:** This research we use indices of Corruption Perception Index (CPI) from Transparency International. Data on corruption range from 0 to 10. The lower the index, the more corruption and higher the index, the least corrupt. It is explanatory variable or control variable in this thesis.
- b) Government Expenditure:** This refers to the purchase of goods and services, which include public consumption and public investment, and transfer payments consisting of income transfers (pensions, social benefits) and capital transfer. Government expenditure is also indices which affect the economic growth and development. In this research we use government expenditure in nominal term which is exogenous factor affecting corruption.
- c) Board Money Supply (M2):** The money supply is the entire stock of currency and other liquid instruments circulating in a country's economy as of a particular time. The money supply can include cash, coins, and balances held in checking and savings accounts, and other near money substitutes. Money supply is affected the inflation.
- d) Public Investment:** Public investment, investment by the state in particular assets, whether through central or local governments or through publicly owned industries or corporations. Public investment generally constitutes a relatively small percentage of overall public spending but is frequently a major component of total national capital investment.
- e) Gross Fixed Capital Formulation:** Gross fixed capital formation is essentially net investment. It is a component of the Expenditure method of calculating GDP. Gross fixed capital formation includes spending on land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; the construction of roads, railways, private residential dwellings, and commercial and industrial buildings.
- f) Nominal Gross Domestic Production:** Nominal gross domestic product is gross domestic product (GDP) evaluated at current market prices. GDP is the monetary value of all the goods and services produced in a country. Nominal differs from real GDP in that it includes changes in

prices due to inflation, which reflects the rate of price increases in an economy. GDP is typically measured as the monetary value of goods and services produced.

**g) Consumer Price Index**

The Consumer Price Index (CPI) is a measure that examines the weighted average of prices of a basket of consumer goods and services, such as transportation, food, and medical care. CPI indicate the inflation. It is control variables which can affecting the corruption. It is calculated by taking price changes for each item in the predetermined basket of goods and averaging them. Changes in the CPI are used to assess price changes associated with the cost of living; the CPI is one of the most frequently used statistics for identifying periods of inflation or deflation.

**h) Real GDP:** Real GDP is inflation adjusted output of the economy or annual gross domestic product of the country at base year price 2015/16. Real GDP in that it includes changes in prices due to inflation. This study used the real GDP at factor cost is a dependent variable. The real GDP at factor cost is calculated by using following formula;

$$RGDP = \frac{\text{Nominal GDP at factor cost}}{\text{Implicit GDP Deflator}} \times 100$$

**i) GDP Growth Rate:** GDP growth rate is the rate of change in the real GDP of a country in a fiscal year. It is calculated by using following formula.

$$GDP\ Growth = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$$

## CHAPTER: IV

### DATA ANALYSIS AND PRESENTATION

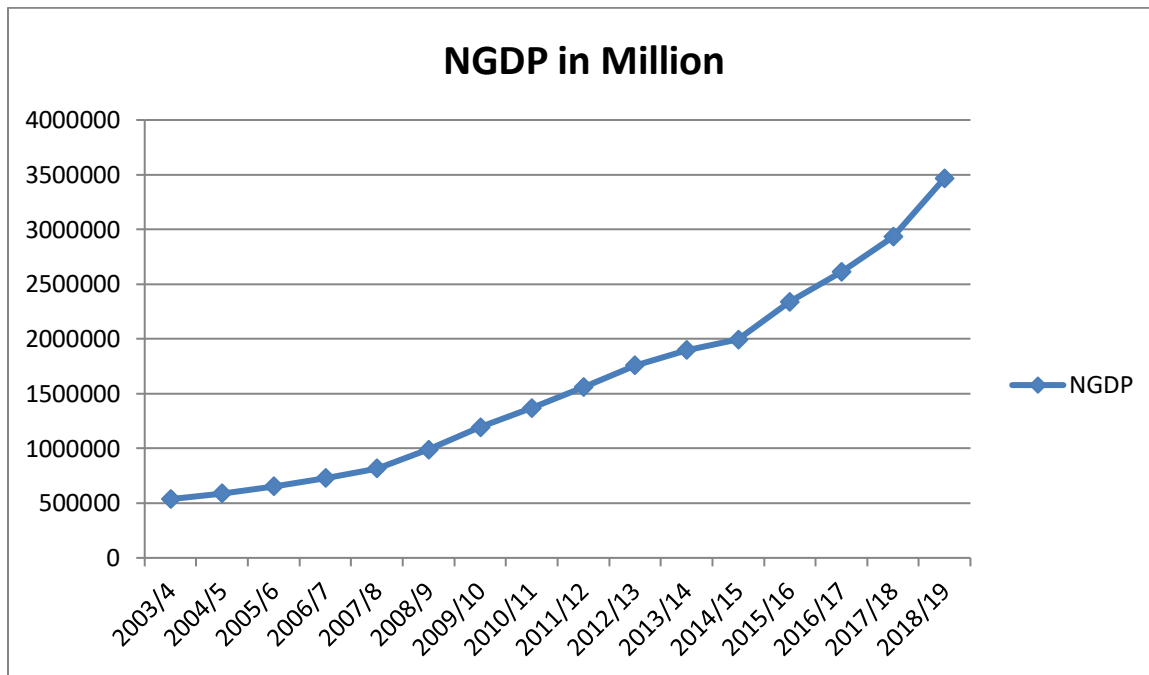
In this research paper, the researcher describes the nature and trend of major variables that affect the public investment and economic growth. In this section the researcher has analyzed that how corruption affects the public investment and economic growth.

#### 4.1 Description of Major Variables

##### 4.1.1 Nature of Nominal Gross Domestic Product (NGDP)

Nominal GDP is major variable; it directly affects the public investment and economic growth in a country. When Nominal GDP increases, it promotes the economic development and economic growth. A nominal GDP increases the public investment. The contribution of agriculture to GDP has been gradually declining and non-agriculture sector is increasing continuously. The nature of NGDP is presented in given figure4.1.1

