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PANEL COINTEGRATION AND GRANGER CAUSALITY APPROACH TO FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN SOUTH ASIAN COUNTRIES

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ABSTRACT

The aim of this study is to examine the long run equilibrium relationship between FDI, growth rate and economic growth in the developing countries of South Asia. Data was collected from the United Nations Conference on Trade and Development and World Bank Development Indicator from 1990 to 2017. However, Johansen Fisher Panel Cointegration and Pairwise Dumitrescu Hurlin Panel Causality Tests were utilized to address the objective of this paper. Consequently, it was discovered that a long run equilibrium relationship exists between FDI, growth rate of economy and economic growth in the developing countries of South Asia within the period under consideration. Moreover, there is an existence of unidirectional causality running from both growth rate and economic growth to FDI inflows in these countries. This implies that whenever the target of the policy makers in these economies is to facilitate the sporadic inflows of foreign capital, expanding the market size and manipulating the rate of economic growth would induce an increase in FDI inflows in the long run. Finally, the important findings that emerged in this work made this paper to recommend the following vital policy for the policy makers, investors, financial institutions regulators and future researchers. Therefore, the policy makers in the developing countries of South Asia should come up with the strategic policy measure that will expand the market size and ensure a sustainable growth rate in this sub region.

KEYWORDS: FDI, Market Size, Growth Rate, Cointegration, Granger Causality and South Asia

1. INTRODUCTION

The sporadic inflows of foreign direct investment in the developing countries of Asian continent has been a subject of interest among scholars in the last decade. The stock of FDI inflows has risen by 25% from 2008 to 2017 in this region of the world. (UNCTAD, 2018). It is worth of note that the developing economies of the South and Southeast Asia have been declared as the highest recipients of global FDI inflows among comity of developing countries. (UCTAD, 2016, UNCTAD, 2018). However, in the South Asia sub region, the inflows of FDI have been observed to be consistent in the last decade. The global investment report of UNCTAD shows that some countries like India, Bangladesh, Iran, Pakistan and Sri Lanka in this region have registered exceptional performance in attracting cross border investment. The statistics from this report indicates that from 2010 to 2017, these countries have improved their FDI inflows by 45.5%, 135.6%, 37.5%, 38.8%, and 187.8% respectively.

Consequently, it is undeniable fact that investment is one of the principal variables that derives economic growth. Robert Solow underscored this argument by enunciating that capital is a necessary condition for economic growth. It has been established in the literature that FDI inflows has the propensity to propel the productive capacity of the host economy through the technology transfer, market competition, acquisition of skills, employment generation and inducing living standard. Meanwhile, the rate of economic growth in South Asia has been impressive in the recent time. The average growth rate of majority of the countries in this region has been observed to surpass the developed economies in the last decade. However, despite the fact that the developing countries of Asia have been a focal point of research in the last couple of years, but South Asian sub region is yet to get enough research attention about FDI among scholars relative to other developing regions in

the globe. (Bimal, 2017). In the same vein, it has been observed that the bulk of recent FDI research in this region focuses on the determinants of this cross border investment. See Tiwari and Mutasque (2011), Azam (2010), Sahoo (2006), Minhas and Ahsan (2015), and Mottaleb and Kalirajan (2010). Having identified this gap in the literature, there is a compelling need to examine and validate the nature of relationship that exists between FDI and economic growth in South Asia. In order to contribute to the exiting literature, this study would move the frontiers of knowledge by examining the nexus between FDI inflows and economic growth in 5 major countries of South Asia, namely India, Bangladesh, Iran, Pakistan and Sri Lanka.

2. EMPIRICAL LITERATURE REVIEW

The literature on FDI in developing countries, emerging countries and developed countries are presented in this section of the paper as follows.

