FACTORS AFFECTING INVESTMENT DECISION IN NEPAL

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ABSTRACT

This article, *Factors Affecting Investment Decision in Nepal*, has focused on the macroeconomics factors (gross domestic product, interest rate, and government expenditure) affecting the investment decision during 1975/76-2017/18. Based on time-series data at a macro level, this study employed Engel-Granger cointegration test, as well as error correction model, investigated the short- and long-run causal relationship between gross investment and the factors influencing the investment decision of the investors, and found a statistically significant relationship between gross investment and macroeconomic variables. Furthermore, the coefficient of error correction term (-0.90) implied around a 90 percent conversion to the equilibrium, showing a steady, long-run relationship between regress and and regressors.

Keywords: convergence - gross domestic product - time-series - cointegration - unit root

INTRODUCTION

An investment decision is a pivot of an economic growth and economic development of the developing countries like Nepal; however, many developing countries are unable to keep up with the pace of economic development owing to the lack of their appropriate investment decision at a macro level. The economic development of a country depends upon the volume of gross domestic product (GDP). The volume of GDP depends upon the volume of gross capital formation, including consumption and net export services, which are the indicators of the level of investment within the country.

As Anthony and David (2013) put it, this concept implies that total amount of GDP is not desired to spend on consumption, but some part of it

goes on making capital formation. The volume of investment is determined by the objective of firms to maximize the utility of consumption subject to given production possibilities and fixed current and future prices, and interest rates.

There is a nexus between an appropriate investment decision and the economic growth of a country. Economic growth is a pre-requisite for capital formation (investment); high rates of capital formation in turn promote production, income, employment, economic growth, and development. Economic theories have explored that capital formation determines the productive capacity of the country and model of the development (Pathania 2013). Thus, the inadequate availability of the capital is a major constraint on the economic development of a country. Therefore, this study has given an attention to the major determinants that affect the gross fixed capital formation and investment decision within the country.

Nepal, a developing country, requires a large chunk of capital to achieve its macroeconomic goals. Realizing the significance of capital formation, therefore, the government of Nepal has begun structural, policy, and institutional reforms to enhance the smooth functioning of economy to raise the capital formation within the country. However, Nepal has faced the problem of capital deficiency for investment due to a low level of capital formation in relation to its demand. The gross-fixed capital formation (GFCF) amounted to 21.35 percent in fiscal year 2008/09, 20.77 percent in fiscal year 2011/12 and 21.6 percent in fiscal year 2017/18: This figure of gross fixed capital formation indicates the poor growth rate of capital formation in the country—the poor growth rate that led to the failure in completing the national proud project at a specified time and in achieving the specified macroeconomic goals of economic development. Therefore, this study is attempting to explore the factors affecting investment decisions in Nepal by using government expenditure, interest rate, and nominal GDP as explanatory variables—a study that has added something new to the exiting studies by plugging the variable gaps.

Thus, this study intends to examine the factors affecting the gross fixed capital formation and the factors affecting the investment decision at a macro level in Nepal. The second section reviews related literatures; the third section is associated with the research methodology; the fourth section presents and analyzes the data; and the fifth section deals with conclusion and policy implications.

LITERATURE REVIEW

From the viewpoint of a target country like Nepal, the determinants of capital formation have been examined thoroughly. The literatures on the determinants of gross capital (Ekanem 2005, Carr *et al.* 2010) have been categorized into three sets: investment-related factors, macroeconomic and financial factors, and country-risk factors. Under the country-risk factors, political stability of the country is a key to significantly affecting the stock of capital: An unstable political environment makes investment riskier and erodes investors' confidence. However, this paper has reviewed the literature related only to the macroeconomic determinants that affect the gross fixed capital formation and investment decision within the country.

Laopodis (2001) examined the key determinants of gross capital formation in Greece, Ireland, Portugal, and Spain by employing the time-series data during the period of 1960–1997. Laopodis used the GDP growth, real interest rate, exchange rate, inflation rate, and political stability index as explanatory variables and gross capital formation as a dependent variable. Using the Engel Granger cointegration test, the investigator found a bidirectional relationship between dependent and independent variables— as well as a long-run significant association between domestic gross capital formation and government expenditure in the study area—and also found that investment decision of the nation depends upon the political stability, interest rate, and size of market (volume of GDP and per capita income).