##### 4.1.1 Nature of Nominal Gross Domestic Product (NGDP)



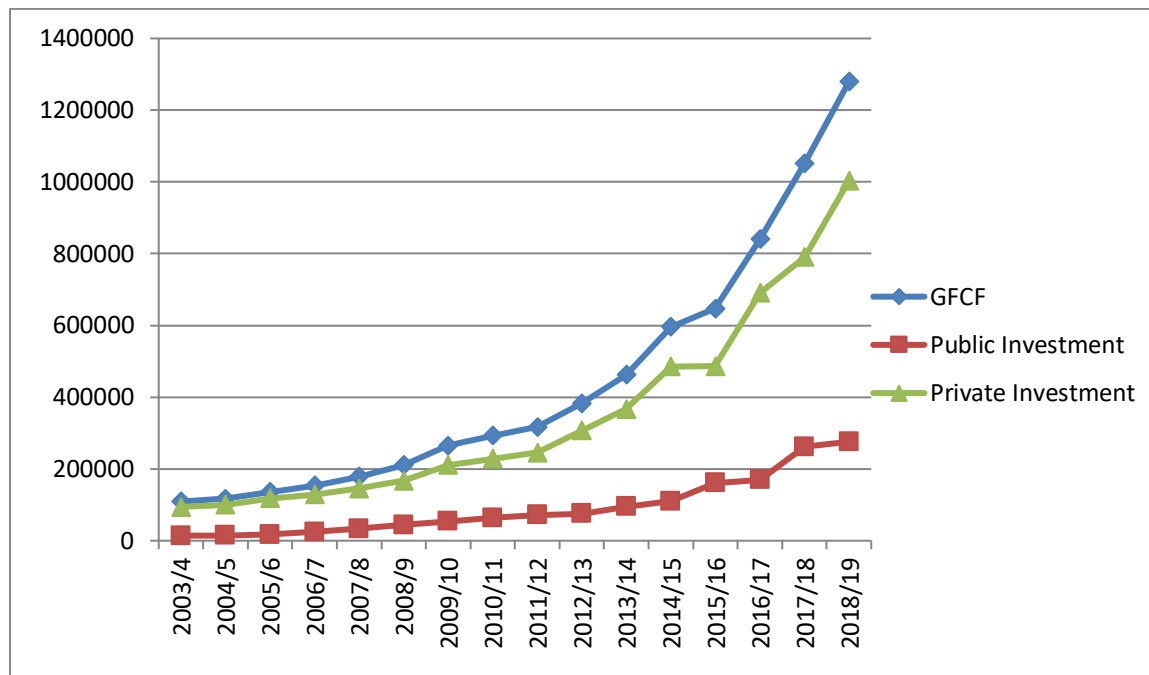
Sources: Central Bureau of Statics

Fig 4.1.1 shows that the Nominal Gross Domestic Product at current price is increasing gradually in every year. In FY 2003/4, NGDP was Rs 536840 million. Similarly the size of NGDP in fiscal year 2004/5 was PRs 589400 million. Similarly fiscal year 2007/8 the size of NGDP was Rs 818700 million. The size of NGDP fiscal year 2018/19 is Rs 3469300 million. In FY 2008/9 the NGDP was reach Rs 988300 million. Similarly in fiscal year 2009/10 the size of NGDP was Rs 1193700 million. The NGDP in FY2011/12 was 1558200 million. Similarly in FY 2012/13 the NGDP was 1758738. In FY 2013/14 the NGDP was increases and met Rs1758738 million. Similarly in fiscal year 2013/14 the size of nominal gross domestic product was Rs.1899089 million. Similarly in fiscal year 2014/15 the size of nominal GDP reaches Rs.1993560. This shows that the size of NGDP was gradually increases annually. In the other hand the size of agriculture contribution in NGDP ratio is a declining and non-agriculture sector GDP contribution increasing in Nepal.

#### **4.1.2. Nature of Investment (GFCF)**

Gross Fixed Capital Formulation is the major factor of public investment and economic growth. It stimulates that higher the rate of investment higher will be economic growth. When the government revenue and output increases it increases the public investment. In the other hand when the public investment increases then the level of corruption as also increase. In Nepal, the size of public investment is very low and most portion of investment is private investment. It is estimated to have a gross capital formulation of 2157.178 billion in the fiscal year 2018/19 where as it was 1672.421 percent in 2017/18. Among the gross capital formulation, GFCF has height share of 1279.513 billion. The total fixed capital formulation to GDP ratio in FY2018/19 is to reach 36.9 percent after increasing from the previous FY 34.7 percent. The trend of GFCF is shows the given figures 4.1.1.

**Fig. 4.1.2. Nature and trend of Gross Fixed Capital Formulations(Rs. In million)**



Source: NRB Bulletin 2019.

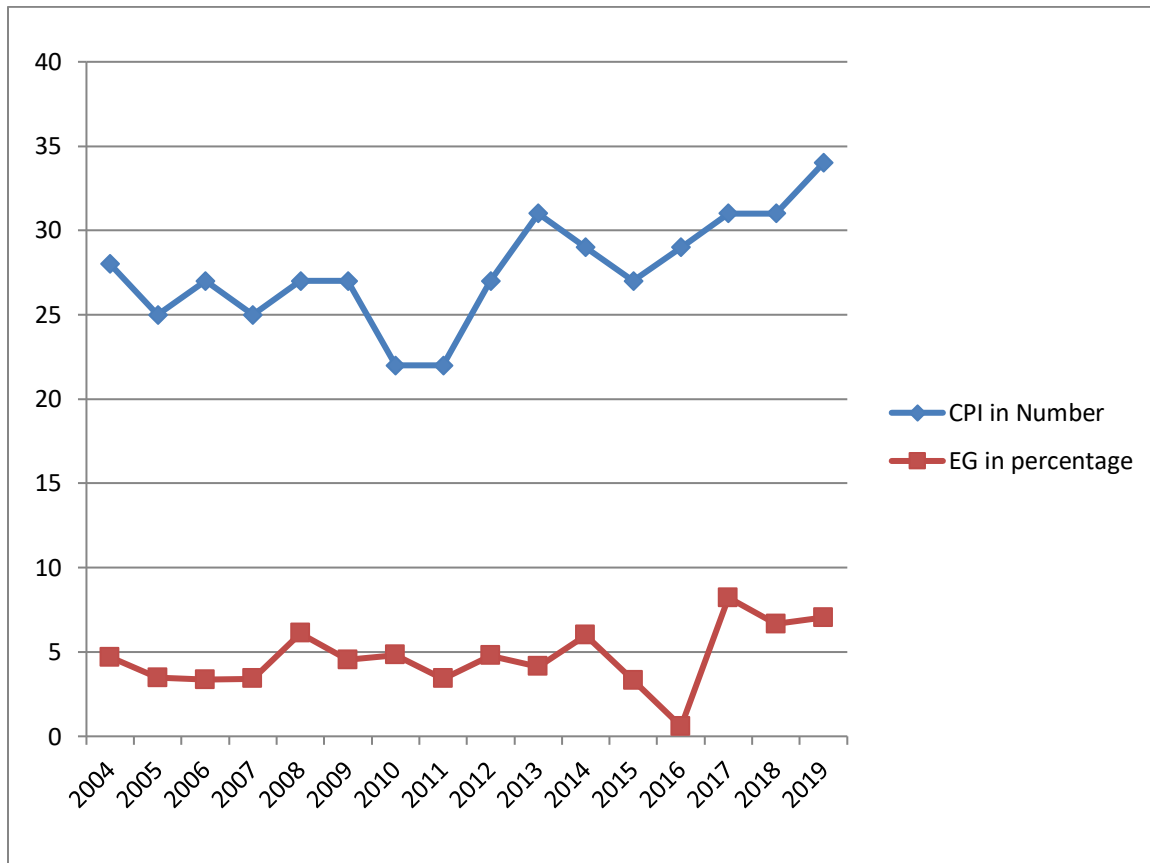
A fig. 4.1.2 shows that Gross Fixed Capital Formulation has increased rapidly in every fiscal year. In FY 2003/4 the GFCF was RS 109188 million whereas the private investment was Rs 94226 million and public investment was only Rs 14119 million. Similarly in fiscal year 2004/5 the GFCF was Rs 117539 million where the public investment has been 14955 and 100326 million. In fiscal year 2009/10 the GFCF has been reached Rs292730 whereas the public investment has increased rapidly then the private investment. In that time public investment was Rs 63800 million and private investment was Rs 228924 million. FY 2008/9 the size of GFCF was Rs211039 where as private investment was 166761 million and public investment was Rs 44288 million. In fiscal year 2013/14 the GFCF was Rs462013 million whereas the public investment was Rs949779 and private investment was Rs 367034. In that fiscal year the public investment raised rapidly whereas private investment rises slowly. In fiscal year 2017/18 the GFCF reached 1051957 million whereas the private investment was 790450 and public investment was reached Rs790450 million. Similarly in fiscal year 2018/19 the size of GFCF was Rs 1279513 million which increased gradually. Private investment was Rs 1003632 million whereas public investment was only Rs275881 million only. The ratio of private investment has been very high, which is rapidly increased. The pattern of public

