The Impact of Exchange Rate Volatility on Foreign Direct Investment Inflows in BRIC Countries

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September 2020

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Course: Economic Research Seminar

Abstract

In recent years changes in direction of foreign direct investments (FDI) started to attract more attention of economists. In the current economic climate, worldwide there is a competition between the host countries to attract the larger volumes of FDI. One of the main factors influencing FDI inflows in modern world is exchange rate and its volatility. This relationship was widely examined in many developed countries, however there was a little research done that raised this question in BRIC countries. Thus,the main purpose of our research paper was to observe the effect of exchange rate volatility on FDI inflows in BRIC countries. For that purpose we collected the quarterly data of FDI inflows and Nominal Effective Exchange Rates from 2000 to 2019 and use standard deviation of BEER as a measure of volatility. Other macroeconomic variables were also used in our time-series analysis.

During our model specification procedure we used a number of ARDL models based on stationarity level of the variables and concluded that exchange rate volatility indeed has a negative impact on FDI inflows in Russia and China. While referring to India and Brazil we didn't manage to find the significant relationship between FDI inflows and exchange rate volatility. Furthermore, among the other significant factors affecting FDI inflows were Exchange rate movements itself and Inflation in case of Russia, and GDP in case of China.

Keywords: FDI Inflows, Exchange Rate Volatility, Time-series Analysis, ARDL models

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1 Introduction

Financial Capital is an internationally traded commodity, just like goods and services are. International financial capital flows are usually divided into two parts – portfolio investments and direct investments. Portfolio investments are usually up to one year, into stocks or bonds, are easily bought and sold, with minimal transaction costs. Direct investments (FDIs), on the other hand, are for longer than one year and have large transaction costs. FDI is an investment in the form of a controlling ownership in a business in one country by an entity based in another country. FDI is among the biggest drivers of innovation and productivity because apart from financial capital, FDIs generate a lot of advanced knowhow and expertise.

In recent years changes in direction of foreign direct investments (FDI) started to attract more attention of economists. In the current economic climate, worldwide there is a competition between the host countries to attract the larger volumes of FDI. The BRIC countries (Brazil, Russia, India and China), as the most developed economies from the emerging economies, offers to foreign investors a number of benefits such as young and cheap labor force, natural resources and big markets.

There have been several studies that tried to determine the factors that influence FDI inflows into various developed and developing economies. One of such factors that recently have been a source of debate is exchange rate and its volatility. The theoretical arguments linking volatility to FDI have been divided between production flexibility arguments and risk aversion arguments. According to production flexibility arguments, exchange rate volatil-

ity increases foreign investment because firms can adjust the use of one of their variable factors following the realization of nominal or real shocks. According to the risk aversion theory, FDI decreases as exchange rate volatility increases. This is because as investors are concerned with future expected profits, firms will postpone their decision to enter as the exchange rate becomes more volatile.

A survey of past studies on this topic yields negative, positive, and indeterminate effects. Tokunbo and Lloyd (2009) empirically investigated the impact of exchange rate volatility on inward FDI of Nigeria. Using cointegration and error correction techniques, they confirmed positive relationship between recipient currency depreciation and FDI inflows while exchange rate volatility has no deterministic effect which is incorporated through standard deviation of exchange rate. Ullah, Zeeshan and Azim (2012) investigated the relationship of FDI and exchange rate volatility. The study demonstrated that FDI is positively associated with Rupee depreciation and exchange rate volatility deters FDI.

Justification for a negative impact of exchange rate volatility on FDI is that a direct investment in a country with a high degree of exchange rate volatility will have a more risky stream of profits (Dixit and Pindyck (1994)). Serven (2003) based on a cross country sample data and a GARCH measure of exchange rate volatility finds a highly significant and negative relationship between exchange rate volatility and FDI beyond some level showing the ability and willingness of investors to take risk to some level with a pertinent compensation. However, the impact has not been similar across countries and had been found to be more pronounced with a higher level of volatility

and high degree of economic openness which aggravates the impact of the exchange rate shock.

When coming to BRIC countries, the focus of literature on FDI and its determinants happens to ignore exchange rate volatility as one of its determinants. The common variables under consideration to have a possible impact on FDI considered by most researchers are market size (measured by GDP or GDP per capita), degree of economic openness, political instability, infrastructure development and inflation (Biyase and Rooderick(2018), Pravin Jadhav (2012), Singh, Chauhan and Pandey(2012), Paula Nistor(2015), Mumtaz Hussain Shah Zahid Ali(2016)). The impact of exchange rate volatility on FDI, however, remains less explored. There was only one study conducted by Danqing Wang in 2013, which explored the long-run and short-run relationship between exchange rate volatility and foreign direct investment in BRIC countries. However, it used the time-series analysis on the annual data and the sample size were extremely small.