Wei (2005) critically investigated the variables that propel FDI inflows in China and India. The author concluded that the factors that derive FDI inflows in India are lower country risk, cheaper cost of labor, geographic closeness to OECD countries, and cultural similarity. The study also established that what caused the wide gap between FDI inflows in China and India was the China had the capacity to attract much higher FDI from OECD countries because the country has larger market size and higher external trade relation with OECD countries. In another perspective, Carcovic and Levin (2000) utilized Ordinary Least Square model in estimating the relationship between FDI and economic growth in 72 developing economies from 1960 and 1995. The results from the study concluded that FDI and economic growth did not have a significant relationship in the countries under study. While examining a comparative analysis of FDI inflows performances in BRICS countries and other two emerging countries in Asian continent from 1990 to 2017, Aderemi et al (2018:1) applied Ordinary Least Square model to validate that the key determining variables of FDI inflows in Chinese economy are growth rate, GDP per capita growth and large market size. Meanwhile, in countries like Brazil, India, South Africa, Singapore and Hong Kong, market size has been identified as the major factor that derived inflows of FDI in these economies. Also, GDP per capita growth in both Russia and South Africa has been concluded to be an insignificant factor that caused inflows of FDI inflows

However, Agrawal et al. (2011) used modified growth model and Ordinary Least Square model to analysis how FDI and economic growth are related in China and India from 1993 to 2009. The authors established that the larger market size of the Chinese economy is the major reason why the foreign investors have more interest in china than India. In another study, Frenkel et al (2004) adopted gravity model and panel data analysis to estimate FDI inflow between major developed countries and twenty-two emerging nations. It was concluded from the paper that the principal variable that derives how FDI flows within these countries are the distance and characteristics of both home and host economies. While examining factors that propel FDI inflows in Indonesia, India and Pakistan from 1971 to 2005, Azam (2010) used OLS and Log Linear Regression Models to establish that external debt, market size, domestic investment, trade openness and physical infrastructure are the principal determinants of FDI inflows in these countries. It was noticed from the reported results that Pakistan and India are similar, when trade openness and government consumption are put in isolation but the results from Indonesia was not correlated with the reported variables that propel FDI India and Pakistan.

Consequently, Falki, (2009) examined the relationship between FDI and economic growth in Pakistan between 1980 and 2006 with the aid of Ordinary Least Square. The result that emanated from the paper submitted that there is an insignificant inverse relationship between FDI and GDP of the country. In another perspective, Aderemi et al (2018:2) critically analyzed the determining factors of FDI inflows in China and the US from 2002 and 2017 with the aid of OLS modeling. It was discovered from the study that FDI inflows is principally driven by the market size of the US economy but GDP per capita growth was the major variable that derived China FDI inflows on the other hand. Atique et al, (2004) applied Eangle Granger and Hansen models to posit that the contribution of FDI inflows to the economy is more than exports. Similarly, Zhang (2001) analyzed FDI inflows and economic growth in 11 high-income and low-income developing economies in East Asia and Latin America with the adoption of Johansen cointegration test, the error-correlation model and the Granger causality test. The author submitted that the effect of FDI in the host economies is country-specific. The paper also confirmed that the inflows of FDI have propensity to propel the growth of East Asian economies if these economies are opened via external trade, development of human capital and education improvement. When using panel data analysis, Hudea and Stancu (2012) estimated the link that exists between technology transfer, foreign direct investments and economic growth in seven East European countries from 1993 to 2009. The researchers established that in both short run and long run FDI and economic growth have a positive relationship in those European nations.

Moreover, Kim and Seo (2003) examined the linked between FDI and economic growth and domestic investment in Korea economy from 1959 to 1999 with the application of vector auto regression model. It was discovered from the study that the relationship between FDI and economic growth is positive and significant. It was also concluded that domestic investment did not crowd out by the inflows of FDI as well. Mallick and Moore (2008) analyzed a panel data of 60 developing countries between the periods of 1970 and 2003. It was discovered from the study that the inflows of FDI has a significant positive impact on economic growth in all high income groups. However, the opposite was the result of lower income group. In the same vein, Chang (2007) concluded that there was no causal relationship between inflows of FDI and economic growth in Taiwan when estimating the Johansen cointegration test, the multivariate error correction model, and the Granger causality to assert that no causal relationship existed between FDI inflows and economic growth in Taiwan. Tiwari and Mutasque (2011) investigated how FDI and economic growth are related in Asian countries from 1986 to 2008 with the panel data analysis. The author submitted that the principal variables that propel economic growth in these countries are FDI, Labor, capital and exports. However, the reviewed of the empirical literature so far established that the researches on FDI inflows and economic growth are ongoing especially in the emerging countries of Asia, and the literature is yet to reach a consensus about the nature of the relationship that exists between these variables. Hence, the relevance of this study.