investment has slightly increased rather it was very low. The Share of private sector and government sector in fixed capital formulation was expected to stand 78.4 percent and 24.9 percent in FY 2017/18. The growth rate of private sector in capital formulation was higher in comparison to that of government expenditure.

#### **4.1.3 Nature and trends of CPI and Economic Growth**

CPI and economic growth has positive relationship. When CPI increases (inflation decreases) economic growth is increases vice versa. The CPI index of Nepal is positive in last three years. The average annual growth rate of the last two decades has been 4.6 percent. During the period the average economic growth rate of agriculture sector and non-agriculture sectors has been 3.1 and 5.3 percent respectively. After being shattered earthquake and border blocked 2015/16, Nepalese economic expanded by annual growth rate is 7.3 percent from FY 2017/18. The trend of CPI and Economic growth shows the change of CPI and Economic Growth over the study periods.

**Fig 4.1.3 Trend and Nature of CPI and Economic Growth**



Source: Economic Survey and International Transparency 2019

Fig.4.1.4 shows that the relationship between corruption and economic growth. When the CPI increased or corruption decreased then the economic growth as also increases. The trend analysis in figure indicates that the CPI was negative in the 2004. At that time the growth rate was nearly 5 percent. Similarly, in the 2005 the growth rate was negative and CPI was nearly 25. Likewise in 2008 both CPI and economic growth has increased. CPI is 27 and economic growth was 6.102 percent at that time. In the 2015 the CPI was reached 29 and economic growth was negative. In the FY 2019 CPI was reached to 34 which is highest in the whole study period and in the history of Nepal. In that period the economic growth was 7.05 percent. Similarly, in the 2011 CPI is 22 which is very low and economic growth is 3.42 which is decreases. From above figure we may conclude that the growth rate of real GDP and rate of CPI has highly fluctuated. Sometimes CPI increase and growth rate of real GDP decreased and vice versa.

#### **4.1.4 Major Determinant Factor of Corruption**

##### **a) Inflation:**

Inflation can be affected by the level of corruption indirectly. It is the main factors causing corruption. Since inflation reduces the level of wages, it negatively affects the purchasing power of people. 'The purchasing power decreases, the basic needs must be met first. If not, people might apply to any kind of illegal methods such as fraud; bribery socio economic deterioration leads the level of corruption increases in a country. A lot of people believe that inflation can be causes of moral Hazard(Paldam, 2002).

##### **b) Economic growth:**

Lack of economic resources can emerge as a fundamental factor leads to corruption is a phenomenon that existing in all countries. Corruption can affect resources allocation in two ways first, it change private investors assessments of the relatives merits of various investments. This influences follows from corruption reduces changes in the relative price of goods and services as well as of resources and factors of production, including enterperianal talent. Second, corruption misallocation resources when decisions on how public funds will be invested or private investments will be corrupt decision- maker will consider potential. "Corruption is the payment as one decision and criteria. Empirical literature in the field has consistently reported a negative correlation between economic growth and the level of corruption and evidence on beneficial effect has been seen a best (Mauro P. , 1995).

##### **c) Human Development Index**

Human development Index regarded as one of the main determinant of corruption. When HDI increases corruption decreases vice versa.

##### **d) Income distribution**

Income inequality is used as aexplanatory variables for corruption. Scott (1972) argued that a more equal income distribution, a relatively large middle class will exist that can act to hold elites accountable and as a consequences a result in lower levels of corruption (Husted,1999, P. 342). An inequality in the distribution of income and poverty may increase the temptation to make illegal gains. Higher the inequality in the distribution of income, the higher will be the level of corruption in a country.



#### e) Openness of Trade

It is said that openness to trade is also important determinant of corruption. There is a stand of literature that investigates the relationship between openness and level of domestic corruption. There is number of scholars that recognize the positive relationship between the openness of a country to international trade and lower level of domestic corruption (S. Soudis, 2009).

#### 4.2 Statistics of the Variables

Descriptive statistics are used to basic features of collection information. It describes the given data set. The descriptive statistics of Nominal GDP (NGDP), consumer price index (CPI), nominal value of gross fixed capital formation (INV), Corruptionperception Index in number, board money supply and government expenditure (GE) government revenue includes mean, median, maximum value, minimum value; standard deviation, skewness; kurtosis and standard error are presented in following table 4.2. Descriptive statistics of the variables for the period 2004-2019

Variables	CPI	CPI2	NGDP	GE	GFCF	M2	PI
Mean	27.6	78.60	1589904	371335.9	440010.1	664668. 3	92850
Median	27	74.85	1463800	317265.5	304957.5	252125. 1	67677. 50
Maximum	34	124.1	3469300	967633.2	1279513	369428 0.	27588 1.0
Minimum	22.	41.70	536840	89442.60	109188	89442.6 0	14119
Standard Dev	3.24	28.73	899109. 7	262535.3	354718.3	110897 0.	83420. 03
Skewness	-0.03	0.235	0.5935	0.929077	1.13512	2.21626 2	1.134
Kurtosis	2.67	1.634	2.31120	2.982705	3.19964	6.09985	3.1394

						0	
Jarque-Bera	0.08	1.392	1.25549	2.302021	3.463	19.5042	3.4421
Observation	16	16	16	16	16	16	16

Source: Author's calculation through e-views

Table 4.2, there are each variables have 16 observations. The average( mean) value of CPI, CPI2, GDP, GE, GFCF, M2, and PI are 27.6 number, 78.60 number, 1589904, 371335.9million, 440010.1million, 664668.2million, and 92850 million during the study period of 16 years. The maximum value of CPI is 34 and minimum value is 22. Maximum value of CPI2, GDP, GE, GFCF, M2, and PI are 124.1 number, 3469300million, 967633.2million, 1279513million, 3694280million, and 275881.0 million respectively and minimum values of these variables are 41.70 numbers, 536840 million, 89442.60 million, 109188 million, 62331million, 89442.60 million, 14119 million respectively. The standard deviation represents that all of the variables are highly volatile during the study periods of 16 years. Skewness of the variables shows that CPI is negative skewness and other variables including positively Skewness. Kurtosis of each variable shows that Prekness of the distortive series. CPI, CPI2, GDP, GE; 2.67, 1.634, 2.31120, 2.982705, respectively are the mesokurtic normal distribution. Similarly, GFCF, M2, PI; 3.19964, 6.099850 and 3.1394 respectively are the leptokurtic positive kurtosis. Jarque-Bera measures the difference between Skewness and kurtosis from the normal distribution. Jarque-Bera of CPI, CPI2, GDP, GE, GFCF, M2, and PI are 0.08, 1.25549, 2.302021, 3.363, 19.50422 and 3.44213 respectively. The descriptive probability value of CPI is 0.08 which shows that jarque-bera statistics exceed which cannot be rejected null hypothesis.

