Time Series Analysis of the Foreign Direct Investment in Nepal: EconomicsPerspective

Dhirendra Prasad Koirala[1], Nazirdduin Abdullah
[1]UniKL Business School Postgraduate Section, Universiti of Kuala Lumpur, Malaysia
[2]UniKL Business School Postgraduate Section, Universiti of Kuala Lumpur, Malaysia

Corresponding Author
Dhirendra Prasad Koirala
Email: eduemploy2004@gmail.com
https://orcid.org/0009-0005-4112-125X

ABSTRACT

The main aim of this paper is to identify the major economic determinants of foreign direct investment in Nepal. In doing so, the Johansen-Juselius (JJ) cointegration approach as well as vector error correction model are implemented to identify the relationship among the macro variables. The empirical results revealed that all the variables are stationary at first difference and the evidence of cointegrating vector is obvious based on the JJ cointegration results. In addition, it is found that there is a long run relationship among the variables based on the coefficient of Error Correction Term (ECT). The long run coefficients show that Trade, GDP, exchange rate, and interest rate have a positive impact on FDI in Nepal, while, gross fixed capital formation (GFCF) and inflation (CPI) have a negative impact. Finally, in the short run, only one lag of FDI is affecting FDI. These results suggest that the inward FDI tends to incorporate information from the macroeconomic variables.

KEYWORDS

INTRODUCTION

There is a great interest among the countries towards attracting Foreign Direct Investment(FDI) and therefore higher capital inflow to achieve economic development. The advantages of FDI are notable in two items; first, it promotes economic growth through spillover effect such as human resources augmentation, capital accumulation, efficiency improvement of the locally owned firms, expansion of international trade and technological change (Gregory & Wagle, 1997; Bhattacharyya, 2012). Second, in comparison with other private capital flows, FDI flows tend to be more stable. This is because FDI is supposedly more costly to reverse and it is not very sensitive to the shocks in the region and the globe (Froot, 2008).

Due to the higher immigration over the past years, Nepal has resulted in a pluralistic society with diverse ethnic, cast, religion and linguistic communities. Nepal is classified as a hybrid regime based on the democracy index developed by the Economist Intelligence Unit. When a regime has serious weaknesses in the operation of government, weakness in political parties, elections' substantial irregularities, harassment

123

of the media, as well as weak civil society rules, and weak rule of law, is called a Hybrid regime (Solomon & Shrestha, 2014). In the other side, Nepal is considered as one of the liberalized countries in terms of its FDI in the South Asian region and the predominant source of FDI is from India. Despite its liberalized nature, the growth has been poor in recent years in which leads to a major impact on the government's fiscal position negatively (Dhakal *et al*., 2009).

Many studies have highlighted the significant impact of FDI on the economic growth of the country. For instance, Campos and Kinoshita (2002) examined the impact of FDI on the economic growth in 25 Central and Eastern European countries as well as the former Soviet Union economies. Their empirical findings revealed that FDI has a positive and significant impact on the economic growth among the selected countries. Besides, the other studies by Yan and Majagaiya (2011) for Nepal, Har, Teo, & Yee (2008) for Malaysia, Feridun and Sissoko (2011) for Singapore, Tiwari and Mutascu (2011) for 23 Asian countries, and El-Wassal (2012) for 16 Arab Countries, revealed that FDI has a positive impact on GDP growth. In the case of Nepal, the study by Bhattarai (2007) examined the role of aid policy on economic growth while the findings revealed that aid was effectively only in the presence of good policy environment. Srinivasan (2011) studied the relationship between FDI and economic growth among the SAARC countries including Nepal. The findings show a positive relationship and emphasized the importance of improvising the economic policies to drive FDI.

Therefore, it is essential to identify the factors that affects the FDI inflow into the country. In this regard and in the context of Nepal, there are few studies have been conducted such as Krishna (2011), and Pradhananga (2007). However, those studies are descriptive and failed to identify the critical success factors. Various macroeconomic variables are quoted as the major determinants of foreign direct investment across the world. Studies have been done earlier suggest that GDP, trade openness, inflation rate, exchange rate, financial market capitalization, interest rate, infrastructure, and policy change are the main factors. In this study the major macro variables will be examined.

