

# CONTRIBUTION OF FOREIGN DIRECT INVESTMENT ON REAL GROSS DOMESTIC PRODUCT OF NEPAL

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## Abstract

*The objective of this article is to measure the contribution of Real Foreign Direct Investment (RFDI) on Real Gross Domestic Product (RGDP) covering the sample period of 2000 – 2021 AD, employing time-series data. The period 2000 AD was the peak policy changes of Nepal's openness and updated data are available up to 2021AD. Co-integration analysis is introduced to capture long-run relationship, and Pairwise Engel Granger test, and Error Correction Mechanism (ECM) are for short-run relationship among variables. On the paper, RFDI contributes to RGDP; the coefficient is positive as well as significant at the 5 percent level in the short run only. In the long run, RFDI is not effective for the Nepalese RGDP growth like African country of Botswana. The research finds remittance, domestic capital and export, tourism earning, are important tools to RGDP growth for long run and these variables are positive and significant at 5 percent level. All the stability and diagnostic test of the model has no symbols of misspecification, residuals are normally distributed, homoscedasticity and no serially correlated.*

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**Key words:** RGDP; RFDI; OLS; ECM; Co-integration; Pairwise Engel Granger test;

## Introduction

Nepal faces two constraints; first it has minimal domestic revenue and donor financial support, second, it has limited private-sector capital and investment capacity to promote growth. Foreign direct investment (FDI) is an important component of developing countries' growth strategies (World Bank, 2021). Attracting FDI helps link a country's economy to global value chains and facilitates economic growth. FDI brings investment, jobs, increased exports, supply chain spillovers, new technologies and business practices to developing countries. In this respect, foreign direct investment (FDI) becomes an important source of private finance (UNCTAD, 2019).

To attract FDI, developing countries have established pro-investment policies that help firms open subsidiaries in all parts of the world with relative ease. In this regard, policymakers in developing countries such as Nepal attract FDI to accelerate economic growth, job creation and poverty reduction. This is based on the premise that FDI is a way of obtaining capital and technology that is not available in the host country (Olusanya, 2013).

In its efforts to transform economy, Nepal formally adopted the policies of liberalization, privatization and globalization after the restoration of multiparty democracy in the early 1990s as the forerunner of globalization in the South Asian region. The accession of Nepal to the WTO in 2004 accelerated the process of globalization. Currently Rs.50 million thresholds, foreign direct investments in Nepal are regulated mainly by the Foreign Investment and Technology Act (FITTA) of 2019, along with the Public Private Partnership and Investment Act, Labor Act, and the Companies Act.

Nepal's gross FDI inflow was decreased by 18.2 percent to Rs.2838 million in 2019 AD. The COVID-19 pandemic has a sizeable impact on global foreign direct investment flows as it declined in Nepal also around Rs.1018 million in 2020 AD. But there was some good news, that inflow increased Rs.1630 million by 2021 AD. The number of foreign investment projects licensed in Fiscal Year 2022 was 295 with proposed foreign capital of Rs.5420 million for 2022 AD contributing to generate 16905 additional employments. This was about 93 percent of proposed total capital in foreign invested industries. It comprises 15 large, 73 medium and 217 small scale industries. While analyzing the category of these industries, the highest 127 enterprises in tourism followed by 97 enterprises in service sector. On the other hand, the amount of foreign investment commitment is led by the service sector industries worth Rs.2360 million (Industrial Statistic, 2021/22 AD).

## Literature Review

There have been many empirical studies examining the effect of FDI on the economic growth of developing countries. Voluminous literature shows that the effect of FDI inflows on economic growth differs depending on the countries policies. FDI contributes to growth through several channels. It can directly affect growth through capital formation. As a part of private investment, an increase in FDI will, by itself, contribute to an increase in total investment.

Ronal (2017) empirically explained the impact of FDI on Uganda's economic growth, employment and poverty reduction. To achieve this end, the study brought together the dependent variables as well as FDI and other explanatory variables as a pioneer in economic analysis. Study shows 100 percent increase in FDI leads 2 percent increase in growth, 10 percent increase in employment and 5 percent decrease in poverty.