2.1 An Overview of South Asian Countries

Table 1: Annual GDP Growth Rate between 1990 and 2017

Year/Country	Bangladesh	India	Sri Lanka	Pakistan	Iran
2007	4.8	9.8	6.8	4.8	8.2
2008	1.7	3.7	6	1.7	0.3
2009	2.8	8.5	3.5	2.8	1
2010	1.6	10.3	8	1.6	5.8
2011	2.7	6.6	8.4	2.7	2.6
2012	3.5	5.5	9.1	3.5	-7.4
2013	4.4	6.4	3.4	4.4	-0.2
2014	4.7	7.4	5	4.7	4.6
2015	4.7	8.2	5	4.7	-1.3
2016	5.5	7.1	4.5	5.5	13.4
2017	5.7	6.6	3.1	5.7	4.3
Average	3.8	7.3	5.7	3.8	2.1

Source: WDI, 2018

In the last decade, the average growth rates in India and Sri Lanka have been observed to be higher than those of the developed economies. Indian economy has the highest growth rate among the selected countries, followed by Sri Lanka. The economic growth rate in Bangladesh and Pakistan have a similar indicator. Meanwhile, the Iran came last among the selected countries.

Table 1: Percent of FDI inflows Increment in the Last Decade

Year/Country	Bangladesh	India	Sri Lanka	Pakistan	Iran
2007-2017	135.6%	45.5%	187.8%	38.8%	37.5%

Source: UNCTADstat, 2018

The rate at which the inflows of cross border investment has risen in the respective countries under investigation has been presented in the table above. It could be pinpointed that Sri Lanka`s FDI inflows have risen by the highest percentage in the last decade, followed by Bangladesh, India and Pakistan respectively. Iran registered the least percentage increment among the selected countries. It is worth of note that, Sri Lanka was the first economy in the South Asian sub region to liberalize its national economy to the global community in 1977. This liberalization made the country to adopt a series of policy measures such as the rationalization of public expenditure, export promotion, liberalization of trade policy and exchange rate system, and incentives to investment. It has been observed that from the advent economic liberalization till now, Sri Lanka has remained one of the most outward oriented economies in the sub region. This has been one of the critical

factors that has contributed to FDI inflows in the country. Similarly, in the early 80s, India commenced reforming the structure of its economy. In 1991, aggressive privatization and liberalization policies began in the country due to the balance of payment and foreign exchange liquidity problem disrupted the economy in that year. Subsequently, a number of policies has been introduced in the country to ensure the integration of the economy with the rest of the world. In the same vein, in 2002, India embarked on the second phase of economy reforms tagged second generation reforms with a view to reducing the fiscal deficit, reforming labor laws and invigorating the states involvement in the active economy management and improving infrastructural facilities.

Moreover, the country of Bangladesh was not left behind when it comes to economic reformation. The country embarked on the landmark economic reforms in the 1980s and early 90s. The initial reform took place in Bangladesh through the advent of the structural adjustment programme which was sponsored by the World Bank and the IMF. The World Bank structural and sectoral adjustment loans (SALs and SECLs) was introduced in the country. Later, a three-year IMF sponsored structural adjustment facility (SAF) was equally implemented in 1986. However, this policy measure sparked off the advent of various policy initiatives in 1990s, such as agricultural policy, privatization and public enterprise reforms, trade and industrial policy fiscal policy reform and financial sector reform.

