

Foreign Direct Investment, Current and Capital Accounts: A Cointegration Analysis

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Abstract: The current account, capital and financial accounts make up a country's balance of payments. These accounts tell a story about the state of an economy, its economic outlook and its strategies for attaining its foreseen goals. By means of cointegration and VECM approach, this study examines the impact of current and capital accounts on foreign direct investment in South Africa. The cointegration test results reveal the presence of a long run economic relationship amongst the variables implying that they share a common linear. Furthermore, foreign direct investment has a significant and positive relationship with current account and capital account in the short-run. GDP, which was, introduced as a control variable in the system showed an insignificant and negative relationship with foreign direct investment. Apart from contribution to the literature, the findings of this study are valuable for international organisations and the African governments in terms of future policies. The study recommends that the government should continue with the strategy of attracting more foreign investors into South Africa, because the money help boost domestic productivity and thus have a potential to expand the economy.

Keywords: Foreign Direct Investment, Current account, Capital account, South Africa

1. Introduction

The current account, capital and financial accounts make up a country's balance of payments (BOP). Jointly, these three accounts tell a story about the state of an economy, its economic outlook and its strategies for attaining its foreseen goals. A large volume of trade, for example, can show an open economy that supports free trade. On the other hand, a country that shows little international activity in its capital or financial account may have an underdeveloped capital market and little foreign currency entering the country in the form of FDI (Heakal, 2014).

The capital account contains FDI, portfolio and other investments, plus changes in the reserve account and current accounts which are important indicator about an economy's health. It is well defined as the sum of the balance of trade (goods and services exports less imports), net income from overseas and net current transfers. A positive current account balance indicates that while a negative current

account balance indicates the opposite, a current account surplus increases a nation's net foreign assets by the amount of the surplus, and a current account deficit decreases it by that amount. These accounts are the two main components of a nation's balance of payments (Heakal, 2014).

FDI is considered an important source to build up physical capital, create employment opportunities; develop productive capacity and increase skills of local labour and managers through transfer of technology, and integration with rest of the world. FDI inflow is accounted as credit entry in the financial account of BOP thus having direct positive impact on BOP. However, increasing volumes of FDI also increase the size of imports and profits return, (Rehman, Hafeez, Ali & Ahmed, 2010).

In developing countries such inflows may cause exchange rate appreciation (Dutch disease), trade and income account balance failing. These may have serious implications for overall BOPs, foreign exchange reserves and direct investment. Having

to increase the imports over and above exports, countries require much of the US dollars (USD) for payments. Investment income payments to foreigners increase the current account deficit, as they are outflows and thus reduce the capital resources available to the host economy. These investment income flows are affected by the business cycle and display significant volatility. It is this feature that largely prevents FDI from being anti-cyclical and stabilising, due to its effect on the BOPs through the current account (South African Institute of International Affairs (SAIIA, 2013).

The aspect of FDI makes many developing countries vigilant about full financial liberalisation. Some notable examples of economic crises caused by BOPs instability in the wake of financial liberalisation are the 1994 economic crisis in Mexico, known as the "Tequila crises" and the 1997 Asian financial crisis. These economic events are also marked by large current account deficits and fixed exchange rate systems. The South African current account deficit has established a great deal of attention in the past decade. This is not unwarranted as an extended current account deficit is commonly acknowledged as indicating an unsustainable BOPs and this state of affairs, which usually precedes a currency crisis. This decrease causes destruction as exchange rates adjust and make what was before-hand affordable no longer affordable (SAIIA, 2013).

A further result is a mismatch with investors' expectations, which causes them to lose confidence in the economy. Once that occurs, investors will begin to sell their asset holdings, which could be government bonds, stocks and shares in companies. When a country runs a current account deficit, the deficit needs to be financed. Most of the economies around the world including South Africa are still facing liquidity downfalls due to the 2008 financial crisis are trying to control their imports. As a ripple effect, the house prices have been diminishing, along with vehicle sales, manufacturing production has been reduced, the mining sector is shrinking further and retrenchments are on the increase (SAIIA, 2013).

Economic growth was expected to slow-down in South Africa which is a risky proposition for Africa as a whole but luckily, the sound fiscal position was somewhat a cushion to the economic slowdown. On the other hand, lower global demand hurt South Africa's export-sector and the falling rand was

expected to significantly counter such a decrease (Zini, 2008).

The current study examines the impact of current and capital accounts on foreign direct investment in South Africa. Based on the literature survey, it appears as if not many studies are available that has focused on this relationship in the context of South Africa.