The previous literature is expanded in the following ways.The impact of exchange rate volatility on foreign direct investment inflows in developed countries had been widely documented in earlier empirical economic literature (Cushman 1988, Dixit, Aizenman 1992),however, it remains less explored in countries across the BRIC countries. The majority of existing literature had explored the relationship between exchange rate volatility and FDI using time-series analysis for individual countries on annual data , while in our study we we have tried to investigate the relationship by using quarterly seasonally adjusted data for BRIC countries, which also includes recent years' data. Moreover, as an exchange rate measure we took Nominal effec-

tive exchange rate, while the majority of the previous literature used national currency units per US dollar.

2 Data and Methodology

The data used in this analysis consists of time series quarterly seasonally adjusted data from 2000 - 2019 for the BRIC countries namely Brazil, Russia India and China. The main data sources for the selected variables are FRED, OECD and IMF datasets.

The dependent variable in our study is the FDI inflows which are taken in million constant 2010 US dollars and the main independent variable is Exchange Rate Volatility. In looking for exchange rate volatility data, the monthly BEER figure has been used and the data for volatility generated from the natural logarithmic figures of the BEER. The standard deviations of the monthly exchange rate changes are applied to estimate the exchange rate volatility for all countries.

Based on the discussed literature review, our study estimates a set of potential determinant variables that influence the FDI inflows as a control independent variables. The control independent variables in our estimation include GDP per capita for market size, Inflation rate for Macroeconomic stability, and Trade Openness.

We took GDP per capita as a determinant of FDI inflows as it is expected that high and increasing economic growth is an indication of growing market size in the host country. This implies an increasing local demand for goods and services in a host country some of which can only be produced by inter-

national firms. The second explanatory variable is inflation.First of all, lower inflation leads to macroeconomic stability and reduce uncertainty in the host country. Secondly, lower inflation reduces real interest rate, making it easy for international firms to raise capital in the host country. Trade openness index determines the total volume of trading into the GDP and show the extent to which the host economy is open toward the entry and exit of goods and services. It is obvious that the more the economy is open toward the entry and exit of goods and services, the incentives of foreign direct investment will increase.

In the scope of our analysis we used ARDL or ECM models depending on the stationarity level of our variables.

3 Results

In order to conduct the best model for our time-series analysis we have proceeded with the following steps. First of all, we have adjusted the variables for seasonality.After that,we have checked the stationarity of the variables both by inspecting it visually and by the Augmented Dickey Fuller test after choosing the appropriate number of lags. Then,based on the stationarity level of the variables we have conducted the best suited ARDL model, as in all countries' cases we have both I(1) and I(0) variables.Additionally, we have used the logarithmic transformations for FDI inflows,GDP and Broad Effective Exchange rate in order to have comparable scales.

3.1 *Russia*

After the conducting stationarity tests we have gotten that ln(FDI), ln(BEER), ln(GDP) and Inflation are non- stationary and integrated of order 1 (I(1)), while the Exchange rate Volatility and Trade Openness measures are the stationary variables. We can also observe it from the Figure 1.

Let's look at the Russian exchange rate volatility over the years(See Figure 2).

As we can observe the Russian exchange rate volatility has peaked between 2008 and 2009, also between 2015 and 2016. The reason that exchange rate volatility in Russia had a such peak between 2008 and 2009 was a crisis during 2008–2009 in the Russian financial markets as well as an economic recession that was compounded by political fears after the war with Georgia and by the plummeting price of Urals heavy crude oil, which lost more than

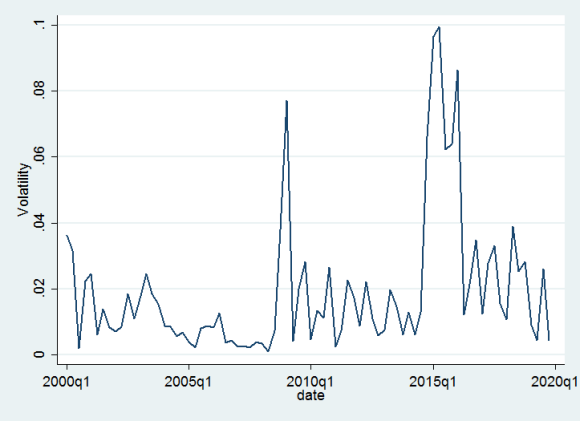

Figure 1: Nominal Effective Exchange Rate Volatility

70 percent of its value since its record peak of US$147 on 4 July 2008 before rebounding moderately in 2009. From July 2008 – January 2009, Russia's foreign exchange reserves (FXR) fell by $210 billion from their peak to $386 billion as the central bank adopted a policy of gradual devaluation to combat the sharp devaluation of the ruble.

The reason for such a performance in 2015-2016 was the financial crisis in Russia in 2014–2015 which was the result of the sharp devaluation of the Russian ruble beginning in the second half of 2014. A decline in confidence in the Russian economy caused investors to sell off their Russian assets, which led to a decline in the value of the Russian ruble and sparked fears of a Russian financial crisis. The lack of confidence in the Russian economy stemmed from at least two major sources. The first is the fall in the price of oil in 2014. Crude oil, a major export of Russia, declined in price by nearly 50% between its yearly high in June 2014 and 16 December 2014. The second is the result of international economic sanctions imposed on Russia following Russia's annexation of Crimea and the Russian military intervention in

Ukraine.