#### 4.2.1 Stationary Test of the Variables

The time series data should be stationary. If the time series data are non-stationary it may provide the spurious result. The present study used Augmented Dickey Fuller (ADF) test to test the stationary of the variables at level and first difference. The result of ADF test is presented in following table 4.4

**Table 4.2.1: Result of Augmented Dickey Fuller Unit Root Test**

Variables	Constant		Constant and Trend		Remarks
	t-statistics	p-value	t-statistics	p-value	
LnNGDP	0.048031	0.9493	-0.470568	0.0894	
LnCPI	-0.334326	0.8944	-2.471876	0.3339	
LnCPI2	-0.927456	0.7497	-0.389972	0.9768	
LnGE	-1.644275	0.4357	-2.147775	0.4786	
LnGFCF	1.960701	0.9994	-1.669438	0.7138	
LnM2	1.466694	0.9979	-0.480988	0.9700	
Ln PI	0.684344	0.9855	-5.45478	0.0044	
$\Delta$ LnNGDP	-4.01417	0.0108***	-3.796890	0.0526*	I(1)
$\Delta$ LnCPI	-3.723642	0.0177**	-4.225303	0.0274**	I(1)
$\Delta$ LnCPI2	-4.248469	0.0072***	-5.950432	0.0022***	I(1)
$\Delta$ LnGE	-4.057910	0.0108**	-3.423664	0.0996*	I(1)
$\Delta$ LnGFCF	-3.860626	0.0129**	-4.657553	0.0126**	I(1)
$\Delta$ LnM2	-3.585501	0.0212**	-4.149428	0.0283**	I(1)
$\Delta$ Ln PI	-2.814270	0.0852*	-2.456822	0.0001***	I(1)

Source: Author's own calculation from E-views

Note: \*/\*\*/\*\* denotes the statistically significant at 10%, 5% and 1% respectively.

The table 4.2.1 shows the result of the ADF test statistics of concerned variables used in this thesis. If the variables are stationary in level then that variables are known as I(0) and if variables are stationary only after first difference then it is called I(1). The result of ADF test shows that all variables are non-stationary at level but stationary only after first difference. So these all variables is called I (1). The table 4.2.1 all variables LnRGDP, LnCPI, LnCPI2, LnGR, LnGE, LnM2 and

LnGFCF are stationary at first difference. Since all variables are stationary at first difference so this study applies Engle Granger approach to test the long-run cointegration of the variables.

#### 4.3 Engle- Granger Co-integration Test and Error Correction Model

According to Engle –Granger co-integration test the long run co-integration of the variables are tested by testing the stationary of the residual term or error correlation term in the long run model. So before testing the stationary of residual term, the long run model has derived by using OLS method as below in table 4.5.1.

**Table 4.3.1 Long Run Model by Using OLS Method: where LnPI as Dependent Variable**

Dependent Variable: LNPI

Sample: 2004-2019

Method: Least Squares

Included Observation: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.304873	0.844890	-3.911600	0.0021
LNCPPI	-0.432528	0.319543	-1.354581	0.2008
LNNGDP	0.916587	0.347302	2.639161	0.0216
LNGFCF	0.561987	0.274224	2.049375	0.0629
R-squared	0.989264	Mean dependent var	4.793991	
Adjusted R-squared	0.986580	S.D. dependent var	0.419314	
S.E. of regression	0.048575	Akaike info criterion	-2.999115	
Sum squared resid	0.028314	Schwarz Criterion	-2.9805968	
Hannan-Quinn criter.	-2.989225	Durbin-Watson stat	1.678806	
F-statistic	368.5891	Prob (F-statistic)	0.000000	
Log likelihood	27.99292			

Source: Author’s own calculation from E-views.

Table 4.3 is the long run model and coefficient are called long run coefficient. To test the long run cointegration among the variables, first of all the stationary of the residual is tested. If the residual of the long run model is stationary at level then the variables are co-integrated and exists a

long run relationship and model is not a spurious model. The stationary test of residual is presented in table.4.3.1

**Table 4.3.2 ADF Test of Residual**

Null Hypothesis: D(RESID,2) has a unit root

Exogenous: Constant

Lag Length: 2( Automatic-based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test Statistic	-4.682494	0.0089
Test critical values: 1% level	-4.582648	
5% level	-3.320969	
10% level	-2.801384	

\*Mackinnon(1996) one- sided p-values

The result of Stationary test of the residual indicate that the absolute value of Augmented Dickey-Fuller test statistic 4.682494 is greater than the absolute value of Engle- Granger Cointegration test 4.324 at 5 percent level of significance (See appendix IV). So, the null Hypothesis is that the ECM has unit root is rejected i.e. ECM is stationary at level. Thus the residual term is stationary at level form so this concludes that there exist cointegration among the variables and the long run model will not be spurious.

Table 4.3 shows the long run model and the coefficient gives the long run coefficient. The result implies that the Nominal GDP and GFCF have significant positive role in increasing the public investment in the long run but CPI has significant negative effect on public investment.

The coefficient of LNCPI is -0.43 percent and it shows that one percent increase in corruption perception index (CPI) will decrease the public investment by 0.43 percent in long run.

Similarly, the coefficient of LnNGDP is 0.92 and significance at 5 percent level of significance. It indicates that when NGDP increases by one percent then public investment increases by 0.92 percent in long-run.

Similarly, the coefficient of LnGFCF is 0.56 percent; it indicates that when the LnGFCF increases by one percent then the public investment increases by 0.56 percent in long run.

In table 4.3, the value of R-squared is 0.9892. It means in long run, 98.92 percent of total variation in public investment is explained by explanatory variables and 0.98 due to error. Similarly, the probability value of F-statistics is less than 1 percent which shows that there is overall significant of long run model.

The Durbin-Watson statics is 1.67. By using this value, it is difficult to conclude about the autocorrelation, so this study is used Breusch-Godfrey Serial Correlation LM test to the serial correlation. The result of serial correlation LM tests the serial correlation. The result of serial correlation shows that the observed R- squared is 0.451545 with probability is 0.0479 percent. This probability is less than 5 percent. So the null hypothesis that there is no serial correlation cannot be rejected. Hence the long run OLS model is free from autocorrelation.