Furthermore, Pakistan took its first step to liberalize its investment policies in 1984. The country made an industrial policy statement that ensures an equal opportunity to the public and private sectors in the country. Therefore, the introduction of foreign private investment, joint equity participation of foreign and local investors in the areas of managerial and technical skills, marketing expertise and advanced technology was incorporated in the country to boost participation of foreign investors in the country. In order to facilitate sporadic inflows of cross border investment in this country, a new industrial policy package came on board in 1989 with a mandate to recognize crucial impact of the private sector in propelling investment in the country. As a result of this, a series of regulatory measures were put in place to generally improve the business environment so that FDI could be attracted in the country. Within the period, the Board of Investment (BOI) was set up in conjunction with the PM's secretariat, with a mandate to create platforms that will serve as attraction to foreign investors in the economy. Within the period Pakistan had signed bilateral agreements on the promotion and protection of investment with 46 countries which later caused sporadic inflows of FDI in the country.

Moreover, in 2000s, Iran liberalized its investment regulation. As a result of this, FDI inflows in this economy has been moving in towards few strategic industries of the economy such as vehicle manufacturing industries, oil and gas industries, petrochemical and pharmaceutical industries and copper and mining industries. Between 1992 and 2009, approximated 485 projects with values of US$34.6 billion of cross border investment has been received by the Iranian economy. In conclusion, in the past few decades, the developing countries of South Asia have been liberalizing their economies on a continuous basis with aggressive policy changes in their macroeconomic variables, competitive FDI and trade policies so that a friendly investment climate that would catalyze the emergency of foreign investors in the country could be created.

3. METHODOLOGY

This paper makes use of secondary data from 1990 to 2017. Data on FDI were got from UNCTAD investment report of the World Bank. Meanwhile, data on other macroeconomic variables such as GDP and growth rate of the economy were extracted from World Bank Development Indicator.

3.1 Estimation Techniques

This study employs the Augmented Dickey Fuller (ADF) and Philips-Perron (PP) unit root tests, Johansen co-integration test and panel granger causality. All these estimation techniques were used to examine the nature of relationship that exists between FDI and economic growth in the selected countries. Consequently, the stationary of a variables is a crucial factor to consider in analysis of the variables because it can influence their performance in such a way that a spurious result can emanate from the study. However, if the time series variables possess unit roots, this means that the variables might drift away in the short run and converge in the long run if they are cointegrated. This is the idea behind the cointegration technique put forward by Johansen and Juselius (1990). Moreover, attempt to examine the feedback effect among the variables of interest led to the estimation of the causal relationship between the variables with the adoption of a recently-developed panel causality test, known as Dumitrescu and Hurlin (2012) causality test. The linear panel causality model can demonstrated as follows:

$$GDP_{it} = \alpha_0 + \sum_{i=0}^{p} \alpha_1 FDI_{it-1} + \sum_{i=0}^{p} \alpha_2 GRT_{it-1} + \sum_{i=0}^{p} \alpha_3 GDP_{it-1} + U_{1it} \text{ - - - - - - - (I)}$$
$$GRT_{it} = \gamma_0 + \sum_{i=0}^{p} \gamma_1 FDI_{it-1} + \sum_{i=0}^{p} \gamma_2 GRT_{it-1} + \sum_{i=0}^{p} \gamma_3 GDP_{it-1} + U_{2it} \text{- - - - - - - - (II)}$$
$$FDI_{it} = \beta_0 + \sum_{i=0}^{p} \beta_1 FDI_{it-1} + \sum_{i=0}^{p} \beta_2 GRT_{it-1} + \sum_{i=0}^{p} \beta_3 GDP_{it-1} + U_{3it} \text{- - - -- - - (III)}$$

Where
GDP is used to proxy economic growth.
GRT denotes growth rate of economy.
FDI is used to represent the inflows of foreign direct investment in the selected countries.
U_{1it}, U_{2it} and U_{3it} connote error terms, p is the lag length and t = 1990……..2107.
While i =1….5.

The countries selected for this study are Sri Lanka, India, Bangladesh, Islamic Republic of Iran and Pakistan. The availability of the relevant data for this study motivated the choice of these countries among other countries in the South Asia sub region.