UNCTAD (2021) states FDI plays a key role in the economic growth and development process. FDI is considered to be an instrument through which economies are being integrated at the level of production into the world of globalization by bringing a package of assets, including, capital, technology, managerial capacities and skills, and access to foreign markets.

Bhusal's (2021) empirical finding indicates that RFDI contributes to economic growth; the coefficient is positive as well as significant at the 5 percent level in the short run only. In the long run FDI is not significant for the Nepalese economic growth. The study finds remittance, domestic capital and export are important tools for GDP growth, and these variables are positive and significant at 5 percent level.

## Objective of the Study

The general objective of the study is to identify the relationship between FDI and economic growth in Nepal. The specific objective is to examine the contribution of RFDI on RGDP in Nepal.

## Hypothesis of the Study

Null Hypothesis (Ho): RFDI has no significant contribution to RGDP growth of Nepalese economy (RGDP).

Alternative Hypothesis (H1): RFDI has significant contribution to RGDP growth of Nepal.

## Methodology

This entire article followed the quantitative data. This study employs annual time series data covering of 22 years the period from 2000 to 2021 AD. Late 1990s has been the significant policy change in overall Nepalese economy and latest updated data are available up to 2021AD. The model is developed based on the variable selected as RGDP, RFDI, Remittance, Foreign Aid, Export, Tourism Earning, Domestic Capital of Nepal guided by the functional relation between growth and FDI received. All the data are based on secondary sources included different Report and article published by Nepal Rsatra Bank; Economy Survey published by Ministry of Finance Government of Nepal, National Income Accounting published by Central Bureau of Statistics and others international publications including World Bank. Different econometrics and statistical tools such as Co-integration, Pairwise Engel Granger test, and Error Correction Mechanism have been used. These data were analyzed with the help of Excel, E-views-10 and Micro fit software package.

## Measures of FDI Impact on RGDP (Model -1)

$$RGDP = f(RFDI) \dots \dots \dots (1)$$

From the above functional relationship following stochastic model will specified.

$$RGDP = \beta_0 + \beta_1(RFDI) \dots \dots \dots (2)$$

Generally workings of model retested in its natural logarithm form as

$$\ln(RGDP) = \beta_0 + \beta_1 \ln(RFDI) + \mu \dots \dots \dots (3)$$

## Measure of FDI on others Variables Impact on RGDP (Model 2)

$$GDP = f(RFDI, RREM, RDK, REXP, RFAID, RTFEE) \dots \dots \dots (1)$$

From the above functional relationships, the following stochastic model is specified below:

$$RGDP = \beta_0 + \beta_1(RFDI) + \beta_2(RREM) + \beta_3(RDK) + \beta_4(REXP) + \beta_5(RFAID) + \beta_6(RTFEE) + \mu \dots \dots (2)$$

Generally working model can be restated in its natural logarithm form as follows:

$$\text{Ln(RGDP)} = \beta_0 + \beta_1 \text{Ln (RFDI)} + \beta_2 \text{Ln (RREM)} + \beta_3 \text{Ln (RDK)} + \beta_4 \text{Ln (REXP)} + \beta_5 \text{Ln (RFAID)} + \beta_6 \text{Ln (RTFEE)} + \mu \dots (3)$$

### Unit Root Test

When we apply standard estimations and test procedures in the dynamic time series model, as the first step, it's necessary to examine the stationary property of a series (Gujarati.etal.2012). Accordingly, Augmented Dickey-Fuller test as suggested Dickey and Fuller (1979) has been applied to test the presence of a unit root in a time series data. There are three versions of ADF test.

$$\Delta Y_t = \beta_1 + ZY_{t-1} + \alpha_i + e_t \dots \dots \dots 1 \text{ (Intercept only)}$$

$$\Delta Y_t = \beta_1 + \beta_{2t} + ZY_{t-1} + \alpha_i + e_t \dots \dots \dots 2 \text{ (Trend and intercept only)}$$

$$\Delta Y_t = ZY_{t-1} + \alpha_i + e_t \dots \dots \dots 3 \text{ (no trend, no intercept)}$$

The basic objective of this test is to examine null hypothesis and alternative hypothesis.