After running several regression models for choosing the appropriate level of lags, we have stopped on ARDL(2,4,4,3,4,2) model(See Figure 4).

As we can observe from the output, our main explanatory variable (Volatility of exchange rate) has a significant and negative impact on the FDI inflows at the first and positive effect at the second lag. Investors usually look at previous period volatility as Russia's exchange rate is quiet unstable and people prefer to look at recent trends rather than historical performance as the latter has informational limitations. Among the other variables that have a significant negative impact on FDI inflows are Exchange rate movements itself at 2nd and 4th lag, Inflation and FDI inflows in previous quarters.1 unit increase in the depreciation rate of the ruble 2 and 4 month before will lead to deacrease in FDI inflows growth rate by 0.75 and 6.53 respectively.

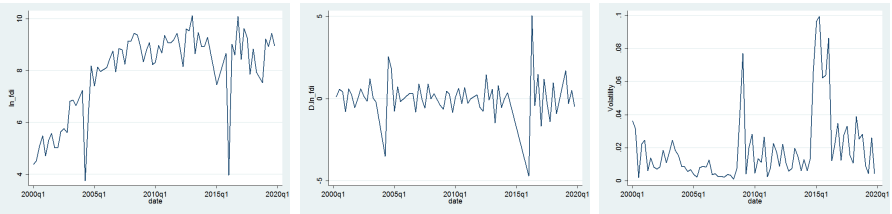

Figure 2: FDI Inflows and BEER Volatility

Note: Visually checking for the stationarity. Here lnfdi and D.lnfdi are the logarithm of FDI inflows and its first difference respectively.Volatility is the quarterly volatility of BEER. The graphs for the rest of the variables see in Appendix.

Source	SS	df	MS	Number of obs	=	55
				F(19, 35)	=	2.48
Model	17.1669983	19	.903526225	Prob > F	=	0.0098
Residual	12.7736945	35	.364962701	R-squared	=	0.5734
				Adj R-squared	=	0.3418
Total	29.9406928	54	.554457274	Root MSE	=	.60412

D.ln_fdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_fdi						
LD.	-.5309265	.1377796	-3.85	0.000	-.810634	-.2512189
L2D.	-.1352098	.0961193	-1.41	0.168	-.3303423	.0599227
ln_exch						
LD.	-.7533147	3.907261	-0.19	0.848	-8.685475	7.178846
L2D.	7.965101	4.490592	1.77	0.085	-1.151286	17.08149
L3D.	-2.106749	3.969781	-0.53	0.599	-10.16583	5.952334
L4D.	-6.836259	3.776596	-1.81	0.079	-14.50316	.8306384
Inflation						
LD.	.1299807	.0819389	1.59	0.122	-.0363641	.2963255
L2D.	.0457209	.0803144	0.57	0.573	-.1173261	.2087678
L3D.	-.1990673	.0774911	-2.57	0.015	-.3563826	-.041752
L4D.	-.001163	.0760645	-0.02	0.988	-.1555822	.1532561
ln_gdp						
LD.	-1.322471	1.469205	-0.90	0.374	-4.305116	1.660174
L2D.	-1.401813	1.80455	-0.78	0.442	-5.065245	2.261619
L3D.	1.603312	1.960465	0.82	0.419	-2.376644	5.583267
Volatility						
L1.	-23.03456	13.26891	-1.74	0.091	-49.97187	3.90275
L2.	23.93581	11.69789	2.05	0.048	.1878237	47.6838
L3.	9.125523	13.08113	0.70	0.490	-17.43058	35.68163
L4.	-16.48095	11.13201	-1.48	0.148	-39.08013	6.118238
Openness						
L1.	4.610866	5.709726	0.81	0.425	-6.980494	16.20223
L2.	-.2697509	4.931651	-0.05	0.957	-10.28154	9.742034
_cons	-1.475194	1.238839	-1.19	0.242	-3.990171	1.039783

Figure 3: Regression Output for Russia

3.2 *China*

After conducting stationarity tests we have gotten that ln(FDI), ln(BEER), ln(GDP) and Openness are non- stationary and integrated of order 1 (I(1)), while the Exchange rate Volatility and Inflation measures are the stationary variables. We can also observe it from the Figure 3. If we look to the chinese exchange rate volatility dynamics over the years we can observe that it was also more volatile during the financial crises and because of the sunctions put on China in 2018-2019(See Figure 4).

As we have a mix of both I(1) and I(0) variables we have turned to ARDL model. After running several regression for choosing the appropriate level of lags, we have stopped on ARDL(4,4,4,4,4,4) model. See the results output in Figure 2.