The main purpose of this study is to check the possible major determinants of FDI inflow in Nepal. To the researcher knowledge, there is no proper study that could consider the FDI determinants in Nepal. However, there are some works that have been done previously in Nepal but they are mainly considers as notes or working papers. Therefore, this paper serves as first amongst the scholarly attempts to identify the success factors toward FDI inflow. This paper adds to the existing literature by analysing the macroeconomic determinants towards the inward FDI. The macroeconomic analysis will be carried out both in short run and long run. The literature has mainly focused on the short run analysis; therefore, a long run analysis seems necessary to provide a new insight for policy makers using macroeconomic factors.

LITERATURE REVIEW

Nepal is naturally equipped with all the required resources and features for the foreign direct investments. However, the FDI in Nepal is not up to the expectation of the nation. Foreign direct investments are observed to flow in only to certain specific sectors in the country. The other industries in Nepal also have a wide scope for FDI, but are not identified by the foreign investors. According to Gillespie (2014), promoting foreign direct investments in Nepal can play a chief role in growth and development of its economy.

Literature has been done for many cases in the area of major determinants of foreign direct investment. For instance, Bengoa and Sanchez-Robles (2003) in their study claimed that FDI is correlated positively with economic growth. However, host countries need liberalized market, economic stability, and

human capital to guarantee the inflow of FDI in long term. Below provides a brief literature about the determinants of FDI in this paper.

Tintin (2013) studied the determinants of FDI inflows into six Central and Eastern European countries (CEEC) over the 1996–2009 period. He applied panel regression analysis by incorporating GDP, EU membership, trade openness, and institutions. The latter is measured by state fragility, economic freedoms, civil liberties, and political rights indices) towards FDI inflows. His results revealed the positive and significant effect of above variables towards FDI inflow to the CEEC.

Market Size (GDP)

Villaverde and Maza (2015) investigated the FDI determinants in EU region for the period of 2000 to 2006. They specify the model and run the factor analysis test to ensure that the number of determinants is adequate and remove the less significant factor. After running the regression model, they found that labour market characteristics, economic potential, competitiveness, and technological progress have a significant impact on FDI. In contrast, market size and labour found to be non-significant.

The case of China's recent rise in terms of FDI led Jing (2010) to carry out a study on why this phenomenon is happening. The study led to the conclusion that MNCs are attracted to various aspects of the Chinese market namely the ease of market entry, a lot of local talent to make use of R&D, and, most importantly, the size of the Chinese market. For the past decade alone, FDI inflows into China rose to $40 billion.

Exchange Rate

The rate of FDI flows is related positively to the volatility and of the exchange rate. This aspect points to the fact that investments are made only when the exchange rate is favourable to them. However, the levels of FDI made are indirectly related to the other measures of volatility. From the studies carried out by Udoh and Egwaikhide (2008), exchange rate had a negative impact on the amount of FDI.

Other models have estimated exchange rate volatility. Several number of studies have shown a negative relationship between FDI and exchange rate (Kiyota & Urata, 2004). However, some other studies illustrated no clear evidence on the long run relationship between FDI and exchange rate (Pain & Van Welsum, 2003).

Trade Openness

According to the United Nations, there are links between FDI and international trade particularly for resource seeking and market-seeking FDI. For example, most countries that have correct trade ties have a lot of FDI between them. However, the studies on this issue are not complete. Moore (1993) provided the research results that shows firms are more likely to invest in a host country when the international production costs is less than avoiding transportation costs, domestic production, and tariff duties and non-tariff impediments. While Marchant, Cornell and Koo (2002) established that, there is a relationship between FDI and exports. In conclusion, the trade relations may or may not create a good ground for the thriving of FDI. It all depends on the needs of the MNCs in question and how they approach business.

Jadhav (2012) explored the role of Trade openness, market size, and natural resources as economic determinants and rule of law, inflation rate, government effectiveness, political stability/no violence, voice and accountability, regulatory quality, and control of corruption as potential political and institutional determinants of FDI into BRICS. They use panel data for a period of 2000-2009 by applying panel unit-root

test, and multiple regressions. Their empirical findings indicate that market size is a positive and significant determinates of FDI. Trade openness (positively), natural resource availability (negatively), voice and accountability and rules of law are found to be statistically significant.