3.2 Result and Discussion

Table 3: Panel Unit Root Test

Variables	Panel ADF Test			Panel PP Test		
	Level	First Difference	Remarks	Level	First Difference	Remarks
RGDP	0.00499 (1.0000)	3.04145 (0.9804)	I (2)	9.2E-05 (1.0000)	4.60724 (0.9158)	I (2)
GRT Rate	28.1301 (0.0017)	-------	I (0)	33.3979 (0.0002)	---------	I (0)
FDI	0.00378 (1.0000)	27.9792 (0.0018)	I (1)	4.2E-06 (1.0000)	48.6062 (0.0000)	I (1)

Source: Authors' Computation, 2018. ( ) Figures in parentheses represent P-values

Table III presents the outcomes of unit root tests of GDP, growth rate and FDI with the application of both Panel Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The reported results from the above tables indicate that growth rare, FDI and real GDP are I(0), I(1) and I(2) variables concurrently. In another words, variables FDI and real GDP possess a unit root, and consequently stationary after first differencing and second differencing simultaneously. However, in an attempt to examine a long run equilibrium relationship among these variables, this study employed Johansen Fisher Panel Cointegration Test.

Table: IV: Johansen Fisher Panel Cointegration Test

Trend assumption: Linear deterministic trend
Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	21.72	0.0166	26.28	0.0034
At most 1	4.631	0.9145	5.857	0.8271
At most 2	3.069	0.9798	3.069	0.9798

* Probabilities are computed using asymptotic Chi-square distribution.

Individual cross section results

Cross Section	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.**
Hypothesis of no cointegration				
1	26.5205	0.1139	19.9611	0.0722
2	26.5205	0.1139	19.9611	0.0722
3	26.5205	0.1139	19.9611	0.0722
4	26.5205	0.1139	19.9611	0.0722
5	26.5205	0.1139	19.9611	0.0722
Hypothesis of at most 1 cointegration relationship				
1	6.5594	0.6294	6.4455	0.5567
2	6.5594	0.6294	6.4455	0.5567
3	6.5594	0.6294	6.4455	0.5567
4	6.5594	0.6294	6.4455	0.5567
5	6.5594	0.6294	6.4455	0.5567
Hypothesis of at most 2 cointegration relationship				
1	0.1139	0.7357	0.1139	0.7357
2	0.1139	0.7357	0.1139	0.7357
3	0.1139	0.7357	0.1139	0.7357
4	0.1139	0.7357	0.1139	0.7357
5	0.1139	0.7357	0.1139	0.7357

**MacKinnon-Haug-Michelis (1999) p-values
Source: Authors` Computation, (2018)

Johansen Fisher Panel Cointegration Test was estimated and its results were presented in the table above. The reported results show that we have the presence of two cointegrating vectors in the systems. Taken a critical look at both the trace statistics and the maximal eigenvalue statistics one could establish that the system possesses two cointegrating vectors in the model (at a lag interval of 1 to 1. This implies that the variables of interest namely, FDI, growth rate and economic growth in the South Asian economies possess a long run equilibrium relationship with one another, though the variables might adjust to short run disequilibrium via the same model. This finding supports the conclusion from the works of Zhang (2001) and Mutasque (2011).

Table 5: Pairwise Dumitrescu Hurlin Panel Causality Tests
Sample: 1990 2017
Lags: 4

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
FDI does not homogeneously cause GRT	3.46518	-0.63393	0.5261
GRT does not homogeneously cause FDI	1.00795	-1.98821	0.0468
RGDP does not homogeneously cause GRT	6.72328	1.16175	0.2453
GRT does not homogeneously cause RGDP	5.75341	0.62722	0.5305
RGDP does not homogeneously cause FDI	1.41927	-1.76151	0.0582
FDI does not homogeneously cause RGDP	7.39708	1.53311	0.1252

Source: Authors` Computation (2018)

The table above shows that estimated results from the panel Granger causality test. This test was carried out to establish the nature of feedback effect that exists among the variables of interest in this study. Consequently, it could be validated that there is unidirectional causality which runs from growth rate to FDI inflow in the South Asian sub region. Similarly, the

study also confirms that a unidirectional feedback effect exists from economic growth to FDI inflow in the selected countries. This confirmed the submission of Chakraborty and Basu (2002) and contradicted the finding of Chang (2007) who discovered a contradictory result among developing economies. However, there is no granger causality between economic growth and growth rate in the studied economies. The implication of these results is that the market size and the growth rate of these countries are important variables that propel the inflows of cross border investment in this sub region.