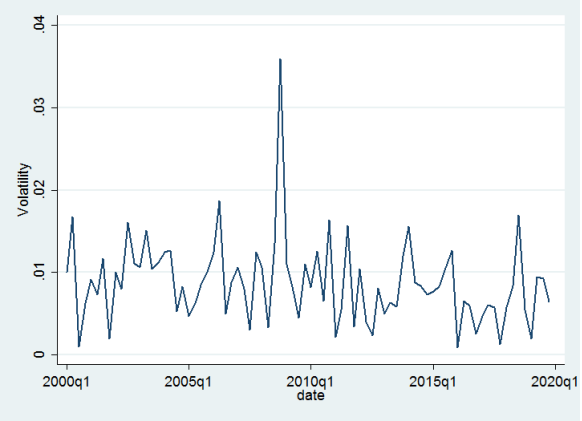

Figure 4: Nominal Effective Exchange Rate Volatility

As we can observe from the output, our main explanatory variable (Volatility of exchange rate) has a significant and negative impact on the FDI inflows at the first lag(1 unit increase in the previous quarter's volatility of exchange rate will lead to the decrease in the growth rate of FDI inflows by 16,3). The result is somehow logical and is consistent with previous researches , as direct investment in a country with a high degree of exchange rate volatility will have a more risky stream of profits. Among the other variables that have a significant impact on FDI inflows are the GDP and FDI inflows in previous quarters.

Note: Visually checking for the stationarity. Here lnfdi and D.lnfdi are the logarithm of FDI inflows and its first difference respectively.Volatility is the quarterly volatility of BEER. The graphs for the rest of the variables see in Appendix.

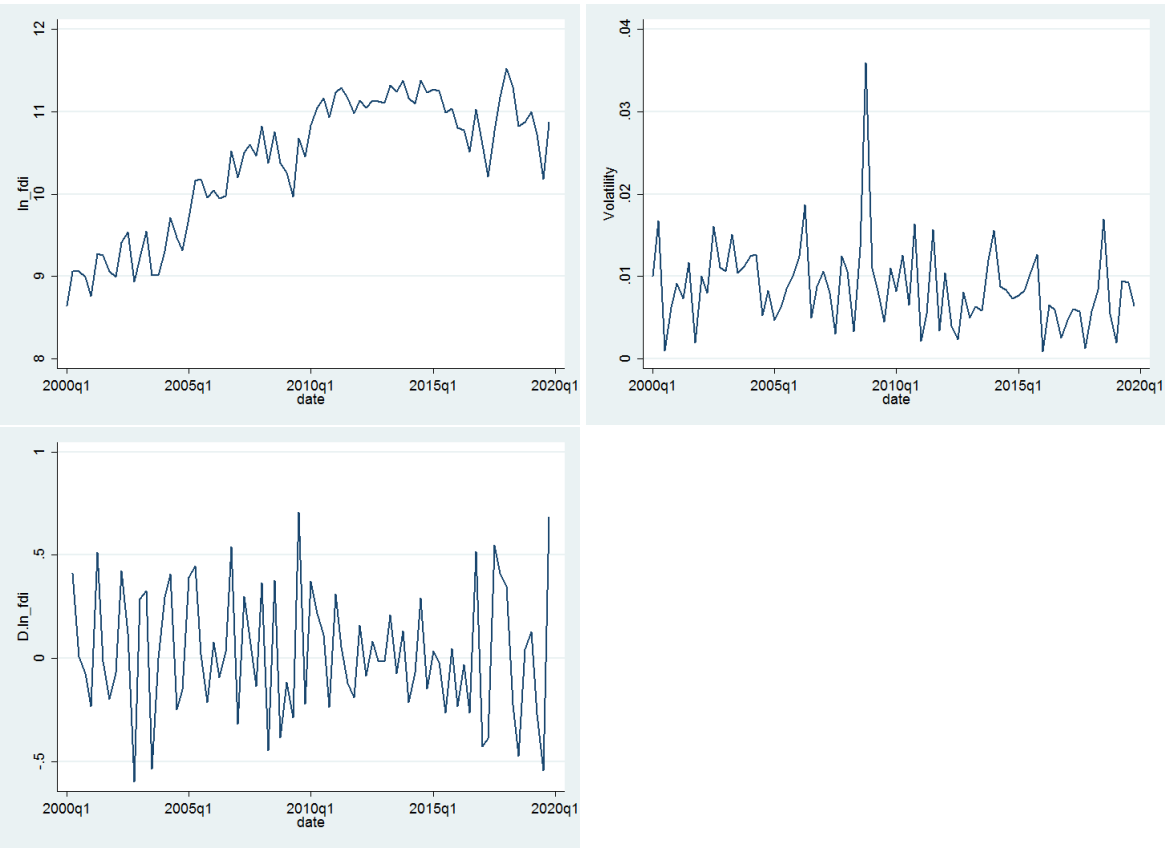

Figure 5: FDI Inflows and BEER Volatility

Note: We have taken the differences for non-stationary variables and the levels for stationary variables.FDI inflows and GDP are in constant $US.Exchange rate is also in nominal terms.