Null hypothesis (Ho): Variables are not stationary or got unit root,

Alternative hypothesis (H1): Variables are stationary.

### Engle-Granger Co-integration Test

Engle-Granger (1969) calculated critical values that are appropriate to estimate error terms. This approach checks for the mixed effect by checking the stationary of the error terms. If the error terms found to be stationary I(0) at their levels using the Engle and Granger critical values then the regression of the equation will not be spurious.

If the regression model with non-stationary variables is run the regression model may be spurious or nonsense like model 1.1

$$\text{LnRGDP} = \beta_0 + \beta_1 \text{Ln(RFDI)} + \beta_2 \text{Ln (RREM)} + \beta_3 \text{Ln (RDK)} + \beta_4 \text{Ln (REXP)} + \beta_5 \text{Ln (RFAID)} + \beta_6 \text{Ln (RTFEE)} + \mu \dots \dots \text{ (Model 1.1)}$$

The symptom of a spurious regression of R-squared value would be greater than Durbin Watson Statistics. After the test of ADF test at level series model variables got unit root or non-stationary. So, from the Johansen Co- integration Test and some variables are co-integrating and they have long run relationship. So Engle-Granger Model (ECM) is to be used as given below.

$$D (\text{LnRGDP}) = \beta_0 + \beta_1 D(\text{LnRFDI}_{t-1}) + \beta_2 D(\text{LnRREM}) + \beta_3 D(\text{LnRDK}) + \beta_4 D(\text{LnREXP}) + \beta_5 D(\text{LnRFAID}) + \beta_6 D (\text{RTFEE}) + \beta_7^* \text{ECM}_{t-1} + V \dots \dots \text{ (Model 1.2)}$$

V is white noise error terms is one period lag residual of model 1.1.  $\text{ECM}_{t-1}$  is an error correction term that guides the variables of the system to restore back to equilibrium. In other words, it corrects the disequilibrium.

## Granger Causality Test

The standard Granger Causality Test seeks to determine whether past value of variable help to predict change in another variable. The definition states that in the conditional distribution, lag value of  $Y_t$  add no information to explanation of movement of  $X_t$  beyond the provided by lag value of itself.

## Empirical Analysis and Discussion

To examine the impact of RFDI, RGDP is assumed as a function of RFDI. The regression model has been employed to examine the impact of the variables. It was hypothesized that all the independent variables in the model have significant positive impact on Nepalese economy which is a proxy by RGDP and actually following results are obtained.

Following the ADF test, all series are non-stationary at level but stationary at first difference. However, ADF tests are often affected by the choice of the lag length ( $p$ ) and lose power while estimating a large sample. If all the variables are stationary at first difference we should use the OLS technique

## Log Level and Frist Difference

Variables	Log Level Form	First Difference		
		p-value	t-statistics	p-value
LnRGDP	-1.1765	0.9316	-6.2948	0.0000
LnRFDI	-2.0375	0.2701	-8.1474	0.0000
LnRREM	-0.9376	0.7624	-7.9007	0.0000
LnRDK	-0.0795	0.9427	-6.7774	0.0000
LnREXP	-2.3016	0.1778	-7.7146	0.0000

Source: Author's estimation results using Eviews-10, 2022

Following results show that RFDI is significant at 5 percent meaning positive impact of RFDI meaning 1 percent change in RFDI leads to about 0.2 percent change in RGDP. If we drop others all the variables there is positive relation between RGDP and RFDI.

$$\text{LNRGDP} = 10.677 + 0.204\text{LN RFDI}$$

$$\text{P- value} = 0.0000$$

$$\text{t-value} = (25.66) (3.8415)$$

$$R^2 = 0.4245, F - \text{test } 14.57, \text{SD} = .45, \text{DW} = 1.09 \text{ (see Appendix)}$$