Jun (2003) explored the factors affecting investment decisions in China by employing time-series data during the period of 1978–2000. Using government expenditure, the ratio of external debt to GDP, exchange rate, interest rate, inflation rate, and volume of foreign capital flows as explanatory variables and the ratio of investment to GDP as a dependent variable, Jun— through the regression analysis—found a significant relationship between dependent and independent variables and concluded that the volume of real investment was a function of GDP growth and capital output ratio, and the GDP growth was a function of investment.

Trevino and Mixon (2004) analysed the factors affecting on investment decision in Latin American seven countries by using cross country data. Gross domestic product, consumer price index, real exchange rate were explanatory variables and foreign direct investment was proxy for investment. This study found the significant relationship between explained and explanatory variables through regression analysis.

Umerede (2006) investigated the key determinants of investment in Nigeria. Time-series data was applied to investigate the main determinants of investment by covering the period of 1980 to 2004. An OLS method was used to explore the association between gross capital formation and its determinants. Foreign direct investment, energy consumption index, total credit to private sector, national saving, inflation rate, lending rate, and exchange rate were used as explanatory variables in the model. Umerede revealed that foreign direct investment, total credit to private sector, and energy consumption index were the positive and statistically significant determinants of gross capital formation in Nigerian economy.

Pathania (2013) examined the relationship between export, import, and gross capital formation in India during the period of 1991 to 2010. Using the Granger causality cointegration test to explore the determinants of gross capital formation in India, Pathania found bidirectional causality between gross capital formation and growth of export but unidirectional causality between gross capital formation and import in India.

Torbira and Ogbula (2014) explored how insurance companies' fund mobilization, and gross capital formation were related in Nigerian economy and employed multiple regression method to investigate the relationship between these variables: gross capital formation as a dependent variable and insurance companies' fund mobilization, premium from fire, accidents, motor vehicles, and employee liability insurance policies as explanatory variables. Torbira and Ogbula found these explanatory variables to be positively, statistically, and significantly correlated with gross capital formation in Nigerian economy.

Jiranyakul (2014) used Time-series data (1979–2012)—as well as an autoregressive distributed-lag approach to co-integration model as an econometric tool—and analyzed determinants of investment decision in Thailand to investigate the determinants of gross investment. Jiranyakul found that real GDP became co-integrated with capital formation, that capital formation made the positive and significant impact on real GDP, and that the stock market liquidity—measured by stock market capitalization, public expenditure, exchange rate, and external debt—played a significant role in the investment decision process in Thailand.

To explore key determinants of gross capital formation in Nigerian economy, Lucky and Kingsley (2016) used time-series data and examined

the short- and long-run relationship between dependent and independent variables by employing Granger causality cointegration test and vector error-correction model. The ratio of gross capital formation to GDP was used as a dependent variable; employed as the independent variables were the ratio of broad money supply to GDP, the ratio of credit to private sector to GDP, the ratio of national saving to GDP, the ratio of public expenditure to GDP, the ratio of operating surplus to GDP, the ratio of external debt to GDP, the ratio of government revenue to GDP, commercial bank lending rate, exchange rate, and inflation rate. Lucky and Kingsley found that the ratio of government expenditure to GDP, inflation rate, the ratio of government revenue to GDP and operating surplus were the significant key determinants of capital formation in Nigerian economy during the period of 1981 to 2014.

Stupnikova and Sukhadolets (2019) examined the role of construction sector in gross investment decision at a macro level in Russia. The time-series data were used to explore the interrelationship between the growth of gross investment, volume of construction industry, supply of industrial balance, and amount of fixed asset investment in Russia during the period of 2006 to 2016. The autoregressive distributed-lagged (ARDL) model was used to evaluate cointegration and effects of construction industry volume on gross investment. The gross investment was used a dependent variable and cost index, construction work index, and the investment index as independent variables. Stupnikova and Sukhadolets found that there was the non-linear causation between gross fixed investment and construction industry volume over a long period of time—as well as stationary and cointegrated correlation—and that the fixed investment made positive impact on gross capital formation only during the period of economic expansion, but its highly volatile impact during the period of crisis.

Patil and Bagoti (2021) investigated the factors affecting on investment decision in India by employing KANO model. In order to explore the factors that have affected the investment decision of Investors 10 sectors with 30 companies were taken as a sample. The 467 respondents were selected out of 30 companies to collect the information about the factors that have influenced the investment decision of the Indian investors. This study found that economic indicators, financial statement were the major factors that directly affected the investment decision of investors.

METHODOLOGY

To meet the objective of this paper, econometric model and diagnostic test have been used to analyse the collected data. *Publication Manual of the American Psychological Association* (2020, 7th ed.) has been strictly followed for research format and citation.