2. Literature Review

There is a consensus by most academics that the Mexican Tequila Crisis has been caused by fiscal debts and high current account deficits that were not justifiable (Calvo, 1998). The latter is an important argument of the study, due to its examination of the connection between capital inflows and the current account. Calvo further states that the Mexican current account deficit reached 8% in 1994 and was expected to reach about 9% in 1995. The Tequila Crisis caused a decrease in capital inflows into Central and South America, which consequently affected Argentina through a decline in capital inflows and investments, thus causing a recession (Hausmann & Velasco, 2002).

Given the complexity of this issue, several authors present a variety of positions of this matter. Hossain's (2007) take on this is that the initial impact of an inflow of FDI on BOP is positive but the medium term effect could become either positive or negative as the investors increase their imports of intermediate goods and services, and begin to repatriate profit. Jansen (1995) argued that the impact of FDI on the current account has become complicated by the investment income payments that arise from FDI and Lehman (2002) established that structural change in external accounts of a country takes place due to FDI inflows. Trade openness and host country risks are found to increase affiliate profitability of FDI and earning repatriations are not determined through constant dividend pay-out ratio. Using data for the period 1996-2000 of Brazil and Argentina Lehman observed that FDI was responsible for causing huge income and profit repatriations that had caused current account deficit in both countries.

Woodward (2003) claimed that FDI flows have contributed significantly to current account deficits. Using data of six economies Woodward's results showed that FDI was one of the main factors responsible for current account deficit in these countries.

By making it analogous to loan, the study argued that subsequent repatriation of the capital, from the recipient country, was the same as repayments of loan. Kumar (2007) determined that FDI inflows appeared to be risky for developing countries' economies. FDI being foreign capital, led to capital flight in times of extreme financial crisis. The Kumar concluded that FDI may be accompanied with distress sale of domestic assets and proved harmful for the economy. The profits earned through the investment were ousted to the countries of origin of that foreign investment that had exerted bad impact on current account balance.

The size of FDI seem also to have some impact because Mencinger (2008) points out that the bigger inflow of FDI led to higher current account deficit. This is based on the notion that it drives local competitors out of business, increases import and decreases the efficiency acquired by firms from multinational firms. In addition, Bhagwati (1998) claimed that the impact of FDI on growth appeared to be positive in the case of export promoting countries but not in the case of small developing economies. The study also discovered that the FDI to GDP ratio and current account balance to GDP ratio of eight transition economies had shown a negative relationship.

A few studies have been conducted to examine the nature and direction of causal relationship between FDI inflows and current account balance in case of Pakistan. Several scholars such Siddiqui and Ahmad (2007) and others as also investigated this relationship by focusing on a causal relationship between FDI and current account. Amongst them Demekas *et al.* (2005) concluded that the benefits of FDI had long been recognized for the host countries, including knowledge and technology transfer to domestic firms and the labour force, productivity spill-overs, enhanced competition, and improved access for exports abroad, notably in the source country. Finally, Mohammed (2007) argues that South Africa has experienced high portfolio investments in the last decade. After the advent of constitutional democracy in April 1994, the country experienced a net inflow of capital for the first time in approximately ten years.

3. Research Design and Methodology

The empirical analysis is done by employing the annual time series data (1980 to 2013) of FDI,

current accounts, capital accounts and GDP from South African Reserve Bank. GDP which is used as a proxy for economic growth was introduced as a control variable in the system and the model is presented as follows:

$$\ln FDI_t = \alpha + \beta_1 \ln GDP_t + \beta_2 \ln CurrAccount_t + \beta_3 \ln CapAcc_t + \mu_t \quad (1)$$

where,

- $\ln FDI$ = Foreign Direct Investment
- $\ln GDP$ = Gross domestic product used as a proxy for economic growth
- $\ln CurrAccount$ = Current account
- $\ln CapAcc$ = Capital account

The cointegration and VECM approaches are employed to analyse the long run and short run relationships respectively and the results are presented in section 4.

4. Data Analysis and Results

4.1 Unit Root Tests

This first step of the analysis includes the stationarity testing by means of the Augmented Dickey-Fuller (ADF) test to determine the integrating order of time series variables. The test is used to test for the presence or absence of a unit root in each variable and to determine their order of integration.

The test is based on the following assumptions:

H_0 : unit root exist

H_1 : unit root does not exist,

and the interpretation of the results is based on comparing their *t*-statistics with their critical values:

If $t^* > ADF$ critical values: accept the null hypothesis (there is unit root)

If $t^* < ADF$ critical values: reject the null hypothesis (no unit root)

The results are presented in Tables 1 and 2 respectively. All the variables are transformed logarithms and they were tested on all the models.