Source	SS	df	MS	Number of obs	=	75
				F(24, 50)	=	1.90
Model	3.34786464	24	.13949436	Prob > F	=	0.0277
Residual	3.66442686	50	.073288537	R-squared	=	0.4774
				Adj R-squared	=	0.2266
Total	7.01229149	74	.094760696	Root MSE	=	.27072

D.ln_fdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_fdi						
LD.	-.7336786	.1595771	-4.60	0.000	-1.054199	-.4131585
L2D.	-.6636995	.1873531	-3.54	0.001	-1.040009	-.2873897
L3D.	-.4816757	.1874796	-2.57	0.013	-.8582396	-.1051117
L4D.	-.0644303	.1592229	-0.40	0.687	-.3842389	.2553783
ln_exch						
LD.	-.3672265	2.06914	-0.18	0.860	-4.523217	3.788764
L2D.	.1997563	2.293185	0.09	0.931	-4.406241	4.805754
L3D.	-2.222132	2.344772	-0.95	0.348	-6.931745	2.48748
L4D.	.2164087	2.206606	0.10	0.922	-4.215691	4.648508
Inflation						
L1.	-.0233529	.0491861	-0.47	0.637	-.1221462	.0754404
L2.	-.040344	.0701334	-0.58	0.568	-.1812111	.1005232
L3.	-.018678	.069628	-0.27	0.790	-.15853	.121174
L4.	-.0061663	.0507831	-0.12	0.904	-.1081673	.0958346
ln_gdp						
LD.	3.559764	1.159415	3.07	0.003	1.23101	5.888517
L2D.	3.083007	1.174894	2.62	0.011	.7231633	5.442851
L3D.	2.296027	1.206896	1.90	0.063	-.1280948	4.720148
L4D.	3.271933	1.272799	2.57	0.013	.7154421	5.828424
Volatility						
L1.	-16.30545	7.52094	-2.17	0.035	-31.41171	-1.1992
L2.	-3.526748	7.52388	-0.47	0.641	-18.63891	11.58541
L3.	-7.014731	7.396088	-0.95	0.347	-21.87021	7.840748
L4.	-4.679083	7.164274	-0.65	0.517	-19.06895	9.710785
Openness						
LD.	2.016823	1.881673	1.07	0.289	-1.762629	5.796275
L2D.	.8016079	1.933966	0.41	0.680	-3.082878	4.686094
L3D.	-.7539698	1.890868	-0.40	0.692	-4.55189	3.04395
L4D.	1.684996	1.72087	0.98	0.332	-1.771474	5.141466
_cons	.0925075	.1281562	0.72	0.474	-.1649017	.3499168

Figure 6: Regression Output for China

3.3 *India and Brazil*

After conducting stationarity tests we have gotten that all the variables except the Volatility are non- stationary and integrated of order 1 (I(1)) both in case of Brazil and India(See Appendix).

After running several regression for choosing the appropriate level of lags, we however didn't manage to find the model with the significant explanatory variables(See Appendix). FDI inflows in these countries were only explained by the previous periods FDI inflows.

4 Conclusion

The impact of exchange rate volatility on Foreign Direct Investment Inflows have been a common research topic among many scientists. In the scope of our research we have tried to examine this relationship in BRIC countries by applying time-series analysis with an ARDL model. The results of our analysis showed that the impact of exchange rate volatility on FDI inflows differs among taken countries. To be more precise, in case of Russia and China we have found the significant and negative relationship between exchange rate volatility and FDI inflows. Such results are consistent with previous findings and the risk aversion theory, which states that as investors are concerned with future expected profits, firms will postpone their decision to enter as the exchange rate becomes more volatile. Furthermore, among the other significant factors affecting FDI inflows were Exchange rate movements itself and Inflation in case of Russia, and GDP in case of China. On the other hand, we didn't find any significant relationship between exchange rate volatility and FDI inflows in case of India and Brazil. The only significant explanatory variables were the FDI inflows in previous periods.