**Table 4.3.4 Breusch- Godfrey Serial Correlation LM Test**

F-statistic	0.145206
Prob.F(2,10)	0.8666
Obs*R-squared	0.451545
Prob. Chi- Square(2)	0.0479

To test the short-run relationship between public investment and other explanatory variables, we used the Error Correction Model. The result of Error Correction Model is presented in table 4.5.4.

**Table 4.3.5 : Regression Result of Short- run Error Correction Model:  $\Delta$ LNPI as Dependent Variable**

Dependent Variable: D(LNPI)

Method: Least Squares

Date: 02/13/20 Time: 14:38

Sample (adjusted): 2007 2019

Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.240949	0.023533	10.23857	0.0001
D(LNGDP)	1.025300	0.318844	-3.215677	0.0182
D(LNGFCF)	1.641444	0.271625	-6.043054	0.0009
D(LNM2)	0.214200	0.033497	6.394582	0.0007
D(LNGE)	0.135708	0.055928	2.426463	0.0514
D(LNCPI)	-0.745971	0.130334	-5.723548	0.0012
ECM(-1)	-0.288512	0.147318	-1.958430	0.0979
R-squared	0.947919	Mean dependent var		0.092112
Adjusted R-squared	0.895837	S.D. dependent var		0.055618
S.E. of regression	0.017950	Akaike info criterion		-4.898684
Sum squared resid	0.001933	Schwarz criterion		-4.594481
Log likelihood	38.84145	Hannan-Quinn criter.		-4.961212
F-statistic	18.20074	Durbin-Watson stat		2.026876
Prob(F-statistic)	0.001305			

Sources: Author's own calculation from E-views

Table 4.3.3 is the short run error correction model and the coefficient of the short run model shows the short run elasticity of the variables with respect to public investment. In the short run GDP, GFCF, M2, GE has significant and positive effect on public investment. Result shows that one percent in nominal gross domestic product, gross fixed capital formulation and broad money supply leads to increase in public investment. But corruption perception index is significant rather negative effect on the public investment.

The coefficient of real gross fixed capital formation ( $\Delta \text{LnGFCF}$ ) is 1.641 and indicates that in short run when real fixed capital formation increases by 1 percent then public investment will be increase by 1.64 percent.

Similarly, the coefficient of  $\Delta \text{LnCPI}$  is negative and significant at 1 percent. This means that when CPI increase by 1 percent then public investment decrease by 0.75 percent. The result of pooled OLS effects regression shows that the coefficients of CPI is -0.75 with p-value 0.0012 and significant, suggesting that corruption negative affect the amount of public investment.

The coefficient of  $\Delta \text{LnGDP}$  is positive and significant. This means that when the nominal GDP is increases by 1 percent than public investment will be increases by more than 1 percent in short run.

In the above figure 4.4.3, the result of error correction model indicates that the coefficient of the speed of adjustment ( $ECM_{t-1}$ ) is -0.2885 with t-statistic -1.958 and corresponding probability 0.0979. This coefficient implies that 28.85 percent of the error being corrected every year. The coefficient is found to have the correct sign and statistically significant at 1 percent level explaining the fact that public investment and other explanatory variables are covering in the long run.

#### **4.3.6 Granger Causality Test between Public Investment and Corruption Perception Index**

Granger Causality test helps to provide the information the causal direction between the variables. The result of casual direction helps for long run and short run analysis between the variables. The results of Granger causal direction helps for long run and short run analysis between the variables. The results of Granger causality between public investments CPI in following table 4.3.5



**Table 4.3.6 Pair wise Granger Causality between LnPI and LnCPI**

Pairwise Granger Causality Tests

Date: 02/14/20 Time: 15:31

Sample: 2004 2019

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNCPI does not Granger Cause LNPI	14	0.82518	0.4688
LNPI does not Granger Cause LNCPI		1.42685	0.2896

Source : Author’s Calculation through E-views

The result of Granger Causality suggest that there is only one way causal relationship between public investment and CPI that is CPI is Granger causes to public investment. However, the null hypothesis that LnPI does not Granger causes LNCPI cannot be rejected 5 percent level of significance. Therefore, there is uni-directional relationship between the public investment and CPI.

**4.4 Corruption and Nominal Gross Domestic Product**

Hypothesis-3: High CPI index(less corruption) leads high economic growth

To test the hypothesis, we regress the NGDP- ratio on constant, CPI and other control variables. Here GDP at producer’s price is dependent variables. We added natural log in each variables to estimate the regression model.

**Model 2**

$$LnNGDP = \alpha + \beta_1LnCPI + \beta_2LnPI + \beta_3LnGE + \beta_4LnCPI + \beta_5LnGFCF + \beta_6PI + \dots (2)$$

**4.4.1 Estimation the Regression Model: Where LnNGDP at Producer Price is Dependent Variable**

According to Engle-Granger co-integration test the long run co-integration of the variables are tested by testing the Stationary of the residual term or error correlation term in the long run model. So

before testing the stationary of residual term, the long run model has derived by using OLS method as below in table 4.6.1

#### 4.4.1 Long Run Model by using OLS Method: Where LnNGDP as Dependent Variables

Dependent Variable: LNGDP

Method: Least Squares

Date: 02/16/20 Time: 15:47

Sample (adjusted): 2005 2019

Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.519135	0.370418	9.500429	0.0000
LNCPI	0.078655	0.109677	0.717148	0.0437
LNPI	0.179984	0.088473	2.034337	0.0763
LNGE(-1)	0.529758	0.173057	3.061182	0.0156
LNGFCF(-1)	0.723404	0.204861	-3.531194	0.0077
LN2(-1)	0.087317	0.039541	2.208281	0.0582
LNCPI2(-1)	1.219984	0.318967	3.824793	0.0051
R-squared	0.997970	Mean dependent var	6.158502	
Adjusted R-squared	0.996448	S.D. dependent var	0.245856	
S.E. of regression	0.014653	Akaike info criterion	-5.303628	
Sum squared resid	0.001718	Schwarz criterion	-4.973204	
Log likelihood	46.77721	Hannan-Quinn criter.	-5.307147	
F-statistic	655.5493	Durbin-Watson stat	2.627867	
Prob(F-statistic)	0.000000			

Sources: Own calculation from E- views

Table 4.4.1 is the long run model and coefficients are called long run coefficient. To test the long run co-integration among the variables, first of all the stationary of the residual is tested. If the residual of the long run model is stationary at level then the variables are co-integrated and exists a long run relationship; and model is not a spurious model. The stationary test of residual is presented in table 4.4.2

**Table 4.4.2 ADF Test of Residual**

Null Hypothesis: ECM has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.827507	0.0024
Test critical values:		
1% level	-4.004425	
5% level	-3.098896	
10% level	-2.690439	

\*MacKinnon (1996) one-sided p-values.