Rogmans and Ebbers (2013) analysed the determinants of FDI into countries of the Middle East and North Africa (MENA) countries based on the econometric model of regression and correlation. They find that, energy endowments negatively impact the FDI flows into the region. Oil prices, market size (measured by GDP per capita), and openness to trade positively affect the FDI inflows. On the other hand, aggregate measures of environmental risk found not to be differentiating factor in the region and among countries.

Inflation Rate

Inflation rate is another important factor affecting the FDI inflow. If the host country is facing inflation, it means that the assets are depreciating overtime due to inflation and foreign investors may not receive back their principal investment. Therefore, this study is looking into the inflation level in Nepal to identify the impact of inflation on the FDI.

Singhania and Gupta (2011) examined the determinants of FDI in India using macroeconomic variables such as interest rate, GDP, Patents, inflation rate, openness, money growth, and policy change, the latter as dummy variable. The aim was to find the best fit model of ARIMA (p,d,q) to clarify the FDI inflow variations into India. Their empirical result shows that out of the macroeconomic variables considered, only patents, inflation rate, and GDP are significant. Another significant factor is the FDI policy change during 1995-97 that affected the FDI inflows in India.

Vijayakumar et al. (2010) investigated the factors affecting FDI inflows in BRICS over the time span of 1975–2007. They used panel least squares method with fixed effects and found that infrastructure, labour cost, market size, exchange rate, and gross capital formation are the potential determinants of FDI inflows in BRICS. The inflation rate, trade openness, and growth prospects (industrial production index) are found to be statistically insignificant and less important determinants of FDI inflows to BRICS.

Interest Rate

Interest rate is defined as reward when money is invested and it is a cost when money is borrowed. Generally foreign investors look for cheaper funds at destination and higher return on their investment. Therefore, if interest rate is relatively low on the funds borrowed and if it is high on the invested funds, more FDI inflow will take place.

Li and Liu (2005) investigated the role of interest rate an d inflation rate on the FDI in a panel of 84 countries from 1970-1999.the find that interest rate has no impact on the FDI as FDI is direct rather than portfolio investment. However, the impact of interest rate is taken care in this study.

Financial Market Capitalisation

Financial market capitalisation is usually referred as the gross fixed capital formation. This is the situation whereby countries measure their stock market capitalisation as a percentage of GDP. This value shows the share of capital in the GDP of the country. Of course, the higher the capital in the country, the higher will be the rate of economic development.

Al-khouri (2015) examined the factors influencing the foreign direct investment (FDI) flows among the 16 economies comprising the Middle East and North African (MENA) region. He used panel data for

126

the period of 1984-2012 by implementing generalized method of moment (GMM) technique. The variables are country risk, size, previous FDI, trade openness, inflation volatility, financial market development, and rate of return. Their results support the agglomeration effect, which indicates that countries that have already had FDI attract more FDI in the future. In addition, economic risk affects FDI significantly and negatively, whereas trade openness has a significant and positive influence on FDI. Degree of openness play a significant role, stock market capitalization, as well as the return on investment affect the FDI flow positively.

Anuchitworawong and Thampanishvong (2015) investigated the effect of natural disaster on FDI inflow in Thailand. The variables considered are GDP, natural disaster, financial market development, CPI, exchange rate, investment, enrolment in secondary and tertiary education, and trade openness by applying simultaneous equation modelling. Data for the study collected from 1971 to 2012 from Bank of Thailand. Their results show that natural disaster does matter for FDI flows. Higher severity of natural disaster tends to lower FDI flows into Thailand. Furthermore, all variables found to be significant in attracting FDI into Thailand except for CPI and enrolment in secondary education.

DATA & METHODOLOGY

The main aim of this research is to find the critical success factors on the improvement of FDI inflow in Nepal. Therefore, the study adopts quantitative technique where macroeconomic data is collected from the secondary sources. FDI inflow is in USD million, CPI is the consumer price index that proxied inflation, GDP represents the gross domestic products in USD billion, GFCF represents gross fixed capital formation in local currency, and IR represents the interest rate in percentage. Trade openness is in USD billion, and finally EXR is the exchange rate. The data were collected from various sources such as World Bank, International Monetary Fund, and the Data Stream. The access were given by the "International Centre for Education in Islamic Finance" (INCEIF) which is located in University Malaya, Kuala Lumpur. The time span for secondary data in this study covers the period of **1980 – 2016**. The frequency of data is yearly.