Table 1: The Unit Root Test Results at Levels

Variables	Model	ADF Lags	ADF (t-Statistics) $\tau_\tau \tau_\mu \tau$	Critical Value at 5%	Conclusion
Log(FDI)	Trend & intercept	0	-2.850656	-3.552973	Unit root
	Intercept	0	-2.895314	-2.954021	Unit root
	None	0	-2.578822	-1.951332	No unit root
Log(CU)	Trend & intercept	3	-0.748997	-3.568379	Unit root
	Intercept	3	1.161473	-2.963972	No unit root
	None	3	1.816714	-1.952473	No unit root
Log(CA)	Trend & intercept	3	-2.451385	-3.552973	Unit root
	Intercept	3	-2.067349	-2.954021	Unit root
	None	3	-2.109077	-1.951332	No unit root
Log(GDP)	Trend & intercept	3	3.782647	-3.552973	No unit root
	Intercept	3	15.011500	-2.954021	No unit root
	None	3	22.581300	-1.951332	No unit root

Source: Authors

The result from Table 1 shows that logs of FDI, Current account, Capital account and GDP show the existence of unit root, which is means nonstationary at levels except at "None" where they are stationary. This means majority of the models indicate that our variables have a unit root problem at levels thus the null hypothesis is not rejected (unit root does not exist). This calls for first differencing and the results are presented in Table 2 on the next page.

The results from Table 2 show that when the ADF test is applied to variables at first differences all of the variables are stationary in first difference, unit root existing only in GDP at intercept. Thus the null hypothesis of nonstationarity is rejected (no unit root) and the variables are integrated of order one I(1).

4.2 Cointegration Analysis

Once it has been established that the variables are integrated of the same order, the next step was to determine whether there exists a long run equilibrium relationship amongst them. Cointegration describes the existence of an equilibrium or stationarity relationship among two or more times series each of which is individually non-stationary. The advantage of this analysis is that it allows one to integrate the long run and short run relationship between variables within a combined framework.

Two conditions must be met for two or more variables to be cointegrated.

Firstly, they must be integrated of the same order. Secondly, linear combinations of the variables from the regression of the non-stationary variables (in levels form) must be stationary. In this study, maximum likelihood approach is used to test for cointegration. This approach has been shown to be superior to Engle and Granger's (1987) residual-based approach. Among other things, the Johansen approach is capable of detecting multiple cointegrating relationships. These tests are based on the following assumptions:

H_0 : there is no cointegration

H_1 : there is cointegration

The results are presented in Table 3 and the first column of the table provides the tests for hypothesized number of cointegrated equations where the null hypothesis is ranging from "None" number of cointegration relationship ($r = p$) up to "At most 3" cointegrating vectors. The second column gives the eigen values in descending order, while the third and fifth column reports the corresponding trace statistics and max-eigen statistics generated. The fourth and sixth columns report the critical values at the 5% levels.

Table 2: Unit Root Test at First Difference

Variables	Model	ADF Lags	ADF (t-Statistics) $\tau_\tau \tau_\mu \tau$	Critical Value at 5%	Conclusion
Log(FDI)	Trend & intercept	3	-7.978853	-3.557759	No unit root
	Intercept	3	-8.071788	-2.957110	No unit root
	None	3	-8.205215	-1.951687	No Unit root
Log(CU)	Trend & intercept	3	-5.959273	-3.568379	No unit root
	Intercept	3	-5.198946	-2.963972	No unit root
	None	3	-2.210959	-1.952910	No unit root
Log(CA)	Trend & intercept	3	-7.521863	-3.557759	No unit root
	Intercept	3	-6.984808	-2.957110	No unit root
	None	3	-7.651927	-1.951687	No unit root
Log(GDP)	Trend & intercept	3	-3.712678	-3.557759	No unit root
	Intercept	3	-0.740093	-2.957110	Unit root
	None	3	0.426437	-1.951687	No unit root

Source: Authors

The results of the trace test statistic shows the presence of four cointegrating equations and the maximum eigen value statistic indicates the presence of two cointegrating equations at 5% level. The results are based on comparing the trace statistics 84.06471 which is greater than critical value 47.85613, 41.90302 is greater 29.79707, 16.75566 is greater 15.49471 and 6.809936 is also greater than the critical value 3.841466. The max-eigen test results are based on comparing the max-eigen statistics of 42.16170 which is greater than the critical value 27.58434 and 25.14736 is greater than the critical value 21.13162. These results prove that the variables are tangled together in a single way in the long run and there is no unique long run equilibrium relationship. Therefore, the existence of a long run

relationship of the model can be seen within an Error Correction Term (ECT).