Research design

The research design—an overall plan, structure, and strategy to answer research questions—is based on four key constraints: (a) objectives of the research, (b) available sources of data, (c) the urgency of the decision, and (d) the cost of obtaining the data (Zikmund 2002). Here, gross investment was denoted by gross fixed capital formation within the country. Engel-Granger cointegration and error correction model were used here to examine the determinants of gross fixed capital formation (GFCF). Nepalese data were used in this study by covering 44 years of observations from the fiscal year 1975/76 to 2017/2018 and forty-four observations. To analyze the data, GFCF was used as a dependent variable and total government expenditure (GTE), average lending interest rate of commercial bank (IR), and nominal gross domestic product (NGDP) as explanatory variables. The data were subjected to robust time-series property tests; thereafter, a cointegration model was applied to analyze the data.

Nature and source of data

Secondary data were used for the fiscal years from 1975/76 to 2017/18. The data were taken from government official documents—such as economic surveys, budget speeches, statistical abstracts, and economic reports—by covering the 43 fiscal years. The 43 observations for each of the variables were used to analyze the investment decision of the nation.

Model specification

The model was developed on the basis of acceleration principle and neo-classical theory of investment: An investment is a function of change in output. In the model, GFCF is used as a proxy for investment and NGDP as a proxy for output. Thus, model is formulated, and expected signs assigned, on the basis of previous empirical studies (Jiranyakul 2014, Umerede 2006) as follows:

$GFCF = \mathrm{f}\,(GTE,\ IR,\ NGDP)$ (1)

Econometrically, the model is expressed as

$GFCF = \beta_0 + \beta_1 GTE + \beta_2 IR + \beta_3 NGDP + \mu_t$ (2)

Model 1 was transformed into a log form, and a final estimation equation was built up this way:

$\mathrm{Ln}GFCF = \beta_0 + \beta_1 \mathrm{Ln}IR + \beta_2 \mathrm{Ln}GTE + \beta_3 \mathrm{Ln}NGDP + \mu_t$ (3)

$$\beta_1 < 0,\ \beta_2 > 0,\ \beta_3 > 0$$

Where *GFCF* denotes gross fixed capital formation, *NGDP* denotes nominal gross domestic product, *GTE* is the total government expenditure, and *IR* is the lending average interest rate of Bank, μ is a noise term, *t* is time factor, and Ln refers to natural logarithm.

Analysis tools

Eviews (Version 9) programme was applied to process and to analyze the data. These tools were used here: unit root test and cointegration analysis, along with statistical tests of significance, such as *t*-test, *F*-test, Adjusted R^2. The cointegration models were applied to analyze the determinants of GFCF in Nepal.

Unit root test

Generally, time-series data are nonstationary (Nelson & Plosser, 1982) and the outcome is a spurious regression. To avoid spurious results, the stationarity test was conducted. Augmented Dick Fuller (ADF) and Phillip Perron (PP) tests (used to run the regression of the first difference of the series against first lagged value, constant, and time trend) were employed to examine stationarity and to establish the order of integration as follows:

Without intercept and trend $\Delta Y_t = \rho Y_{t-1} + \mu_t$ (4)

With intercept $\Delta Y_t = \alpha + \rho Y_{t-1} + \mu_t$ (5)

With intercept and trend $\Delta Y_t = \alpha + \beta T + \rho Y_{t-1} + \mu_t$ (6)

Because μ_t are correlated in Equations 3, 4, and 5, Dickey and Fuller have developed an Augmented Dickey Fuller (ADF) test, by adding lagged dependent variables. The ADF test consists of estimating Equation 6:

$$Y_t = \alpha + \beta T + \rho Y_{t-1} + \sum_{i=1}^{k} \beta_i \, \Delta \, Y_{t-i} + e_t \tag{7}$$

Where e_t is a pure white noise error term and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-} = (Y_{t-1} - Y_{t-2})$, and so on; k is the lagged values of ΔY and t is a trend. This hypothesis was set:

H_0: $\rho = 0$ (i.e., a unit root in variables).

H_1: $\rho \neq 0$ (i.e., no unit root or stationary).

Cointegration analysis

Cointegration test was used; Y_t was used as a dependent variable and X_t as an independent variable integrated of first order, that is, $I(1)$, using this linear combination with no constant: $Y_t = \hat{\beta} X_t + \hat{\mu}_t$ or, $\hat{\mu}_t = Y_t - \hat{\beta} X_t$. If the linear combination $\hat{\mu}_t$ is stationary in order $I(1)$, then the variables are said to be cointegrated.