Johansen-Juselius Cointegration
Two variables are considered cointegrated if they exhibit a long run relationship among themselves and if they share common trend. Based on this technique when two variables are cointegrated, and then definitely there is a causality among them in either direction (Sims 1972). When cointegration exists between two variables, the possibility of the relationship estimated between them will not be spurious. To determine the direction of causality, usually vector error correction term is a good indicator. The null hypothesis for cointegration is the absence of cointegration among the variables while alternative hypothesis assumes that cointegration exist among the variables (Bekhet & Yusop, 2009).

If the variables under consideration are more than two, then, Johansen-Juselius cointegration methodology (1990) should be utilized as there could be more than one cointegration vector among the variables (Enders 2004).

For this purpose and to illustrate the method, we assume that there is an *x* and *ε* representing (*n*I*) vectors instead of a single variable *y*. *A* denotes (*n*n*) matrix and *I* is (*n*n*) identity matrix.

$\square x_t$ $\square_t$

$$\square \; \square x_t \square 1 \; \square \; \square_t \qquad\qquad\qquad\qquad \square \; (A_t \; \square \; I)$$

The rank of π matrix r represents the number of linear combination of variables included in π matrix or number of cointegrating vectors. The following is the two tests statistics which declare the rank of matrix:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i)$$

$$\lambda_{\max}(r, r+1) = -T \ln(1 - \hat{\lambda}_{r+1})$$

where; $\square$ = the estimated value of the characteristic roots obtained from the estimated π matrix while the number of observations is represented by T.

EMPIRICAL FINDINGS

Table below shows the descriptive statistics of the macroeconomic data used in this study. The mean, median, maximum, minimum, skewness, and kurtosis are reported.

Table 1: Descriptive Statistics of the Nepal Economic Data

Criteria	CPI	FDI inflow	GDP	GFCF	IR	Trade Openness	EXR
Mean	37.44	16936976	7953.27	1690946589	9.4	2648.479	57.08
Median	31.46	1390000	5284.00	1066000350	9.0	1805.177	63.55
Maximum	109.93	94022157	21314.00	5912503600	15.0	8265.737	107.00
Minimum	5.53	-6647984	1980.00	306749991	5.5	385.8850	12.00
Std. Deviation	28.58	28831520	6188.94	1.54E+09	2.9	2336.483	28.67
Skewnes s	0.95	1.669515	1.1238	1.338670	0.40	1.036748	-0.1149
Kurtosis	3.01	4.500451	2.7784	3.577242	2.02	2.781786	1.9020
No. of observati ons	37	37	37	37	37	37	37

Stationary Tests

Many economic time series data exhibit trending behaviour or non-stationarity in their mean. An appropriate econometric tool should determine the type of the trend in the data. If data show some sort of trending behaviour, then trend removal is necessary. For the multivariate modeling, stationary test is necessary to ensure that all the variables are stationary at the same order. Unit root tests are performed on the logarithm form of data set and the results are presented in Table 2 below.

Table 2: Unit Root Tests

		Level		1st difference	
Variables	*Test*	*Intercept*	*Trend & Intercept*	*Intercept*	*Trend & Intercept*
Exchange rate	ADF	-2.50	-1.43	-6.46*	-7.32*
	PP	-2.71	-1.39	-6.50*	-7.19*
Inflation	ADF	-1.99	-1.80	-4.37**	-4.44*
	PP	-1.75	-1.98	-4.36**	-4.44*
FDI	ADF	-2.15	-2.31	-15.21*	-14.97*
	PP	-5.27*	-5.86*	-20.69*	-20.31
Interest Rate	ADF	-1.10	-2.08	-5.49*	-5.41*
	PP	-1.10	-2.26	-5.49*	-5.40*
GDP	ADF	0.22	-1.22	-5.76*	-5.83*
	PP	0.10	-1.49	-5.88*	-5.88*
GFCF	ADF	-0.00	-1.72	-7.54*	-7.57*
	PP	0.14	-1.70	-7.45*	-7.54*
Trade openness	ADF	-0.60	-3.15	-7.44*	-7.32*
	PP	-0.59	-3.12	-7.69*	-7.56*

Note: *, ** and *** denote significance at 1%, 5% and 10%, respectively.