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B Appendix

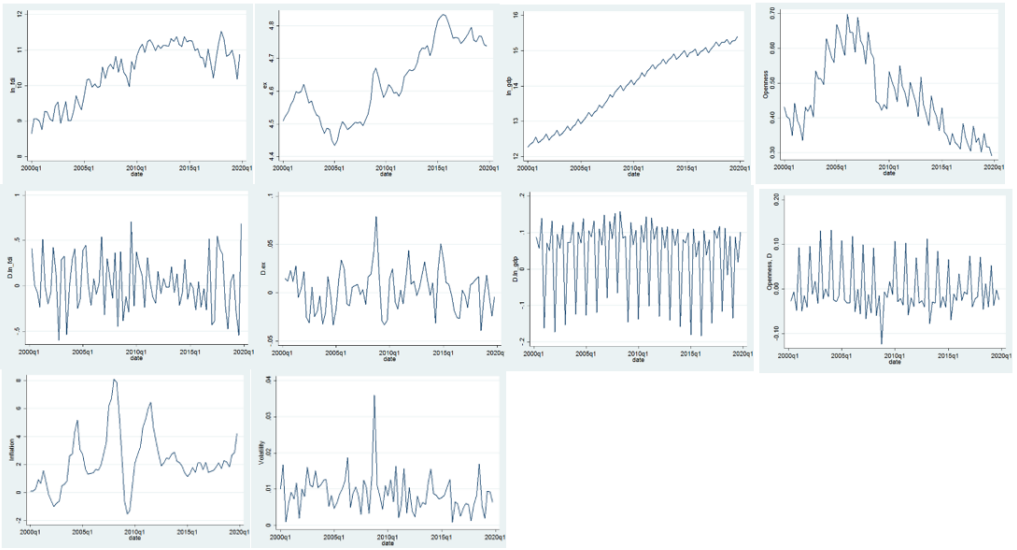

Figure 7: Time series plot of variables for China

```
. dfuller ln_fdi , regress lags(4)

Augmented Dickey-Fuller test for unit root         Number of obs   =        75

                     ------------ Interpolated Dickey-Fuller ------------
                Test         1% Critical       5% Critical      10% Critical
              Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.036           -3.545            -2.910           -2.590
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2712

------------------------------------------------------------------------------
      D.ln_fdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------------+--------------------------------------------------------------
       ln_fdi |
          L1. |   -.0874842   .0429766    -2.04   0.046    -.1732201   -.0017483
          LD. |   -.3328634   .1177182    -2.83   0.006    -.5677047   -.0980221
         L2D. |    -.304221   .1257557    -2.42   0.018    -.5550968   -.0533452
         L3D. |   -.1320829   .1273232    -1.04   0.303    -.3860858     .12192
         L4D. |    .1400683   .1201468     1.17   0.248    -.0996181    .3797547
              |
       _cons |    .9534552   .4499509     2.12   0.038     .0558277    1.851083
------------------------------------------------------------------------------

.  dfuller D.ln_fdi , regress lags(4)

Augmented Dickey-Fuller test for unit root         Number of obs   =        74

                     ------------ Interpolated Dickey-Fuller ------------
                Test         1% Critical       5% Critical      10% Critical
              Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.081           -3.546            -2.911           -2.590
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0010

------------------------------------------------------------------------------
     D2.ln_fdi |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
---------------+--------------------------------------------------------------
       ln_fdi |
          LD. |  -1.665714   .4081521    -4.08   0.000    -2.480168   -.8512587
          LD2.|    .310249   .3674172     0.84   0.401    -.4229206    1.043419
         L2D2.|  -.0069507   .2948555    -0.02   0.981    -.5953256    .5814243
         L3D2.|  -.1396505   .2103888    -0.66   0.509    -.5594748    .2801739
         L4D2.|  -.0039676   .1252556    -0.03   0.975    -.2539113     .245976
              |
       _cons |   .0358045   .0345614     1.04   0.304    -.0331617    .1047707
------------------------------------------------------------------------------
```