The result of Stationary test of the residual indicate that the absolute value of Augmented Dickey-Fuller test static 4.827507 is greater than the absolute value of Engle-Granger Critical value 4.324 at 5 percent level of significance. So, the null Hypothesis that the ECM has unit root is rejected i.e. ECM is stationary at level. Thus, being residual term is stationary at level form so this concludes that there exit co-integration among the variables the long run model will not be Spurious.

Table 4.7.1 shows the long run model and the coefficient gives the long run coefficient. The result implies that the all the explanatory variables have significant and positive role to increasing nominal GDP in long run.

The coefficient of LnGFCF (-1) is 0.72 and it deficit that one percent increase in real fixed capital formulation increases then the NGDPFC by 72 percent. The effect is significant at 1 percent level.

Similarly, the coefficient of LNCPI is 0.079 and significant at 1 percent level. It indicates that when LNCPI increase by 1 percent then nominal GDP at factor cost will increases by 0.079 percent with assumption that other variables are constant. Similarly the coefficient of LnGE(-1) is 0.53 and significant at 1 percent level. This means that when the total government expenditure increases by 1 percent than the NGDP at factor cost will increase by 0.53 percent in long run. Similarly, the coefficient of LnCPI2 (-1) is 1.21 and significance level is 1 percent. It indicates that when LNCPI2 increases by 1 percent then nominal GDP is increases by 1.21 percent with assumption that other

variables are constant. Similarly  $\ln m_2(-1)$  coefficient is 0.08 and significance at 1 percent level. It shows that when the board money supply increases one percent then the nominal GDP at factor cost increases by 0.087 percent in long run.

**Table 4.4.3 Breusch-Godfrey Serial Correlation LM Test**

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.182326	Prob. F(2,6)	0.1143
Obs*R-squared	7.721186	Prob. Chi-Square(2)	0.0211

In the table 4.4.1, the value of R- squared is 0.9979 which means in long run, 99.79 percent of total variation in nominal GDP is explained by explanatory variables and 0.82 percent due to error. Similarly, the probability value of F-statics is less than 1 percent which shows that there is overall significant of long run model. The Durbin- Watson is 2.62. By using this value, it is difficult to conclude about autocorrelation. So this study is used Brush-Godfrey Serial Co-integration LM test the serial correlation. The result of serial correlation shows that the observed R-squared is 7.7211 with probability chi-squared 0.021(table6.4.3). The probability is less than 5%. So the null hypothesis that there is no serial correlation cannot be rejected. Hence, the longrun OLS model is free from autocorrelation.

#### **4.4.4 Granger Causality Test between NGDP and Corruption Perception Index**

Granger Causality test helps to provide the information the causal direction between the variables. The result of casual direction helps for long run and short run analysis between the variables. The results of Granger causal direction helps for long run and short run analysis between the variables. The results of Granger causality between nominal GDP of factor cost and CPI in following table 4.5

**Table4.4.4 Pairwise Granger Causality Test between NGDPFC and CPI**

Pairwise Granger Causality Tests

Date: 02/17/20 Time: 14:40

Sample: 2004 2019

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNCPI does not Granger Cause LNGDP	14	0.01022	0.9898
LNGDP does not Granger Cause LNCPI		4.66584	0.0407

The result of Granger Causality suggest that there is only one way causal relationship between LnNGDP and CPI that means CPI is Granger causes to LnGDP. However, the null hypothesis that LnNGDPFC does not Granger causes LnCPI cannot be rejected 5 percent level of significance. Therefore, there is uni-directional relationship between the LNNGDPFC and CPI.

## CHAPTER: V

### SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Major Finding

The main objective of this study is to examine the relationship between corruption, public investment and economic growth in Nepal. To fulfill this objective, we used the dataset of 16 years over periods 2004 to 2016. The ADF test is applied to test the stationarity of the time series data and Engle-Granger Co-integration test is examined to test the co-integration among the variables. The long run model is estimated by using OLS method. Similarly, ECM model was applied for the short-run dynamism of the model. Likewise, Granger Causality is used to test the causal direction between public investment and corruption perception Index. The major finding of this study is listed as given below.

- a) The result of ADF test shows that all variables are stationary only after the first difference i.e. all variables used in this study are  $I(1)$ .
- b) The Engle-Granger co-integration test indicates that variables are co-integrated and long run OLS model is free from spurious regression.
- c) In the case of public investment as a dependent variable, the long run OLS model shows that NGDP and GFCF have significant positive effect on the public investment in long run. Instance of when NGDP and GFCF increase by one percent leads to increase 0.91 and 0.56 percent respectively. However, corruption perception index decreases (increases corruption) has significant negative effect on public investment in long run. When one percent increases by CPI leads to decrease the public investment by 0.43 percent.
- d) The coefficient of ECM (-1) is negative and significant at 10 percent level indicates that the real GDP and other explanatory variables are covering into long run equilibrium.
- e) In case of nominal gross domestic production at producer price as dependent variables, the long-run OLS model shows that GE, GFCF, M2 and consumer price one period lagged value have significant and positive effect on NGDP in long run. Similarly public investment and corruption perception index have positive and significant effect on NGDP in long run. For instance, one percent increases in GE, GFCF, M2 and consumer price Index leads to NGDP increases 0.52, 0.72, 0.8 and 1.21 percent respectively. Similarly corruption perception index

(CPI) and PI increases by one percent which leads to increases NGDP by 0.7 and 0.17 percent respectively.

## 5.2 Conclusion

The main objective of the macroeconomic policy of Nepal is to attain the high economic growth with zero level of corruption. First we find that corruption increases the public investment while it reducing the productivity and thus it reduces the economic growth. The corruption leads to the diversion of productive time from economic activities to lobbying for favor to get work done. Saving, capital accumulation, board money supply, government expenditure, inflation, government revenue and population growth are the major determinant of economic growth. Corruptions distorts the decision making process connected with public investment projects in Nepal.

In the long run, public investment is driven by the real factors like gross fixed capital formulation, nominal gross domestic product. The GFCF and NGDP are positively driving the public investment. But corruption perception index is negatively driving the public investment. High CPI deficit may be responsible for this negative relationship. It means that when low CPI (high corruption) leads to high public investment vice versa. Similarly, in short run public investment is driven by many exogenous variable or control variables. In short-run NGDP, GFCF, M2 and GE have positive effects on public investment but corruption perception index have negative effect on public investment.

The result of Granger Causality shows that CPI only affects the public investment but it is not, vises versa. In the long run, all the control or explanatory variable have significant and positive role these control variables increasing nominal GDP in long run. The result of Granger Causality shows that only CPI affects the GDP but it is not, vice versa in Nepal.

Various legislations had been put in place to combat corruption in the public sectors overtime. No doubt, a lot had been achieved but more efforts are needed from both the citizens and politicians to fight what seems to be a hydra-headed monster that had define many problems in Nepal.

### 5.3 Recommendation

From the above finding and conclusion of the study, this study recommends the following points.