In the second model the coefficient of LNRDK LNRREM, NRAID and LNREXP are positive as well as significant at 5% level but LNRFDI and LNRTFEE are not significant at 5 percent. It may be due to larger portion of FDI driven out as a profit. It seems that very limited amount of FDI is being invested in productive sectors.

$$\text{LNRGDP} = 7.004 + 0.04\text{LNRFDI} + 0.24\text{LNRREM} + 0.17\text{LNRDK} + 0.22\text{LNEXP} - 0.16\text{LNRAID} - 0.008\text{LNRTFEE}$$

P- value = 0.001, 0.345, 0.023, 0.019, 0.180, 0.062, .092

t-value = (3.9062) (-0.980) (2.433), (1.350) (1.40) (-2.010) (0,100)

R<sup>2</sup> = 0.9189, F – test 25.74, SD = 0.450, DW = 1.20 (see Appendix)

So, to see the long run relation between the variables Engle Granger test has been used to shows the residual term for stationary. P-value is less than 1 percent and t-statistics is greater than critical value. We reject null hypothesis and accept alternative hypothesis. So, there is Co-integration in order zero I(0). Thus residual term being stationary at level we can say there is existence of co-integration. Therefore we converted to the first difference for error correction.

Null Hypothesis: ECM has a unit root				
Exogenous: None				
Lag Length: 0 (Automatic - based on SIC, maxlag=2)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.055437	0.0040
Test critical values:	1% level		-2.679735	
	5% level		-1.958088	
	10% level		-1.607830	
*MacKinnon (1996) one-sided p-values.				

Source: Author’s estimation results using Eviews-10, 2022

In the third model, ECMt-1 is known equilibrium error it’s coefficient tells us what the rate that correct disequilibrium of previous period. The ECM coefficient must be negative for convergent equilibrium which is fulfilled in the model. Others coefficients of DLNRDK DLNRREM, and DLNREXP are positive as well as significant at 5 percent level but DLNRFDI is positive but insignificant at given level. DLNRAID is negative and

not significant at 5 percent. It may be negative due to large amount aid goes back due to different conditions imposed by donors. The model is shown in the following table.

Dependent Variable: DLNRGDP

Method: Least Squares

Date: 12/02/22 Time: 22:04

Sample (adjusted): 2001 2021

Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.07E-15	7.30	1.46	0.1656
DLNRFDI	0.042924	4.43	9.69	0.0000
DLNRREM	0.241726	3.78	6.39	0.0000
DLNRDK	0.171383	1.47	1.16	0.0000
DLNEXP	0.228138	1.67	1.36	0.0000
DLNRFAID	-0.167427	9.53	-1.76	0.0000
DLNRTFEE	-0.008466	8.30	-1.02	0.0000
DECM	-1.000000	3.34	-3.00	0.0000
R-squared	1.000000	Mean dependent var		0.048122
Adjusted R-squared	1.000000	S.D. dependent var		0.196941
S.E. of regression	1.83E-15	Sum squared resid		4.340029
F-statistic	3.32E+28	Durbin-Watson stat		2.868158
Prob(F-statistic)	0.000000			

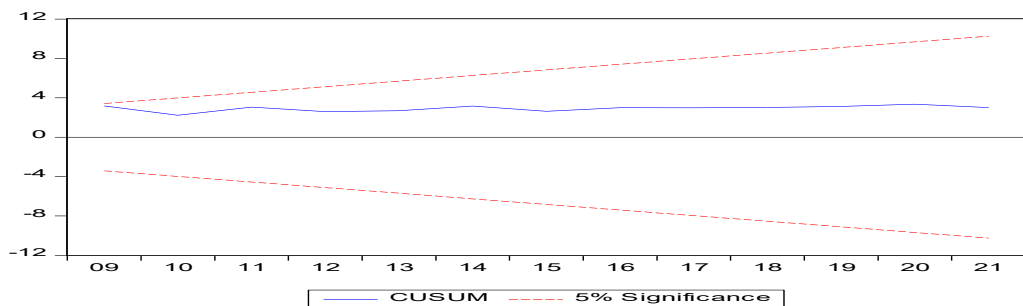
Source: Author's estimation results using Eviews-10, 2022

All the variables included in the model shows the existence of regression. The  $R^2$  of the model estimation is obtained at 1, which indicates that 100 percent of the variation in RGDP explained by the variation of independent variables used in the model. The computed F test is 3, which is lower than the table value. The model is best to fit. It confirms the presence of relationship between RGDP and others variables.