4.3 The Estimation of Error Correction Term (ECT)

ECT techniques allow the long run and short run dynamics to be estimated in single step. The constant term of the single error correction framework is a combination of the short run and long run constant. This technique has an advantage as it isolates the speed of adjustment parameter that shows how quickly the system returns to equilibrium after arbitrary shock, (Zellner, 1962).

A 1% increase in current account will lead to a 2.2459% positive change in FDI. This implies that when foreign

Table 3: Johansen Cointegration Test Results (Trace and Max-Eigen Statistics)

Hypothesized No. of CE(s)	Eigen Values	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None	0.732210	84.06471*	47.85613	42.16170*	27.58434
At most 1	0.544270	41.90302*	29.79707	25.14736*	21.13162
At most 2	0.267142	16.75566*	15.49471	9.945723	14.26460
At most 3	0.191691	6.809936*	3.841466	6.809936*	3.841466
Trace test indicates 4 cointegrating equation(s) at the 0.05 level Max-eigen value test indicates 2 cointegrating eqn(s) at the 0.05 level *denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values					

Source: Authors

investors send money into the domestic economy, it must ultimately pay out the returns due to the foreign investors. As such, a deficit may be a result of the claims foreigners have on the local economy (recorded as a debit in the current account). This is due to the fact that they will have to be paid off in the form of returns (dividends, capital gains), which are debits in the current account. Therefore, a deficit could be the result of increased claims by foreign investors, whose money is used to rise local productivity and stimulates the economy.

A 1% rise in capital account will lead to a 0.0120% positive change in FDI. Hence, governments, corporations and individuals are free to invest capital in other countries. This then paves the way not only FDI into industries and development projects, but for portfolio investment in the capital market as well. As a result, companies striving for bigger markets and smaller markets seeking greater capital and domestic economic goals can expand into the international arena, ensuing in a stronger global economy. Portfolio foreign investments can encourage capital-market deregulation and stock exchange volumes. By investing in more than one market, investors are able to diversify their portfolio risk while increasing their returns.

Finally, Table 4 also shows that a 1% change in GDP will lead to a -0.0015% negative change in FDI and that the ECT (-1) is negative and significant which reflects the possibility of correcting the deviation from the long run equilibrium path. Its coefficient is interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to economic growth. Its magnitude is -0.676405 denoting that about 68% of disequilibrium is corrected in subsequent period.

After a test of the ECT was made, the model was taken through a battery of diagnostic tests in the form of histogram and normality test and serial correlation test and stability tests in the form of Ramsey Reset and CUSUM tests.

4.4 Diagnostic Tests

4.4.1 Histogram and Normality Test

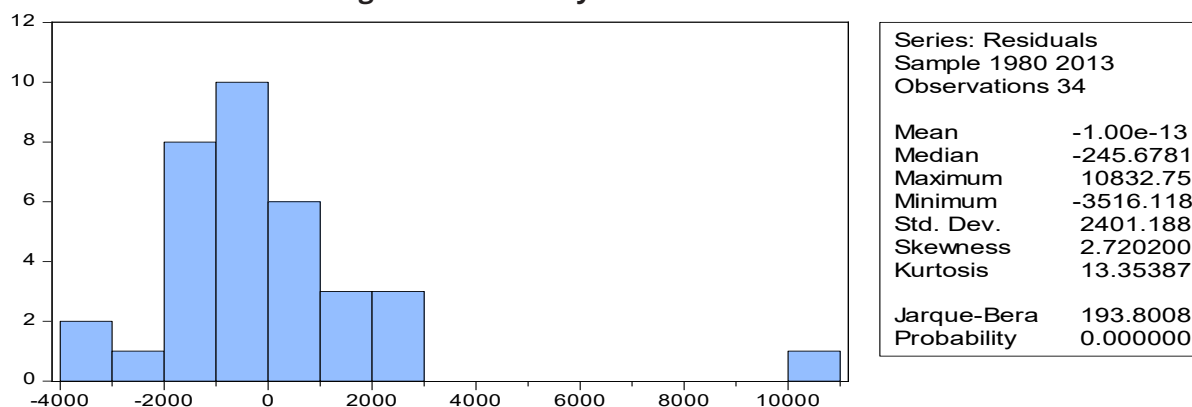
Engle and Granger (1987) show that a properly structured model is determined by using normality test. The test also shows how a random variable can be normally distributed given the underlying data set. In simple terms, the test is a way of choosing a model and can be measured in various ways. In descriptive statistics for example, the test can be employed in order to see the level or percentage of goodness