3.3 Conclusion and Recommendation

In this study, we examined a long run equilibrium relationship that exists between FDI, growth rate and economic growth in the developing countries of South Asia from 1990 to 2017 with the application of Johansen Fisher Panel Cointegration and Pairwise Dumitrescu Hurlin Panel Causality Tests. Consequently, the results that originated from this paper could be summarized as follows: there is an existence of a long run equilibrium relationship between these important economic variables FDI, growth rate of economy and economic growth in the developing countries of South Asia within the period under consideration. The economic implication of this finding is that FDI, growth rate and economic growth possess a great tendency to converge in the long run in these countries. However, the market size and the growth rate of the sub regional economies are the major variables among others that causing the inflows of cross border investment in these countries. It is important to state that as market size expands in this sub region, the growth rate rises and consequently brings about further inflows of FDI to the sub regional economies in the long run. Moreover, there is an existence of unidirectional causality running from both growth rate and economic growth to FDI. This implies that whenever the target of the policy makers in these economies is to facilitate the sporadic inflows of foreign capital, expanding the market size and manipulating the rate of economic growth would induce an increase in FDI inflows in the long run. Finally, the important findings that emerged in this work made this paper to recommend the following vital policy for policy makers, investors, financial institutions regulators and future researchers. Therefore, the policy makers in the developing countries of South Asia should come up with the strategic policy measure that will expand the market size and ensure a sustainable growth rate in this sub region.

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Appendix

Countries	RGDP	FDI	Year	GRT
Bangl	4.12087E+12	500000	1990	4.5
Bangl	4.32945E+12	400000	1991	5.1
Bangl	4.66307E+12	100000	1992	7.7
Bangl	4.74504E+12	200000	1993	1.8
Bangl	4.92238E+12	200000	1994	3.7
Bangl	5.16666E+12	1700000	1995	5
Bangl	5.41707E+12	12500000	1996	4.8
Bangl	5.47202E+12	3100000	1997	1
Bangl	5.61157E+12	3000000	1998	2.6
Bangl	5.81696E+12	1000000	1999	3.7
Bangl	6.06476E+12	2000000	2000	4.3
Bangl	6.185E+12	20600000	2001	2
Bangl	6.38443E+12	4100000	2002	3.2
Bangl	6.69384E+12	6200000	2003	4.8
Bangl	7.18708E+12	5700000	2004	7.4
Bangl	7.73813E+12	3300000	2005	7.7
Bangl	8.21616E+12	3600000	2006	6.2
Bangl	8.61323E+12	21000000	2007	4.8
Bangl	8.75978E+12	9300000	2008	1.7
Bangl	9.00783E+12	29300000	2009	2.8
Bangl	9.15255E+12	15400000	2010	1.6
Bangl	9.4041E+12	1300000	2011	2.7
Bangl	9.73391E+12	43400000	2012	3.5
Bangl	1.01619E+13	33700000	2013	4.4
Bangl	1.06369E+13	44500000	2014	4.7
Bangl	1.11401E+13	45500000	2015	4.7
Bangl	1.17558E+13	40500000	2016	5.5
Bangl	1.2426E+13	169800000	2017	5.7
Iran	2.98339E+15	56000000	1990	13.8
Iran	3.35283E+15	18000000	1991	12.4
Iran	3.44787E+15	30700000	1992	2.8
Iran	3.48373E+15	-132500000	1993	1
Iran	3.43107E+15	9300000	1994	-1.5
Iran	3.50939E+15	2300000	1995	2.3
Iran	3.69094E+15	79100000	1996	5.2
Iran	3.70873E+15	80100000	1997	0.5
Iran	3.7895E+15	63400000	1998	2.2
Iran	3.82192E+15	193800000	1999	0.9
Iran	4.04581E+15	1100000	2000	5.4
Iran	4.07732E+15	5000000	2001	0.8
Iran	4.37355E+21	15200000	2002	7.3