Value of D-W is greater than  $R^2$  indicating model is free from the auto-correlation; Augmented Dickey Fuller test has revealed non stationary at the level and stationary when the variables are converted into first difference. Similarly the Angle Granger Approach shows the long run relation, the residual term is stationary at the level and p-value is less than 5 percent similarly Error Correction Term (ECM) has negative sign after estimation and significant at 5 percent level. The P-value is less than 5 percent it correct the error at the speed of 100 percent annually. Model stability is checked by normal distribution, by observing  $R^2$  and corresponding and corresponding P-value which are all greater than 5 percent. CUSUM test has no structural break limiting within 5 percent boundary shown on the following figures.

### Figure Residual Stability Test

#### CUSUM



### Conclusion

The findings of the study show that there is a positive at 5 percent significant relationship between foreign direct investment and economic growth in the long run, since FDI directed toward capital transfer, and service duplication. FDI priorities has shifted from production to non- production. However, the study shows that aid has significant but negative relationship with RGDP. This may be due to use of consumption from national sources. Meanwhile, export, remittance and domestic capital shows significant positive relationship with RGDP which implies that increasing export, remittance and domestic capital has led to increase in RGDP and RGDP from previous year is being used as capital creation in the current year.

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**APPENDIX-I**

**Pairwise Granger Causality**

Pairwise Granger Causality Tests

Date: 12/02/22 Time: 21:17

Sample: 2000 2021

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNRFDI does not Granger Cause LNRGDP	20	1.98196	0.1723
LNRGDP does not Granger Cause LNRFDI		2.89560	0.0864
LNRREM does not Granger Cause LNRGDP	20	12.4647	0.0006
LNRGDP does not Granger Cause LNRREM		11.1207	0.0011
LNRFAID does not Granger Cause LNRGDP	20	2.55218	0.1112
LNRGDP does not Granger Cause LNRFAID		4.80615	0.0244
LNRDK does not Granger Cause LNRGDP	20	0.29343	0.7499
LNRGDP does not Granger Cause LNRDK		0.88458	0.4334
LNEXP does not Granger Cause LNRGDP	20	5.10699	0.0203
LNRGDP does not Granger Cause LNEXP		0.95277	0.4078
LNRTFEE does not Granger Cause LNRGDP	20	1.85557	0.1905
LNRGDP does not Granger Cause LNRTFEE		0.83110	0.4547
LNRREM does not Granger Cause LNRFDI	20	4.72904	0.0256
LNRFDI does not Granger Cause LNRREM		2.41072	0.1236
LNRFAID does not Granger Cause LNRFDI	20	8.77666	0.0030
LNRFDI does not Granger Cause LNRFAID		2.10899	0.1559

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LNRDK does not Granger Cause LNRFDI	20	3.92220	0.0426
LNRFDI does not Granger Cause LNRDK		0.47785	0.6292
LNEXP does not Granger Cause LNRFDI	20	3.84883	0.0448
LNRFDI does not Granger Cause LNEXP		2.26841	0.1378
LNRTFEE does not Granger Cause LNRFDI	20	5.10006	0.0204
LNRFDI does not Granger Cause LNRTFEE		0.10088	0.9046
LNRAID does not Granger Cause LNRREM	20	0.78984	0.4719
LNRREM does not Granger Cause LNRAID		2.70308	0.0994
LNRDK does not Granger Cause LNRREM	20	6.71821	0.0083
LNRREM does not Granger Cause LNRDK		7.77693	0.0048
LNEXP does not Granger Cause LNRREM	20	10.6412	0.0013
LNRREM does not Granger Cause LNEXP		4.12038	0.0375
LNRTFEE does not Granger Cause LNRREM	20	0.33909	0.7177
LNRREM does not Granger Cause LNRTFEE		1.46660	0.2620
LNRDK does not Granger Cause LNRAID	20	3.00902	0.0797
LNRAID does not Granger Cause LNRDK		0.57284	0.5758
LNEXP does not Granger Cause LNRAID	20	0.07749	0.9258
LNRAID does not Granger Cause LNEXP		10.3891	0.0015
LNRTFEE does not Granger Cause LNRAID	20	3.17177	0.0710
LNRAID does not Granger Cause LNRTFEE		3.21550	0.0688
LNEXP does not Granger Cause LNRDK	20	5.68432	0.0145
LNRDK does not Granger Cause LNEXP		0.36587	0.6996