- a) The implication of this finding is that economist should not be quick to praise politicians whenever capital budget is raises especially in Nepal where is said to be on the high side in public sectors.
- b) This study find that the corruption perception index significant negative affect on public investment both long run and short run. So that the government should effort overtime to fight corruption strict rule and regulation though the different corruption control institution like CIAA, CBI and special court.
- c) In long run, corruption perception index, GFCF, M2, PI, consumer price Index have positive and significant effect on NGDP. So, the government should adopt both expansionary fiscal and monetary policy to achieving high rate of economic growth.
- d) The Granger causality shows the one way causal relationship between the public investment and corruption perception index that is CPI granger causes the public investment. So the policy makers and researchers could focus their study on effect on corruption on Public investment, in case of Nepal. Similarly the casual relationship between the NGDP and corruption perception index indicates that is CPI granger causes the NGDP. So the policy makers and researchers should focus their study effect on corruption in NGDP.



## References

- Acemoglu, D., & Verdier T. (1998). Property Right, Corrupting and the Allocation of talent: A General Equilibrium Approach. *Economic journal*, 108, 1381-1403.
- Arslan, U., & Saglam, Y. (2011). The relationship between Corruption and Public Investment: case of Turkey. *C.U. Sosyal Bilimler institution Dergisi*, 20, 365-378.
- Ata, A., & Arvas, M. (2011). Determinants of Economic Corruption: A Cross Country Data Analysis. *International Journal of Business and Social Science*, 2, 161-169.
- Banerjee, A., Mullainathan, S., & Hanna, R. (2012). Corruption. *National Bureau of Economic Research*, 75.
- Beekman, G., Bulte, E., & Nillesen, E. (2014). Corruption, Investments and Contributions to Public Goods: Experimental evidence from rural Liberia. *Journal of Public Economics*, 115, 37-47.
- Beglystia, V. P., & Tsyplitska, O. O. (2018). Corruption and Economic Development: Role of State. *13* (1), 135-141.
- Bhusal, T. P. (2016). Corruption and Illicit Financial Flows in Nepal. *Tribhuvan University Journal artical*, 3, 211-224.
- Chand, S. k., & Moene, K. O. (1999). Controlling Fiscal Corruption. *Elsvier Science*, 27, 1129-1140.
- Davoodi, H. R., & Tanzi, V. (2000, November 1). Corruption, Growth and Public Finance. *IMF Working Paper*.
- Dickey, D. A., & Fuller, W. A. (1979). Distributions of the Estimators Autoregressive Time Series with a Unit Root. *An Empirical Investigation. RBI Working Paper*, 427-431.
- Dix, S. (2011, June). Corruption and Anti- Corruption in Nepal Lesson Learns and Possible Future Initiatives. *Lesson Learns and Possible Future Initiatives*, 54.

- Engle, R. F., & Granger, C. W. (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, 55, 251-276.
- Farida, M., & Ahmadi, F. (2007, February). Modeling Corruption in a Cobb-Douglas Production Function Framework. 13-16.
- Fitzsimons, V. G. (2011, October 06). Economics Models of Corruption. 45.
- Groenendish, N. (1997). A Principal- agent Model of Corruption. *Crime law and Social Change*, 27, 202-229.
- Gujarati, D. N. (1995). Basic Econometrics. *Somgapore:McGraw-Hill Book Company* .
- Gupta, S., Hamid, D. R., & Terme, R. A. (2002). Does Corrrun Affect Income Inequality and Poverty. *Springer-Verlog GMBg and CG. Kg*, 3, 23-45.
- Handriks, J., Keen, M., & Mutho, A. (1999). Corruption, Extortion and Evasion. *Journal of Public Economics*, 74, 395-430.
- Haque, M. E., & Kneller, R. (2014). Why does Public Investment fail to EConomic Growth? Role of Corruption. *Manchestor School*, 83 (December2015), 623-651.
- Husted, B. W. Wealth, Culture and Corruption. 30, 339-359.
- Hwang, J. (2002). The Relationship between Corruption and Government Revenue. *Journal of Economic Development*, 27, 161-178.
- Jan, M. S., & Ali, S. (2017). The Impact of Corruption on FDI Inflow to Southen Asian Countries. *Journal of Managerial Science*, 9, 71-84.
- Jenjoun, H., & Rohini, P. (2011). Corruption in Developing Countries. *NBER Working Paper* .
- Johansen, S., & Juselius, K. (1990). Maximum likelihood Estimation and Inference on Co-integration with Applications to the Demand for Money. *Oxford Bullitin of Economics and Statistics*, 52, 169-210.
- Klitgaard, R. (1987). Controlling Corruption. *Berkelgy University of California Press* .

- Lambsdorff, J. G. (1999, December). Corruption in Empirical Research-A Review. 10-15.
- Left, N. (1964). Bureacratic Corruption in Africa: The Futility of Cleanups. *The Cayo journal*, 16.
- Lutz, M. B., & Ndikumana, L. (2008, May 21). Corruption and Growth: Exploring the Investment Channel. *Working Paper University of Massachusetts*, .
- Mairp, P. (1998). Fighting Corruption Worldwide Corruption: Causes and Consececes. *Finance and Development*, 35.
- Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics*, 110 (16/09/2008), 681-712.
- Mauro, P. (1998). Fighting corruption Worldwide: Causes, Consequences. *Finance and Economic Journal*, 35.
- Nicholas, D. M. (2015). Corruption and Economic Growth in China: An Empirical Analysis. *John Carroll University* , 1-24.
- Office of the Audit General. (2075). Annual Report of Office of Auditor General. *Finance Minitry Singhadarbar, Kathamandu,Nepal* , 1-557.
- Onogwu, D. J. (2018). Corruption, Public Investment and Revenue: Evedence From Nigeria. *Intenational Journal of Economics and Management Sciences*, 7 (5).
- Paldam, M. (2002). The big pattern of Corruption, Economics Culture and the Seesaw Dynamics. *European Journal of Political Economy*, 18, 215-240.
- Rahman, A., Kisunko, G., & Kopoor, K. (2000). Estimationg the Effect of Corruption- Implication for Bangladesh. *I*.
- Rijckeghen, C. V., & Weder, D. (2004). Corruption and the rate of Tempation Do Wages in the Civil Services Causes Corruption? *IMF Working Paper* .
- Rosa, D., Gooroochum, N., & George, H. (2013). Corruption and Productivity: Firm-Level Evidence. *Seminar Paper at Kiel Insitute and the World Bank* .

- Shaha, R. K. (2018). Corruption in Nepal: Analytical Study. *Central Department of Economic Tribhuvan University Journal*, 32, 271-291.
- Shleifer, A., & Vishy, R. W. (1993). Corruption. *The quartely Journal of Economics*, 108, 599-617.
- Shrestha, P. M. (2007). Corruption in infrasture provision and service delivery at the municipal level in Nepal. *Working Paper Deparment for Internationnal Development or WEDC, Loughborough University*, 33.
- Svenson. (2005, Summer). Eight question about the Corruption. *Journal of economic Perceptive* , 19-42.
- Tanzi, V., & Davoodi, H. (1997). Corruption, Public Investment, and Growth. *IMF Working Paper*, 97, 23.
- Truex, R. (2011). Corruption, Attitudes , and Education: Survey Evidence from Nepal. *World Development*, 39, 1133-1142.
- Upadhaya, N. p. (2003). Corruption: A Phychological Issue. *An Occasional Paper in Sociology and Antropology*, VII, 193-203.
- Vito, T. (2013). Corruption and Economy. *Filozofija.j Drustvo*, 24, 33-59.
- Wei, S. J., & Shleifer, A. (2000). Local Corruption and Global Capital Flows. *Brookings Paper on Economic Activity*, 2000, 303-354.
- Zhang, W. B. (2017). Corruption and Growth in a Dynamic General Equilibrium Model. *European Journal of Multidiciplinary Studeis*, 8, 256-273.