Figure 8: Augmented Dickey Fuller for FDI inflows in China

```
. dfuller Volatility , regress lags(0)

Dickey-Fuller test for unit root                    Number of obs   =        79

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -8.098            -3.539            -2.907           -2.588
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------------------------------------------------------
D.Volatility |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  Volatility |
         L1. |  -.9208856   .1137141    -8.10   0.000    -1.147319   -.694452
             |
       _cons |   .0080788   .0011606     6.96   0.000     .0057678    .0103899
------------------------------------------------------------------------------
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Figure 9: Augmented Dickey Fuller for Exchange rate volatility of China

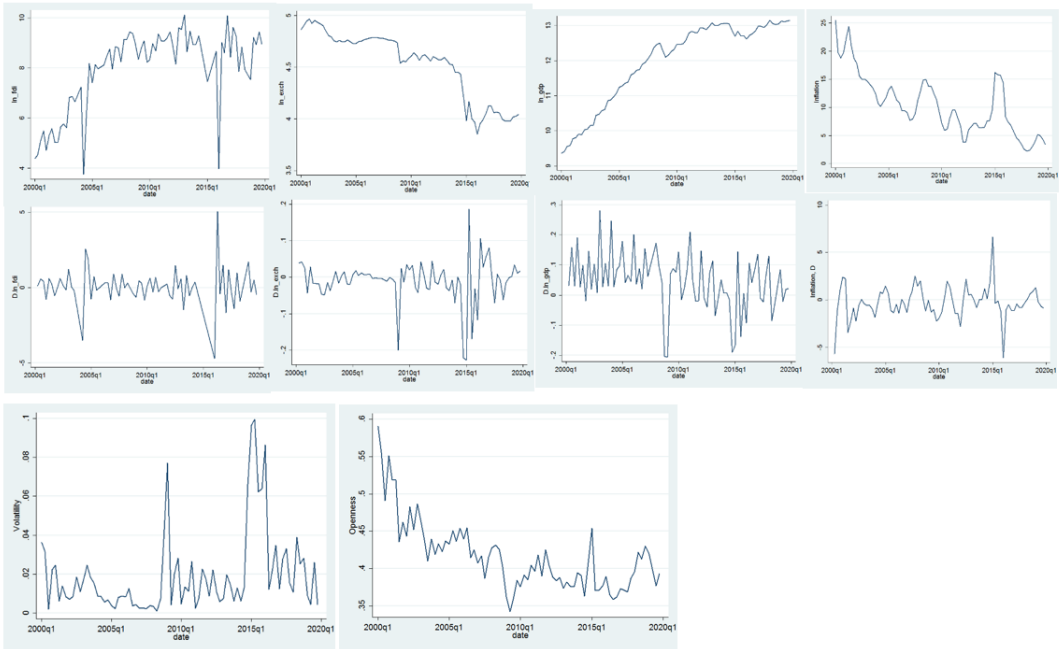

Figure 10: Time series plot of variables for Russia

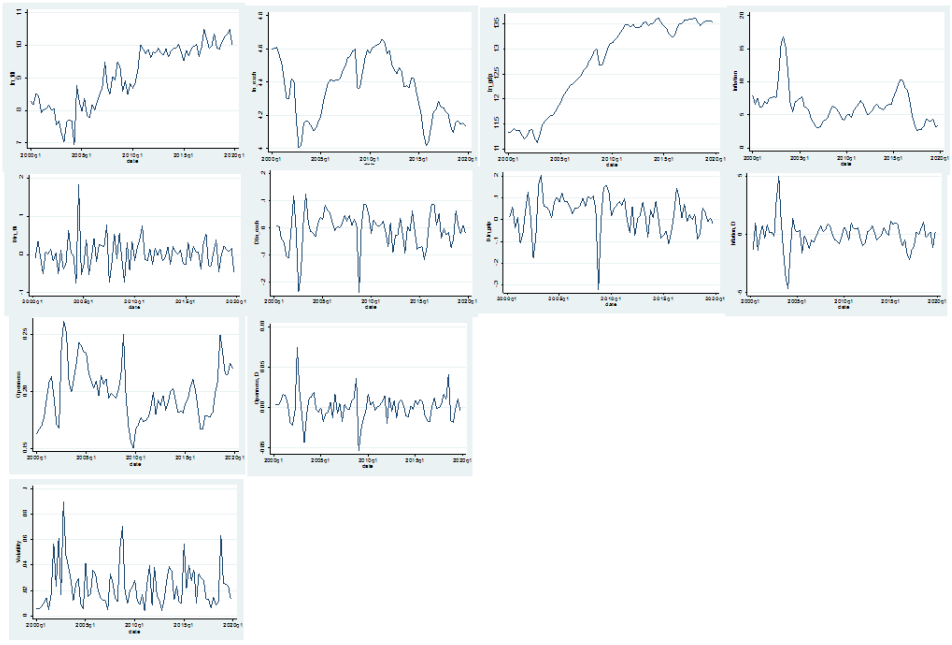

Figure 11: Time series plot of variables for Brazil

Source	SS	df	MS	Number of obs	=	75
				F(24, 50)	=	1.67
Model	5.09654509	24	.212356045	Prob > F	=	0.0631
Residual	6.35504904	50	.127100981	R-squared	=	0.4451
				Adj R-squared	=	0.1787
Total	11.4515941	74	.154751272	Root MSE	=	.35651

D.ln_fdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_fdi						
LD.	-.5318079	.1285698	-4.14	0.000	-.7900479	-.2735678
L2D.	-.4678386	.1460527	-3.20	0.002	-.7611941	-.1744832
L3D.	-.3283163	.1481232	-2.22	0.031	-.6258305	-.030802
L4D.	-.2005853	.134732	-1.49	0.143	-.4712025	.0700319
ln_exch						
LD.	3.589077	2.639302	1.36	0.180	-1.712116	8.89027
L2D.	-1.196886	3.198348	-0.37	0.710	-7.620958	5.227185
L3D.	-.8899596	3.014625	-0.30	0.769	-6.945012	5.165093
L4D.	2.073915	2.557499	0.81	0.421	-3.062974	7.210804
Inflation						
LD.	.0053181	.0642122	0.08	0.934	-.123656	.1342921
L2D.	-.1232289	.0683236	-1.80	0.077	-.260461	.0140031
L3D.	.0469729	.0688936	0.68	0.499	-.091404	.1853498
L4D.	-.0200303	.0544338	-0.37	0.714	-.1293639	.0893032
ln_gdp						