The Augmented Dickey Fuller test and Philips Perron unit root tests were performed on the economic data in this study. Two forms of unit root tests i.e. constant and constant with linear trend are implemented. Tests with a 95% confidence interval returned significant results suggesting that each series of data is integrated at the order of $I(1)$ allowing cointegration tests to follow. Cointegration allows the researcher to evaluate thedynamic interactions among various macroeconomic variables and the inward FDI for the case of Nepal. The macroeconomic variables considered include interest rate, inflation, exchange rate, gross domestic product, gross fixed capital formation, and trade openness of Nepal.

J-J Cointegration & VECM

To use the cointegration technique, the lag length needs to be determined in the system.In this paper Schwarz criteria is employed which suggests the lag length of one. The application of vector error correction model (with one lag) provides the following results in which the cointegrating results are presented in table 4.3 and long-run relationships are presented in table 3 respectively. The estimated equation is:

$$FDI = TTRDAE, GFCF, GDP, EXR, CPI, IR$$

Table 3: J-J Cointegration Test

Test Statistics				%5 Critical Value	
H_0	H_1	Max. Eigenvalue	Trace	Max. Eigenvalue	Trace
$r = 0$	$r > 0$	**67.9748***	**201.855***	45.28	124.24
$r = 1$	$r > 1$	**50.5749***	**133.880***	39.37	94.15
$r = 2$	$r > 2$	**35.8270***	**83.3055***	33.46	68.52
$r = 3$	$r > 3$	23.6618	47.1785	27.07	47.21
$r = 4$	$r > 4$	15.4495	23.8166	20.97	29.68
$r = 5$	$r > 5$	8.23439	8.36704	14.07	15.41
$r = 6$	$r > 5$	0.13264	0.13264	3.76	3.76

* Max eigenvalue and trace tests indicate one cointegrating vector at 5%

According to the table above, cointegrating vector among the variables is evident, becausethe value of the maximal eignvalue and trace tests are bigger than the critical values. In addition, when we turn to find out the long run relationship (causality) among the variablesby error correction model, the result obtained indicates a long-run relationship between inward foreign direct investment and other macro variables at 10% level of significance, since the t-statistic of error correction term for inward FDI is -1.77.

Table 4: Error Correction Model Results

Error Correction	d(lfdi)	d(lttrade)	d(lgfcf)	d(lgdp)	d(lexr)	d(lcpi)	d(ir)
ECT t-1	**-0.4361***	0.0009	0.0003	0.0007	0.0044	0.0019	-0.0185
t-statistics	[-1.77]	[0.37]	[-0.20]	[0.92]	[2.53]	[4.09]	[-0.79]

* implies the long run causality

The significance of the error correction term at 10% suggests a long-term relationship (causality) from all variables toward the inward foreign direct investment (Table 4). The value of the coefficient of the error correction term (-0.4361) shows that the deviation of inward FDI from other variables is adjusted by 43.61 percent in long run per year.

In addition, the error correction term for other variables is also obtained and presented in table above. Since VECM is a system, therefore all variables are estimated simultaneouslywhen they are considered as dependent variable. This provides useful information aboutother variables too, but since only inward FDI is the major concern in this study thereforea brief interpretation of other variables are reported here. The value of ECT for trade openness and GDP is positive but not significant. It implies that there is no convergenceamong the variables and there is no long run impact from other variables toward tradeopenness and GDP. The error correction term in the case of gross fixed capital formationis negative but insignificant which implies that FDI, trade openness, GDP, exchange rate, inflation, and interest rate do not exert independent influences on the gross fixed capital formation. The error correction term is positive and significant for exchange rate and inflation rate; indicating that there is no convergence among the variables in long run butthe impact of other variables are significant towards exchange rate and inflation. Finally, inthe case of interest rate, the ECM is negative and insignificant indicating that there is a long run convergence among the variables but that convergence is not significant.