## APPENDIX-I

### NOMINAL DATA OF THE VARIABLES

Year	NGDPRs in million	GFCFRs in million	GERs in million	M2Rs in million	Corruption Perception Index in number	Consumer price Index in number	PIRs in million
2004	536840	109188	89442.6	89442.6	28	41.7	14119
2005	589400	117539	102560.5	102560.53	25	43.6	14955
2006	654100	135532	110889.2	110889.158	27	47.1	17509
2007	727800	153337	133604.6	133604.6	25	49.8	24645
2008	815700	178446	161349.9	161349.9	27	53.2	32993
2009	988300	211039	219661.9	219661.9	27	59.9	44278
2010	1193700	264900	259689.1	259689.106	22	65.6	53695
2011	1369400	292730	295363.5	199819	22	71.9	63800
2012	1558200	317185	339167.5	244561.1	27	77.8	71553
2013	1758200	382972	358638	296776.5	31	85.3	75386
2014	1899089	462013	435052.3	363493.4	29	93.3	94979
2015	1993560	595823	531340	407947.7	27	100	110253
2016	2339483	647294	601031.9	485239.0	29	109.9	160502
2017	2612102	840693	837247.1	612597.5	31	114.8	169543
2018	2932744	1051957	967633.2	3252780.894	31	119.6	261507
2019	3469300	1279513	498702.5r	3694279.91	34	124.1	275881

Sources: Economic Survey MOF, Transparency International, Quaterly Economic Bullitin, NRB, and World Bank

## APPENDIX-II

### NATURAL LOG FROM THE VARIABLES

Year	LnNGDP	LnGFCF	LnGE	LnM2	LnCPI	LnCPI2	LnPI
2004	11.7298	11.0382	10.9515	10.9515	1.44716	1.62014	10.1498
2005	11.7704	11.0702	11.011	11.011	1.39794	1.63949	10.1748
2006	11.8156	11.132	11.0449	11.0449	1.43136	1.67302	10.2433
2007	11.862	11.1856	11.1258	11.1258	1.39794	1.697302	10.3917
2008	11.9115	11.2515	11.2078	11.2078	1.43136	1.72591	10.5184
2009	11.9949	11.3244	11.3418	11.3418	1.43136	1.77743	10.6462
2010	12.0769	11.4231	11.4145	11.4145	1.34242	1.8169	10.7299
2011	12.1365	11.4665	11.4704	11.3006	1.34242	1.85673	10.8048
2012	12.1926	11.5013	11.5304	11.3884	1.43136	1.89098	10.8546
2013	12.2452	11.5832	11.5547	11.4724	1.49136	1.93095	10.8773
2014	12.2785	11.6647	11.6385	11.5605	1.4624	1.96988	10.9776
2015	12.2996	11.7751	11.7254	11.6106	1.43136	2	11.0424
2016	12.3691	11.8111	11.7789	11.686	1.4624	2.041	11.2055
2017	12.417	11.9246	11.9229	11.7872	1.49136	2.05994	11.2293
2018	12.4673	12.022	11.9857	12.5123	1.4936	2.07773	11.4175
2019	12.5402	12.107	11.6978	12.5675	1.53148	2.09377	11.4407

### APPENDIX-III

Year	RGDPRs In million	EG (%)
2003	459500	
2004	481004	4.67987
2005	497739	3.47918
2006	514486	3.36461
2007	532038	3.41156
2008	564517	6.10464
2009	590107	4.53308
2010	618529	4.81641
2011	639694	3.42183
2012	670279	4.78119
2013	697954	4.12888
2014	739754	5.98893
2015	764336	3.323
2016	768835	0.58862
2017	832060	8.223448
2018	887455	6.65758
2019	950000	7.04768

## APPENDEX: IV

Dependent Variable: LNPI

Method: Least Squares

Date: 02/01/20 Time: 14:29

Sample: 2004 2019

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.304873	0.844890	-3.911600	0.0021
LNCPI	-0.432528	0.319543	-1.353581	0.2008
LNNGDP	0.916587	0.347302	2.639161	0.0216
LNGFCF	0.561987	0.274224	2.049375	0.0629
R-squared	0.989264	Mean dependent var		4.793991
Adjusted R-squared	0.986580	S.D. dependent var		0.419314
S.E. of regression	0.048575	Akaike info criterion		-2.999115
Sum squared resid	0.028314	Schwarz criterion		-2.805968
Log likelihood	27.99292	Hannan-Quinn criter.		-2.989225
F-statistic	368.5891	Durbin-Watson stat		1.678806
Prob(F-statistic)	0.000000			



## Appendex-v

### Critical Values for the Engle-Granger Cointegration Test

T	1%	5%	10%	1%	5%	10%
	<b>Two Variables</b>			<b>Three Variables</b>		
<b>50</b>	<b>-4.123</b>	<b>-3.130</b>	<b>-3.130</b>	<b>-4.592</b>	<b>-3.915</b>	<b>-3.578</b>
<b>100</b>	<b>-4.008</b>	<b>-3.398</b>	<b>-3.087</b>	<b>-4.441</b>	<b>-3.828</b>	<b>-3.514</b>
<b>200</b>	<b>-3.954</b>	<b>-3.368</b>	<b>-3.067</b>	<b>-4.368</b>	<b>-3.785</b>	<b>-3.483</b>
<b>500</b>	<b>-3.921</b>	<b>-3.350</b>	<b>-3.054</b>	<b>-4.326</b>	<b>-3.760</b>	<b>-3.464</b>
	<b>Four Variables</b>			<b>Five Variables</b>		
<b>50</b>	<b>-5.017</b>	<b>-4.324</b>	<b>-3.979</b>	<b>-5.416</b>	<b>-4.700</b>	<b>-4.348</b>
<b>100</b>	<b>-4.827</b>	<b>-4.210</b>	<b>-3.895</b>	<b>-5.184</b>	<b>-4.557</b>	<b>-4.240</b>
<b>200</b>	<b>-4.737</b>	<b>-4.154</b>	<b>-3.853</b>	<b>-5.070</b>	<b>-4.487</b>	<b>-4.186</b>
<b>500</b>	<b>-4.684</b>	<b>-4.122</b>	<b>-3.828</b>	<b>-5.003</b>	<b>-4.446</b>	<b>-4.154</b>

Sources: Critical values are interpolated the response surface in Mackinnon(1991).