Iran	4.75557E+15	-325700000	2003	8.7
Iran	4.9636E+15	104600000	2004	4.4
Iran	5.12193E+15	414600000	2005	3.2
Iran	5.37801E+15	148400000	2006	5
Iran	5.81663E+15	358600000	2007	8.2
Iran	5.83122E+15	202200000	2008	0.3
Iran	5.88997E+15	95600000	2009	1
Iran	6.23146E+15	23900000	2010	5.8
Iran	6.39633E+15	257600000	2011	2.6
Iran	5.92015E+15	135600000	2012	-7.4
Iran	5.90866E+15	189200000	2013	-0.2
Iran	6.18066E+15	3400000	2014	4.6
Iran	6.09904E+15	119700000	2015	-1.3
Iran	6.91608E+15	104100000	2016	13.4
Iran	7.21347E+15	0	2017	4.3
India	23071504286994.000000	237000000	1990	5.5
India	2331533119638.800000	75000000	1991	1.1
India	24593569986299.200000	252000000	1992	5.5
India	25761955460783.900000	532000000	1993	4.8
India	27477424513181.000000	974000000	1994	6.7
India	29558699790865.700000	2151000000	1995	7.6
India	31790240408052.400000	2525000000	1996	7.5
India	33077688192066.400000	3619000000	1997	4
India	35123349973741.500000	2633000000	1998	6.2
India	38230275657288.000000	2164000000	1999	8.8
India	39698697164542.200000	3588000000	2000	3.8
India	42613748923002.600000	5478000000	2001	4.8
India	43196725662289.900000	5630000000	2002	3.8
India	46592153084250.800000	4321000000	2003	7.9
India	50283623010574.100000	5778000000	2004	7.9
India	54952369217676.000000	7622000000	2005	9.3
India	60043137336202.100000	20328000000	2006	9.3
India	65928181583992.000000	25350000000	2007	9.8
India	68493418821509.300000	47102000000	2008	3.9
India	74301512721173.400000	35638000000	2009	8.5
India	81924820482771.100000	27417000000	2010	10.3
India	87363288108910.200000	36190000000	2011	6.6
India	92130167685994.300000	24196000000	2012	5.5
India	98013698221771.100000	28199000000	2013	6.4
India	105276736344243.000000	34582000000	2014	7.4
India	113861448881148.000000	44064000000	2015	8.2
India	121960056325858.000000	44481000000	2016	7.1
India	130038967447739.000000	39916000000	2017	6.9
Pak	4120870732100.000000	200000	1+E86:E141990	4.5