LNRTFEE does not Granger Cause LNRDK	20	1.41621	0.2733
LNRDK does not Granger Cause LNRTFEE		1.61193	0.2322
LNRTFEE does not Granger Cause LNEXP	20	1.77236	0.2037
LNEXP does not Granger Cause LNRTFEE		1.08832	0.3619

Source: Author's estimation results using Eviews-10, 2022

## APPENDIX-II

### Unit Root Error Correction

Null Hypothesis: ECM has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.055437	0.0040
Test critical values:		
1% level	-2.679735	
5% level	-1.958088	
10% level	-1.607830	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ECM)

Method: Least Squares

Date: 12/02/22 Time: 20:51

Sample (adjusted): 2001 2021

Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECM(-1)	-0.621421	0.203382	-3.055437	0.0062
R-squared	0.317864	Mean dependent var		0.003484
Adjusted R-squared	0.317864	S.D. dependent var		0.152730
S.E. of regression	0.126142	Akaike info criterion		-1.256363
Sum squared resid	0.318238	Schwarz criterion		-1.206624
Log likelihood	14.19182	Hannan-Quinn criter.		-1.245569
Durbin-Watson stat	1.865636			

Source: Author's estimation results using Eviews-10, 2022

### APPENDIX-III

#### Measure of FDI Impact on GDP

Dependent Variable: LNRGDP

Method: Least Squares

Date: 12/02/22 Time: 19:30

Sample: 2000 2021

Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.67716	0.416035	25.66406	0.0000
LNRFDI	0.244480	0.063641	3.841534	0.0010
R-squared	0.424583	Mean dependent var		12.24880
Adjusted R-squared	0.395812	S.D. dependent var		0.455927
S.E. of regression	0.354390	Akaike info criterion		0.849670
Sum squared resid	2.511844	Schwarz criterion		0.948856
Log likelihood	-7.346371	Hannan-Quinn criter.		0.873035
F-statistic	14.75738	Durbin-Watson stat		1.093935
Prob(F-statistic)	0.001019			

Source: Author's estimation results using Eviews-10, 2022

## Appendix IV

### Measure of RFDI and Other Variables

Dependent Variable: LNRGDP

Method: Least Squares

Date: 12/02/22 Time: 20:04

Sample: 2000 2021

Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.004942	1.759262	3.981751	0.0012
LNRFDI	0.042924	0.043778	0.980497	0.3424
LNRREM	0.241726	0.099344	2.433216	0.0279
LNRDK	0.171383	0.126725	1.352399	0.1963
LNEXP	0.228138	0.162337	1.405334	0.1803
LNRFAID	-0.167427	0.083279	-2.010432	0.0627
LNRTFEE	-0.008466	0.084557	-0.100122	0.9216
R-squared	0.911498	Mean dependent var		12.24880
Adjusted R-squared	0.876097	S.D. dependent var		0.455927
S.E. of regression	0.160485	Akaike info criterion		-0.567857
Sum squared resid	0.386333	Schwarz criterion		-0.220707
Log likelihood	13.24643	Hannan-Quinn criter.		-0.486079
F-statistic	25.74802	Durbin-Watson stat		1.208249
Prob(F-statistic)	0.000000			

Source: Author's estimation results using Eviews-10, 2022