LD.	-1.384366	1.932956	-0.72	0.477	-5.266823	2.498091
L2D.	1.156024	2.282934	0.52	0.606	-3.999384	5.771432
L3D.	2.421869	2.16293	1.12	0.266	-1.914512	6.778251
L4D.	-1.404061	1.877741	-0.75	0.458	-5.175615	2.367494
Volatility						
L1.	-2.813046	3.120184	-0.90	0.372	-9.08012	3.454029
L2.	-.0349535	3.245283	-0.01	0.991	-6.553296	6.483389
L3.	-.5996448	3.002975	-0.20	0.843	-6.631298	5.432008
L4.	1.263677	3.009259	0.42	0.676	-4.780598	7.307951
Openness						
LD.	6.782338	4.573959	1.48	0.144	-2.404728	15.9694
L2D.	3.229826	4.672187	0.69	0.493	-6.154537	12.61419
L3D.	6.996333	4.558492	1.53	0.131	-2.159667	16.15233
L4D.	10.68277	4.164122	2.57	0.013	2.31888	19.04665
_cons	.0913783	.1486939	0.61	0.542	-.2072822	.3900388

Figure 12: Regression output for Brazil

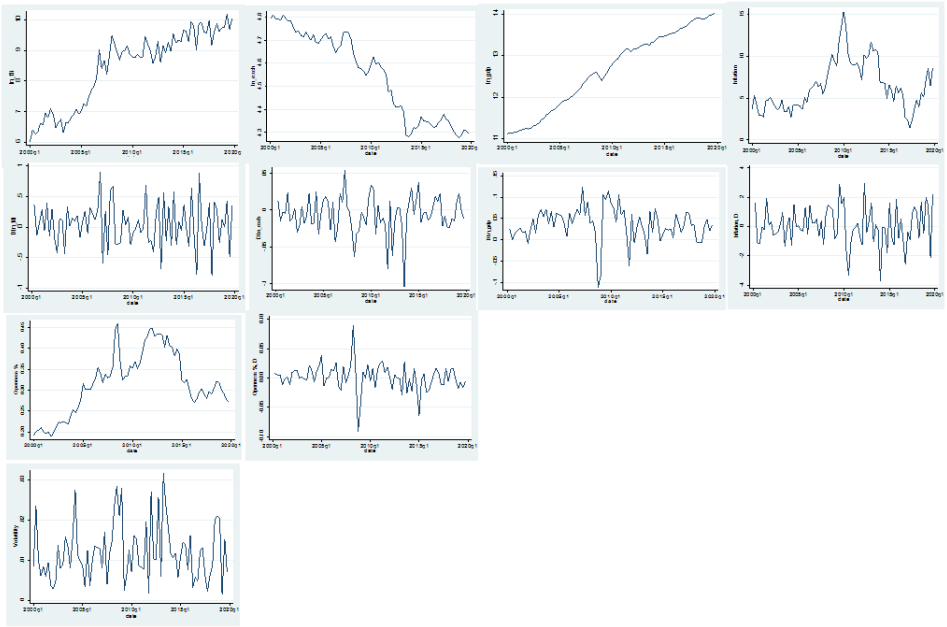

Figure 13: Time series plot of variables for India

Source	SS	df	MS	Number of obs	=	76
				F(14, 61)	=	1.83
Model	3.01029197	14	.215020855	Prob > F	=	0.0547
Residual	7.17983295	61	.11770218	R-squared	=	0.2954
				Adj R-squared	=	0.1337
Total	10.1901249	75	.135868332	Root MSE	=	.34308

D.ln_fdi	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_fdi						
LD.	-.5445099	.1296128	-4.20	0.000	-.8036867	-.2853332
L2D.	-.3397417	.1472825	-2.31	0.024	-.6342512	-.0452322
L3D.	-.1222479	.1428472	-0.86	0.395	-.4078885	.1633927
ln_exch						
LD.	.6303978	2.223546	0.28	0.778	-3.815857	5.076653
Inflation						
LD.	-.0007745	.0347724	-0.02	0.982	-.0703062	.0687573
ln_gdp						
LD.	.4381391	1.58379	0.28	0.783	-2.728844	3.605122
L2D.	.3720387	1.300137	0.29	0.776	-2.227745	2.971823
Volatility						
L1.	2.115792	6.452541	0.33	0.744	-10.78686	15.01844
L2.	1.159229	6.574819	0.18	0.861	-11.98793	14.30639
L3.	-1.856886	6.382101	-0.29	0.772	-14.61869	10.90491
L4.	-.2730189	6.243542	-0.04	0.965	-12.75775	12.21172
Openness						
LD.	-1.800074	2.545185	-0.71	0.482	-6.889487	3.289338
L2D.	1.000766	2.056445	0.49	0.628	-3.111349	5.112882
L3D.	-2.781907	2.190234	-1.27	0.209	-7.161551	1.597737
_cons	.0615129	.144728	0.43	0.672	-.2278886	.3509144

Figure 14: Regression output for India