Table 4: Results of ECT

Variable	Coefficient	Standard Error	t-Statistic
Dlog(CA)	2.245962	1.975303	1.137021
Dlog(CU)	0.012025	0.016580	0.725268
Dlog(GDP)	-0.001518	0.004572	-0.332030
ECT(-1)	-0.676405	0.153162	-4.416273
C	196.4517	572.7901	0.342973

Source: Authors

Figure 1: Normality Test on the Residuals



Source: Authors

of fit of a normal model to the data. The normality test generates a histogram of the residuals, and the Jarque-Bera-statistic for testing their normality. In order to get the skewness and kurtosis, and how they differ with the normal distribution, the Jarque-Bera statistic is employed.

The Jarque-Bera test statistics tests whether the residuals are normally distributed. The null hypothesis is that the residual are not normally distributed and the decision rule is that if $P < 0.05$ level of significance then the null hypothesis should be rejected. In Figure 1, on the previous page, the probability value is 0.000, therefore the study accept the null hypothesis. This means that the residuals are normally distributed for the current study.

4.4.2 Serial Correlation

Table 5 presents the results of the serial correlation on the residuals, from the output of Breusch-Godfrey serial correlation test. The null hypothesis of the test is that there is no serial correlation in the residuals but the probability value of 0.0914 indicates that is rejected. This means that there is no serial correlation in the residuals.

Table 5: Serial Correlation Test on the Residuals

F-statistic	2.609636	Prob. F(2,28)	0.0914
Obs*R-squared	5.341936	Prob. Chi-Square(2)	0.0692

Source: Authors

Table 6: Heteroskedasticity Test: ARCH

F-statistic	0.049943	Prob. F(1,31)	0.8246
Obs*R-squared	0.053079	Prob. Chi-Square(1)	0.8178

Source: Authors

4.4.3 Heteroskedasticity Test

The last diagnostic test undertaken is the heteroskedasticity test which occurs when the variance of the error terms differs across the observations. Its existence is a major concern in the application of regression analysis and the results are presented in Table 6. The ARCH test tests the null hypothesis that there is no heteroskedasticity up to order q in the residual.

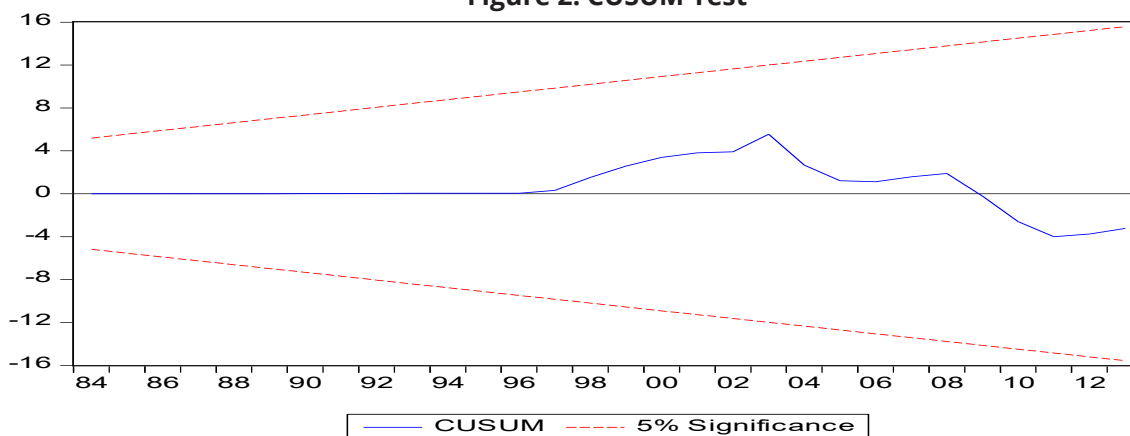
Based on the probability value of 0.8246; the study accepts the null hypothesis. This means that there is no heteroskedasticity up to order q in the residual therefore no problem of misspecification of the second order.

4.5 Stability Tests

4.5.1 CUSUM Test

The stability CUSUM test is applied to evaluate the stability of the long run coefficient together with the short run dynamics. Figure 2 shows CUSUM test from 1980 to 2013 the stability of the parameters remains within the critical bounds of parameter stability.