Engle and Granger (1987) developed a cointegration test, which first employed an ordinary least square method and then obtained residual series of $\hat{\mu}_t$ from the regression model, and eventually tested the unit root of $\hat{\mu}_t$. To verify the cointegration, the ADF stationary test of residual terms $\hat{\mu}_t$ was run and compared with the Mackinnon critical values. The ADF t statistic greater than Mackinnon critical value indicates cointegration among the variables included in the model and then the error correction model is run to find out the short-term dynamics, as well as the long run equilibrium. The error correction model was written as

$$\Delta GFCF = \beta_0 + \beta_1 \Sigma_i^k \Delta GFCF_{t-1} + \beta_2 \Sigma_i^k \Delta GTE_{t-1} + \beta_3 \Sigma_i^k \Delta NGDP_{(t-1)} + \beta_4 \Sigma_i^k \Delta IR_{t-1} + \lambda EC_{t-1} + \epsilon_t \tag{8}$$

Where

Δ = The first difference operator

EC_{t-1} = The error correction term lagged one period

λ = Short term coefficient of the error correction term $(-1 < \lambda < 0)$

ϵ_t = The white noise term

RESULTS AND DISCUSSION

In this analysis, GFCF was taken as a dependent variable and NGDP, IR, and GTE as independent variables and these variables were logged by using Eviews (Version 9) computer programs to fix the data distribution problem for cointegration analysis.

Descriptive statistics

In Table 1, this study summarized descriptive tools of statistics from 1975 to 2018, such as 44 observations, maximum and minimum values, median, mean, the measure of dispersion, and Jarque-Bera statistics.

Table 1: Descriptive statistics of variables for period of 1975 to 2018

	N	Min	Max	Median	Mean	Std. Dev.	Jarque-Bera
Ln*GFCF*	44	7.70	13.84	10.97	10.67	1.77	2.28
Ln*GTE*	44	7.32	13.84	10.79	10.60	1.79	1.80
Ln*IR*	44	1.91	2.91	2.60	2.48	0.30	4.24
Ln*NGDP*	44	9.71	14.91	12.48	12.29	1.61	2.79

Source: Calculation based on data on Quarterly Economic Bulletin of NRB and Economic Survey (2000, 2019).

Table 1 shows descriptive statistics for all the variables (Ln*GFCF*, Ln*GTE*, Ln*IR*, and Ln*NGDP*) that have positive mean and median values. The result indicates that average *GFCF* was 10.67% with minimum value of 7.70 percent and maximum of 13.84 percent. The standard deviation (variability) of GFCF in Nepal remained 1.77%. The value of Jarque-Bera statistics was 2.28; similarly, the mean values of Ln*GTE*, Ln*IR*, and Ln*NGDP*were 10.60, 2.48, and 12.29% with their standard deviations of 1.79, 0.30, and 1.61%, respectively. Finally, Table 1 also displays the value of Jarque-Bera, which shows the nature of distribution of variables included in the study.

Unit root test

In Table 2, Augmented Dickey–Fuller (ADF) test and Philips Peron (PP) tests were used to test no stationarity (unit root) in time series. The rule is that the regression result will be spurious if the unit-root variables are regressed.

Table 2: ADF & PP unit root test of log levels of variables at level

Variables in level	Test statistic ADF		PP	
	Test statistic	Critical value at 5 percent	Test statistic	Critical value at 5 percent
Ln*GFCF*	0.36	-2.93	0.45	-2.93
Ln*GTE*	-0.27	-2.93	-0.27	-2.93
Ln*IR*	-1.73	-2.93	-1.43	-2.93
Ln*NGDP*	0.13	-2.93	0.03	-2.93

Source: Calculation from the Data Sets of N. R. B Quarterly Economic Bulletin and Economic Survey (2000, 2019).

In Table 2, the results of ADF and PP test provided evidence that time-series variables in the model became nonstationary in the level form. However, the data sets of the variables could be stationary in first difference, which is shown by Table 3.

Table 3: ADF & PP unit root test of log levels of variables at first difference

| Variables in level | Test statistic | | | | Order of integration |
| | ADF | | PP | | |
	Test statistic	Critical value at 5 percent	Test statistic	Critical value at 5 percent	
Ln*GFCF*	-9.32	-2.93	-9.40	-2.93	*I*(1)
Ln*GTE*	-5.10	-2.93	-5.09	-2.93	*I*(1)
Ln*IR*	-4.63	-2.93	-4.45	-2.93	*I*(1)
Ln*NGDP*	-4.77	-2.93	-4.74	-2.93	*I*(1)

Source: Calculation from the data sets of NRB Quarterly Economic Bulletin and Economic Survey (2000, 2019).