Pak	4329451396300.000000	-400000	1991	5.1
Pak	4663074497200.000000	-1200000	1992	7.7
Pak	4745039581800.000000	-200000	1993	1.8
Pak	4922381429100.000000	100000	1994	3.7
Pak	5166659980300.000000	0	1995	5
Pak	5417066355900.000000	700000	1996	4.8
Pak	5472016861100.000000	-2400000	1997	1
Pak	5611566111700.000000	5000000	1998	2.6
Pak	5816956880400.000000	2100000	1999	3.7
Pak	6064764363100.000000	1100000	2000	4.3
Pak	6184997348200.000000	3100000	2001	2
Pak	6384424256500.000000	2800000	2002	3.2
Pak	6693838139700.000000	1900000	2003	4.8
Pak	7187078379700.000000	5600000	2004	7.4
Pak	7738133547300.000000	4400000	2005	7.7
Pak	8216160000000.000000	109000000	2006	6.2
Pak	8613232000000.000000	98000000	2007	4.8
Pak	8759778000000.000000	49000000	2008	1.7
Pak	9007825000000.000000	71000000	2009	2.8
Pak	9152553000000.000000	47000000	2010	1.6
Pak	9404102000000.000000	35000000	2011	2.7
Pak	9733907000000.000000	82000000	2012	3.5
Pak	10161854000000.000000	212000000	2013	4.4
Pak	10636891000000.000000	122000000	2014	4.7
Pak	11140138000000.000000	25000000	2015	4.7
Pak	117558241000000.000000	52000000	2016	5.5
Pak	12425979000000.000000	67000000	2017	5.7
SriLank	2330467880461.100000	800000	1990	6.4
SriLank	2437669105700.000000	4500000	1991	4.6
SriLank	2544926333100.000000	1600000	1992	4.4
SriLank	2720527859800.000000	6900000	1993	6.9
SriLank	2872875208900.000000	8300000	1994	5.6
SriLank	3030885794000.000000	5600000	1995	5.5
SriLank	3146058460200.000000	6900000	1996	3.8
SriLank	3347576079300.000000	500000	1997	6.4
SriLank	3504859365300.000000	1300000	1998	4.7
SriLank	3655587261700.000000	2400000	1999	4.3
SriLank	3874923709600.000000	200000	2000	6
SriLank	3815040323400.000000	0	2001	-1.5
SriLank	3966294299500.000000	11500000	2002	4
SriLank	4201902853300.000000	27300000	2003	5.9
SriLank	4430699038500.000000	600000	2004	5.4
SriLank	4707252109100.000000	3800000	2005	6.2
SriLank	5068217941300.000000	2900000	2006	7.7

SriLank	5412695902100.000000	5500000	2007	6.8
SriLank	5734756079300.000000	61700000	2008	6
SriLank	5937704053400.000000	2000000	2009	3.5
SriLank	6413668000000.000000	42500000	2010	8
SriLank	6952720000000.000000	6000000	2011	8.4
SriLank	7588517000000.000000	63900000	2012	9.1
SriLank	7846202000000.000000	65100000	2013	3.4
SriLank	8235429055800.000000	66800000	2014	5
SriLank	8647833261700.000000	5300000	2015	5
SriLank	9034290201900.000000	236800000	2016	4.5
SriLank	9315487732900.000000	71500000	2017	3.1

Sources: UNCTAD (2018), WDI (2018)

Panel unit root test: Summary
Series: FDI
Date: 12/16/18 Time: 07:57
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	16.9618	1.0000	5	130
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	8.22689	1.0000	5	130
ADF - Fisher Chi-square	0.00378	1.0000	5	130
PP - Fisher Chi-square	4.2E-06	1.0000	5	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

ist diff

Panel unit root test: Summary
Series: D(FDI)
Date: 12/16/18 Time: 07:58
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	18.7884	1.0000	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.31201	0.0005	5	125
ADF - Fisher Chi-square	27.9792	0.0018	5	125

PP - Fisher Chi-square	48.6062	0.0000	5	130

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: GRT
Date: 12/16/18 Time: 07:59
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.36363	0.0090	5	130
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.32857	0.0004	5	130
ADF - Fisher Chi-square	28.1301	0.0017	5	130
PP - Fisher Chi-square	33.3979	0.0002	5	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

grt
gdp

Panel unit root test: Summary
Series: RGDP
Date: 12/16/18 Time: 08:00
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	5.72277	1.0000	5	130
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	8.00416	1.0000	5	130
ADF - Fisher Chi-square	0.00499	1.0000	5	130
PP - Fisher Chi-square	9.2E-05	1.0000	5	135

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

ist

Panel unit root test: Summary
Series: D(RGDP)

Date: 12/16/18 Time: 08:01
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	3.24568	0.9994	5	125
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	1.24253	0.8930	5	125
ADF - Fisher Chi-square	3.04145	0.9804	5	125
PP - Fisher Chi-square	4.60724	0.9158	5	130

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

2nd

Panel unit root test: Summary
Series: D(RGDP,2)
Date: 12/16/18 Time: 08:02
Sample: 1990 2017
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-1.64543	0.0499	5	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.38097	0.0000	5	120
ADF - Fisher Chi-square	37.3282	0.0000	5	120
PP - Fisher Chi-square	85.1639	0.0000	5	125

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.