Long Run Coefficients
Since VECM suggested a long run relationship, hence, the long run equation for the longrun relationship among the variables is obtained and it is stated below;

FDI = 4.238 TTRDAE – 89.159 GFCF +117.968 GDP + 44.237 EXR -55.077 CPI +2.724IR
(t-stat)   (0.43).   (-5.25) (5.78)   (2.69)   (-2.20). (3.93)

Several interesting results are notable from the long-run equation. In the long run, expansion in trade seems to be associated with an increase in inward FDI. The long-runassociation between the inward FDI and the gross fixed capital formation is negative whichmeans increase in gross fixed capital formation

131

results decline in the inward FDI. The impact of GDP is positive which implies that when GDP increases, foreign investors will be encouraged to invest in the country. Exchange rate imposes a positive impact on inwardFDI, i.e. rise in exchange rate motivates the foreign investors. This positive impact yield more local currency to the foreign investors. The impact of inflation is negative, i.e. rise in inflation discourages the foreign investors as they might lose some extent of their principal due to inflation. Finally, the impact of interest rate is positive; it means higher interest rate leads higher return on investment that encourages foreign investors.

Short Run Relationship

Short-term causality among the variables can be detected through the VEC model as reported in table 5. In the case of FDI, one period lagged difference of its own is significant, implying the existence of a short-term causality only from its lagged variable. There is no short-term causality in the case of trade openness. However In the case of gross fixed capital formation, the one period lagged difference of trade openness show a short-term causality relationship.

In the case of GDP and exchange rate, only one period lagged difference of exchange rate is significant. For the case of inflation, the one period lagged difference of inward FDI, trade openness, gross fixed capital formation, and also one period lagged difference of its own are significant. Finally, in the case of interest rate, only one period lagged difference of GDP is significant.

Table 5: Short Run Relationship among the Variables

Dep. Variable	d(lfdi)	d(lttrade)	d(lgfcf)	d(lgdp)	d(lexr)	d(lcpi)	d(ir)
				-			
D(fdi(-1))	**-0.5135**	-0.0009	0.0005	0.0000	-0.0011	**-0.0007**	0.0002
	[-3.02]	[-0.56]	[0.409]	[0.01]	[-0.91]	[-2.36]	[0.01]
D(ttrade(-1))	0.7439	-0.2968	**0.3319**	0.0173	0.0284	**-0.1119**	-2.1793
	[0.033]	[-1.313]	[1.972]	[0.227]	[0.178]	[-2.58]	[-1.03]
D(gfcf(-1))	-24.484	0.082868	-0.3812	0.0824	0.1099	**0.3120**	-5.5629
	[-0.742]	[0.246]	[-1.521]	[0.725]	[0.464]	[4.842]	[-1.781]
D(gdp(-1))	15.289	-0.0492	0.1716	0.1075	0.1950	-0.0977	**13.322**
	[0.374]	[-0.118]	[0.553]	[0.765]	[0.665]	[-1.225]	[3.446]
D(exr(-1))	34.664	-0.1907	-0.5572	**-0.7086**	**-0.6429**	-0.1060	1.2324
	[0.843]	[-0.455]	[-1.786]	[-5.012]	[-2.181]	[-1.322]	[0.317]
D(cpi(-1))	1.0506	0.3240	0.1364	0.0432	0.1439	**0.2632**	8.0625
	[0.016]	[0.505]	[0.285]	[0.199]	[0.318]	[2.143]	[1.354]
D(ir(-1))	-0.7390	0.0155	0.0141	0.0095	0.0137	0.0030	0.1814
	[-0.417]	[0.861]	[1.055]	[1.569]	[1.085]	[0.869]	[1.083]
R-squared	0.639	0.116	0.545	0.738	0.400	0.708	0.359
F-statistic	5.764	0.430	3.905	9.180	2.170	7.918	1.821
Akaike AIC	7.832	-1.338	-1.928	-3.511	-2.041	-4.644	3.116
Schwarz SC	8.232	-0.938	-1.528	-3.111	-1.642	-4.244	3.516

* denotes significant at 5%, t-statistics in brackets

Table above provides useful information about short term impacts among the variables. The table show that only one lag of FDI is important in short run in affecting the FDI in Nepal.

Diagnostic Tests
In order to check the robustness of the estimated VECM model, some diagnostic test are implemented here; Portmanteau autocorrelation test and Serial autocorrelation LM test. The null hypothesis for Portmanteau test is "no residual autocorrelation" and for LM test is "no serial autocorrelation". The probabilities' value of the Portmanteau autocorrelation test show that generally models are adequate for estimation. Table 7 depicts the probabilities of the Portmanteau autocorrelation test and since all the probabilities are above 5%, therefore the null hypothesis can be accepted, therefore the model is free from residual autocorrelation. In addition, Table 8 depicts the probabilities of the Serial autocorrelation LM test and since all the probabilities are above 5%, therefore the null hypothesis can be accepted, therefore the model is free from serial correlation.