As Table 3 shows that the variables became stationary in first difference—integrated at same order I(1); that is, all these stationary variables at the same order then paved the way for using cointegration approach to test whether there was a long run association between the time-series variables over the period of 1975–2018.

Cointegration analysis

The cointegrating relationship was explored between gross fixed capital formation and its determinants (interest rate, nominal gross domestic product, and government total expenditure) by employing Engel-Granger cointegration model. The cointegration between the dependent and independent variables is shown as given in Equations 9 and 10.

$$\ln GFCF = -2.54 + 0.29\ln GTE - 0.16\ln IR + 0.79\ln NGDP \qquad (9)$$

p value: 0.000   0.003   0.008   0.000

$R^2 = 0.99$, $N = 44$, $DW = 1.73$, $F = 7914.16$ (0.00)

Equation 9 shows three long-run coefficients and the long run relationship between a dependent variable (*GFCF*) in Nepal—where *GFCF* refers to gross capital formation—and three independent variables (*GTE, IR*, and *NGDP*). The cointegration Equation 8 states that one percent

increase in government expenditure led to a 0.29% increase in gross fixed capital formation in Nepal. Because the long-run positive coefficient (0.29) here was significant statistically at 1% level, government expenditure appeared to have played a major role in capital formation. The long-run negative and statistically significant coefficient of interest rate (-0.16) implies that a 1% increase in interest rate reduced investment by 0.16%. Furthermore, a positive and statistically significant coefficient of NGDP (0.79) demonstrated a long-run association between GFCF and NGDP.

The residual obtained from Equation 8 and its ADF statistic (-5.54) provided a testimony for the cointegrating relation among the variables; thus, the estimated ECM model is shown in Equation 10.

$$D(\ln GFCF) = -0.017 - 0.90 Ect(-1) + 0.59 D(\ln GTE) - 0.10 D(\ln IR) + 0.54 D(\ln NGDP) \tag{10}$$

Pvalue   0.64   0.00   0.00   0.30   0.04

$R^2 = 65$, $N = 43$, $DW = 1.90$, $F = 18.24$ (0.00), $JB = 2.41$

Note. GFCF = gross fixed capital formation; *Ect* = Error correction term; *GTE* = gross expenditure by government; *IR* = market interest rate; *NGDP* = nominal gross domestic product.

The statistically significant coefficient of (-0.90) *Ect*(-1) states that 90% disequilibria of the last year were corrected this year. The statistically significant and positive coefficient of government expenditure (0.59) at 1% level showed that total government expenditure made the positive impact on Nepal's total investment. Because the interest rate coefficient (-0.10) became significant statistically at 1% level, investment was found to be an inverse function of existing interest rate of the market; furthermore, gross domestic product (GDP) represents the market size of the nation. A large volume of GDP shows the large size of market, a motivator of investors. A significant coefficient (0.54) at 5 percent level showed that NGDP put a positive impact on total investment. Thus, this study also examined whether OLS assumptions were violated. As *DW* and *JB* statistics show, the model appeared free from autocorrelation and non-normality problems; likewise, the significant *F* statistics (18.24) provided evidence for a reliable result.

CONCLUSION

Using Engel-Granger approach to cointegration and error correction model, this study aimed to investigate the key factors affecting the investment decisions in Nepalese economy during 1975/76 to 2017/18. Engel-Granger test shows cointegration between investment decision and key macroeconomics factors (government expenditure, interest rate, and nominal GDP); the error correction term was also significant with negative sign, providing an evidence for these three macroeconomic factors affecting the investment decision in Nepal in both short and long runs. This study's findings—two variables(nominal gross domestic product and government expenditure) making positive impact and interest rate making negative one on investment decision—is consistent with the result of Laopodis (2001), Lucky and Kingsley (2016), and Pathania (2013). As the result of Engel-Granger test (Equation 9) suggests, therefore, the government of Nepal should raise the gross expenditure in different sectors, reduce the interest rate, and increase the volume of GDP to make the positive impact on gross investment within the country; for this reason, it would be better for Nepalese policy makers to positively consider an expansionary fiscal policy—the one of the best instruments to raise investment within the Nepalese economy.

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