Figure 2: CUSUM Test



Source: Authors

Table 7: Ramsey Reset Test on Residuals

	Value	Df	Probability
F-Statistic	0.260228	(1.29)	0.6138
Likelihood Ratio	0.303734	1	0.5816

Source: Authors

4.5.2 Ramsey Reset Test

The Ramsey reset test, also known as the regression specification error test is applied as the second stability of the model and the results are presented in Table 7 above.

The p-value from the results is 0.6138 and 0.5816 that are more than the critical p-value=0.05 therefore, the null hypothesis of the misspecification in the model is accepted. This means that the model is statistically well specified and that the residual is normally distributed.

5. Conclusion

The purpose of the study was to determine the impact of current and capital accounts on foreign direct investment in South Africa. The Cointegration analyses suggest that the variables under consideration are cointegrated and hence, share a common linear common trend, that is, they move together in the long run. The ECT was applied to establish the short run and it was established that FDI has a significant and positive relationship with current account and capital account in the short run. GDP was included in the model as a control variable and it showed an insignificant and negative relationship with FDI. Lastly, the results of the diagnostic and stability tests were employed and they proved that the model was statistically acceptable and stable throughout the period.

Based on the results, the study recommends that the government should continue to intensify the strategy of attracting more foreign investment to invest in South Africa. This then paves the way not only for more foreign investment into the industries and development projects, but also for portfolio investment in the capital market as well.

References

- Bhagwati, J. 1998. The capital myth: The difference between trade and widgets in Dollars. *Foreign Affairs*, 77(3):7-12.
- Calvo, G.A. 1998. Capital Flows and Capital Market Crises: The simple economics of Sudden Stops. *Journal of Applied Economics*, 1(1998):35-54.
- Demekas, D.G., Horváth, B., Ribakova, E. & Wu, Yi. 2005. Foreign direct investment in South-eastern Europe: How (and how much) can policies help? IMF Working Paper No. 05/110, European Department, Washington, USA.
- Engle, R.F. & Granger, C.W.J. 1987. Cointegration and error correction: Representation, estimation and testing. *Econometrica*, 55 (2):251-276.
- Hafeez-ur-Rehman, Atif Ali Jaffri, A.A. & Ahmed, I. 2010. Impact of foreign direct investment (FDI) inflows on equilibrium real exchange rate of Pakistan. *South Asian Studies* 25(1):125-141.
- Hausmann, R. & Velasco, A. 2002. The Argentine Collapse: Hard Money's Soft Underbelly (online paper) Available at: <http://www.claaf.org/documents/Hausmen-argentina4.doc>. Accessed May 2017.
- Heakal, R. 2014. Understanding Capital and Financial Accounts in the Balance of Payments. Available at: www.investopedia.com/articles/03/070203.asp.
- Hossain, M.A. 2007. Impact of foreign direct investment on Bangladesh's balance of payments: Some policy implications. Available at: <https://www.bb.org.bd/pub/research/policynote/pn0805.pdf>. Accessed May 2017.
- Jansen, K. 1995. The macroeconomic effects of direct foreign investment: The case of Thailand. *World Development*, 23(2):193-210.
- Kumar, A. 2007. Does foreign direct investment help emerging economies? *Economic Letter*, 2(1):1-8.
- Lehman, A. 2002. Foreign direct investment in emerging markets: Income, repatriations and financial vulnerabilities. IMF Working Paper No. 02/47.
- Mencinger, J. 2008. The "addiction" with FDI and current account balance. Working Paper, International Center for Economic Research (ICER).
- Mohamed, S. 2007. The impact of international capital flows on the South African economy since the end of apartheid (online paper). Available at: http://www.policyinnovations.org/ideas/policy/_library/data/. Accessed June 2017.
- Siddiqui, D.A. & Ahmad, M.H. 2007. The causal relationship between foreign direct investment and current account: An empirical investigation for Pakistan economy. MPRA Paper No. 19743. South African Institute of International Affairs (SAII), 2013. Economic Diplomacy Programme, Occasional Paper no 167.
- Woodward, D. 2003. Financial effect of foreign direct investment in the context of a possible WTO agreement on investment. Presentation to NGO workshop on WTO negotiation on investment and new issues. Geneva, 18-19.
- Zellner, A. 1962. Ancient method of estimating seemingly unrelated regressions and tests of aggregation bias. *Journal of the American Statistical Association*, (57):500-509.