Table 6: Portmanteau Autocorrelation Test

Lags	Q-stat	Prob.
1	19.20396	NA*
2	53.58106	0.9994
3	92.52611	0.9993
4	133.3108	0.9992
5	180.8779	0.9977
6	219.7206	0.9988

Table 7: Residual Serial Correlation LM Test

Lags	Q-stat	Prob.
1	45.88327	0.6003
2	50.73599	0.4050
3	43.94122	0.6779
4	41.69592	0.7611
5	50.99881	0.3950
6	36.56356	0.9054

CONCLUSION

This paper examined the relationship among the macro variables in Nepal as a developing country to identify the determinants of inward FDI. It was done via employing various time series techniques such as cointegration and error correction model. Results obtained from the study are notable. It was evident that there is a great interaction between FDI and a set of macro variables determining the importance of macro variables' behavior towards inward FDI. What are the policy implications from this study? It is found that the variation in FDI is mainly attributed to interest rate, GDP, and gross fixed capital formation. This is a clear indication to policy makers that they should pay attention to the behavior of these variables. Policies should be designed and aligned to correctly affect those variables.

REFERENCES

Al-Khouri, R. (2015). Determinants of foreign direct and indirect investment in the MENA region. *The Multinational Business Review*, *23*(2), 148-166.

Anuchitworawong, C., & Thampanishvong, K. (2015). Determinants of foreign direct investment in Thailand: Does natural disaster matter?. *International Journal of Disaster Risk Reduction*, *14*, 312-321.

Bekhet, H. A., & Yusop, N. Y. M. (2009). Assessing the relationship between oil prices, energy consumption and macroeconomic performance in Malaysia: co-integration and vector error correction model (VECM) approach. *International Business Research*, *2*(3), 152-175.

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European journal of political economy*, *19*(3), 529-545.

134

Bhattacharya, S. (2012). *Legal Regimes Governing Foreign Direct Investment (FDI) In Host Countries*, *Advocates for International Development,* Available at: http://a4id.org/sites/default/files/user/documents/FDI%20Legal%20Gu   ide.pdf.

Campos, N. F., & Kinoshita, Y. (2002). Foreign direct investment as technology transferred: Some panel evidence from the transition economies. *The Manchester School*, *70*(3), 398-419.

Davletshin, E., Kotenkova, S., & Vladimir, E. (2015). Quantitative and Qualitative Analysisof Foreign Direct Investments in Developed and Developing Countries. *Procedia Economics and Finance*, *32*, 256-263.

Dhakal, D., Pradhan, G., & Upadhyaya, K. P. (2009). Nepal and Bhutan: economic growthin two Shangri-Las. *International Journal of Social Economics*, *36*(1/2), 124-137.

El-Wassal, K. A. (2012). Foreign direct investment and economic growth in Arab countries(1970-2008): An inquiry into determinants of growth benefits. *Journal of Economic Development*, *37*(4), 79-100.

Enders, W. (2004). Applied Econometric Time Series, by Walter.*Technometrics*, *46*(2), 264.

Feridun, M., & Sissoko, Y. (2011). Impact of FDI on economic development: a causality analysis for Singapore, 1976–2002. *International Journal of Economic Sciences andApplied Research*, (1), 7-17.

Froot, K. A. (Ed.). (2008). *Foreign direct investment*. University of Chicago Press.Gillespie, A. (2014). *Foundations of economics*. Oxford University Press, USA.

Gregory, N. F., & Wagle, D. M. (1997). *Foreign direct investment* (Vol. 5). D. R. Weigel (Ed.). World Bank Publications.

Har, W. M., Teo, K. L., & Yee, K. M. (2008). FDI and economic growth relationship: An empirical study on Malaysia. *International Business Research*, *1*(2), 11-18.

Hooda, M. S. (2011). *A study of FDI and Indian Economy* (Doctoral dissertation, National Institute of Technology).

Jadhav, P. (2012). Determinants of foreign direct investment in BRICS economies: Analysis of economic, institutional and political factor. *Procedia-Social and Behavioral Sciences*, *37*, 5-14.

Jing, H. (2010). Empirical Investigation on Foreign Direct Investment and Environmental Pollution: A Simultaneous Equations Approach [J]. *World Economy Study*, *2*, 80-86.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money.*Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.

Kiyota, K., & Urata, S. (2004). Exchange rate, exchange rate volatility and foreign direct investment. *The world economy*, *27*(10), 1501-1536.

Krishna, K.C. (2011). *ARCADA, Foreign direct investment in Nepal. International business 2011,* Available at:https://www.theseus.fi/bitstream/handle/10024/38163/kc_krishna.pdf?sequence=1

Li, X., & Liu, X. (2005). Foreign direct investment and economic growth: an increasingly endogenous relationship. *World development*, *33*(3), 393- 407.

Marchant, M. A., Cornell, D. N., & Koo, W. (2002). International trade and foreign direct investment: Substitutes or complements?. *Journal of Agricultural and Applied Economics*, *34*(02), 289-302.

Masih, A. M., & Masih, R. (1996). Empirical tests to discern the dynamic causal chain in macroeconomic activity: new evidence from Thailand and Malaysia based on a multivariate cointegration/vector error-correction modeling approach. *Journal of Policy Modeling*, *18*(5), 531-560.

Moore, M. O. (1993). Determinants of German manufacturing direct investment: 1980–1988. *Weltwirtschaftliches archiv*, *129*(1), 120-138.

Pain, N., & Van Welsum, D. (2003). Untying the Gordian knot: The multiple links between exchange rates and foreign direct investment. *Journal of Common Market Studies*, *41*, 823-846.

Pradhananga, M. (2007). *A Review of Trade and Industrial Policy of Nepal,* Kathmandu:SWATEE.

Quazi, R. M. (2014). Corruption and Foreign Direct Investment in East Asia and South Asia: An Econometric Study. *International Journal of Economics and FinancialIssues*, *4*(2), 231-242.

Rogmans, T., & Ebbers, H. (2013). The determinants of foreign direct investment in the Middle East North Africa region. *International Journal of Emerging Markets*, *8*(3), 240-257.

Saji, T. G. (2013). Does Foreign Direct Investment Lead Economic Growth in India?. *International Journal of Financial Management*, *3*(2), 38-45.

Sims, C. A. (1972). Money, income, and causality. *The American economic review*, *62*(4),540-552.

Singhania, M., & Gupta, A. (2011). Determinants of foreign direct investment in India. *Journal of international trade law and policy*, *10*(1), 64-82.

Srinivasan, P., Kalaivani, M., & Ibrahim, P. (2011). An empirical investigation of foreign direct investment and economic growth in SAARC nations. *Journal of Asia BusinessStudies*, *5*(2), 232-248.

Solomon, O. H., & Shrestha, S. (2014). Does the Informal Sector Thrive Under Democracy or Autocracy?: The Case of Nepal. *The Journal of Developing Areas*, *48*(3), 245-267.

Srinivasan, P. (2011). Determinants of foreign direct investment in SAARC nations: An econometric investigation. *IUP Journal of Managerial Economics*, *9*(3), 26-42.

Tintin, C. (2013). Foreign Direct Investment Inflows and Economic Freedoms: Evidence from Central And Eastern European Countries.*Advances in Business-Related Scientific Research Journal*, *4*(1), 1-12.

Udoh, E., & Egwaikhide, F. O. (2008). Exchange rate volatility, inflation uncertainty and foreign direct investment in Nigeria. *Botswana Journal of Economics*, *5*(7),14-31.

Vijayakumar, N., Sridharan, P., & Rao, K. C. S. (2010). Determinants of FDI in BRICS Countries: A panel analysis. *International Journal of Business Science & Applied Management*, *5*(3), 1-13.

Villaverde, J., & Maza, A. (2015). The determinants of inward foreign direct investment:Evidence from the European regions. *International Business Review*, *24*(2), 209-223.

Tiwari, A. K., & Mutascu, M. (2011). Economic growth and FDI in Asia: A panel-data approach. *Economic analysis and policy*, *41*(2), 173-187.

Yan, X., & Majagaiya, K. P. (2011). Relationship between Foreign Direct Investment and Economic Growth Case Study of Nepal. *International Journal of Business and Management*, *6*(6), 242-246.