



India as Growth Pole in South Asia

Maryam Ishaq¹, Farzana Munir², Furrukh Bashir³

¹ Assistant Professor, Department of Economics, Lahore Business School, The University of Lahore.

Email: maryam.ishaq@econ.uol.edu.pk

² Assistant Professor, School of Economics, Bahauddin Zakariya University, Multan, Pakistan.

Email: farzanamunir@bzu.edu.pk

³ Assistant Professor, School of Economics, Bahauddin Zakariya University, Multan, Pakistan.

Email: furrukh@bzu.edu.pk

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ABSTRACT

This paper aims at assessing the spill over effects of Indian economic growth on its regional neighbours, the short run and long run co-movements of Indian GDP, food inflation and overall inflation against the corresponding macroeconomic fundamentals of its regional trading partners are explored. The short- and long-run association between the models variables is investigated by employing modern time-series econometric estimators including Impulse Response Functions (IRFs) and Autoregressive Distributed Lag (ARDL) approach to Cointegration. The results reveal that during short run, South Asian (SA) macroeconomic variables respond significantly towards Indian variables in the event of Indian economy receiving positive exogenous shocks. There is relatively weak evidence in favor of Indian growth spill overs when we test the hypothesis country-by-country, through ARDL model. This lack of support is more visible when SA exports are regressed on Indian GDP. However, for two cases of inflation, one obtains reasonable amount of support. On contrary, the long-run association amongst SA exports and Indian GDP established through two Panel cointegration tests, there is strong support in favor of proposed hypothesis, emphasizing the fact that Indian economic growth bears strong spill over effects in short- as well as in long-run towards its regional trading partners.

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Corresponding Author's Email: farzanamunir@bzu.edu.pk

1. Introduction

In today's world, developing economies in a region try to better integrate with each other, so that they may join hands together to combat the major macroeconomic challenges faced by them, which mainly include poverty, low shares in world trade, weak development of human capital and infrastructure and deficient volumes of investments. In the perspective of growing economic linkages at regional level, it is widely believed that fluctuations in one important economy of the region can positively impact the neighbour small economies through positive growth spill overs, or may adversely hit them through undesirable exogenous shocks. A number of recent empirical studies come up with substantial evidence in support of considerable spill over effects of economic progression of larger economies in a region on smaller ones through well-synchronized production channels, trade, remittances, capital formation and knowledge sharing through research and development (Arizala, Bellon, & MacDonald, 2019; Ghosh & Parab, 2021; Masha & Ding, 2012; Seck, Fall, & Aidara, 2020; Xia, Qamruzzaman, & Adow, 2022).

Talking about South Asian territory, India has become one of the two fastest growing economies of the world, since early 1990s, the time country has adopted more liberal economic policies at regional level as well as towards outer world. Taking these two inter-related facts into account, the country may have positive spill over effects which may bring higher and sustained economic growth for the other South Asian economies also. Much work has been done on this subject for European economies (Campos, Coricelli, & Moretti, 2019; Dabla-Norris, Espinoza, &

Jahan, 2015; Grossman & Helpman, 1991; Poirson & Weber, 2011) nevertheless, there is serious dearth of studies done on identifying those channels through which Indian economic growth spill overs may be transmitted or channelized to its South Asian regional neighbouring economies.

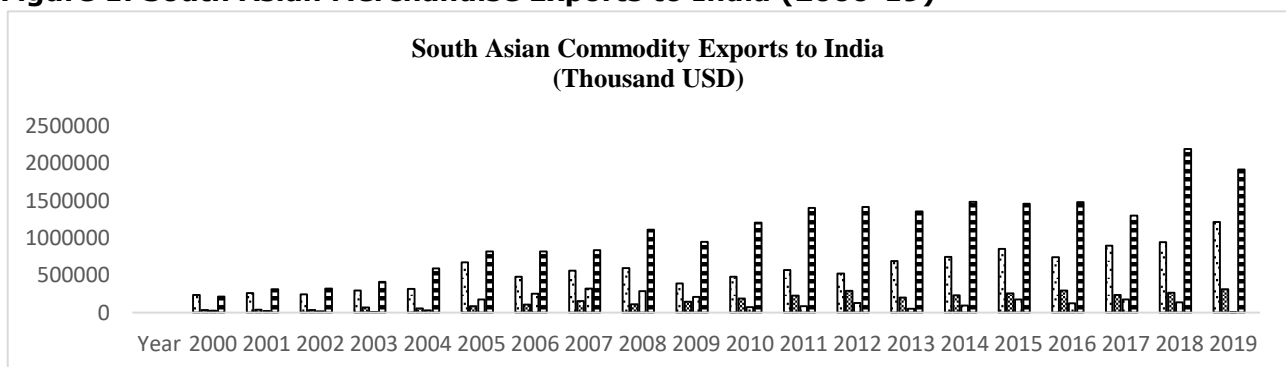
To our knowledge, only a handful number of studies have analysed the significance of India in determining regional growth patterns. India being the largest economy in South Asian territory, it is of critical importance to evaluate country's intra-regional trade linkages in the perspective of collective growth of the region. The phenomenon of inclusive growth often lies at the heart of almost all of the regional integration agreements established in various regions of the world. India being surrounded by seven large and small neighbour states, the country is idealized to play the role of 'Regional Growth Leader' who may set forth a growth conducive environment for its small regional states, thus, the fruits of growing regional economic linkages could equally be reaped by all. The present study extends twofold contribution to the earlier researches done in the similar discipline (a) keeping in view the nature of economic linkages of India with its regional trading partners, precise identification of those economic channels which potentially deem responsible for transmitting the (positive and/or negative) spill over effects of Indian business cycle fluctuations across the South Asian region, and (b) empirically validating the authenticity of above identified spill-over transmission mediums using modern time-series and pooled data econometric procedures. This will serve the key purpose of producing this research that is acquiring statistical evidence around India if the country is effectively serving as regional productivity growth driver for its poorer neighbour states or not.

2. Some Stylized Facts about Indian Economic Integration with South Asia

It is an undisputable fact that India is the largest economy of the South Asian region. The country's GDP accounts for more than 80 percent of the total regional GDP, followed by Pakistan with 10 percent and Bangladesh with 6 percent. Until the onset of global financial melt-down in 2007-08, India was enjoying an extra-ordinarily high rate of economic growth reaching 10 percent per annum with impressive levels of poverty reduction. The country started displaying notable progression in attaining higher rates of economic growth in early 1990s, since the time Indian economy started opening itself towards world economies. Before this, Indian economy had been significantly closed with substantially low volumes of international trade and highly restricted international capital movements. This policy change resulted in overwhelming volumes of exports and imports, Foreign Direct Investment (FDI) and remittances, with sharply declining external debt levels and rising volumes of foreign exchange reserves.

Since the transformation of India from a closed economy into an open one, the direction of economic linkages has also taken a significant shift (Kumar, 2020; Masha & Ding, 2012; Wang, Gunasekarage, & Power, 2005). Earlier, Europe and other advanced western economies used to constitute major chunk of India's trade and investment volumes. However, since early 2000, Asia, Africa and Middle Eastern states are also significantly contributing large shares into Indian trade, investment and remittances.

Figure 1: South Asian Merchandise Exports to India (2000-19)¹



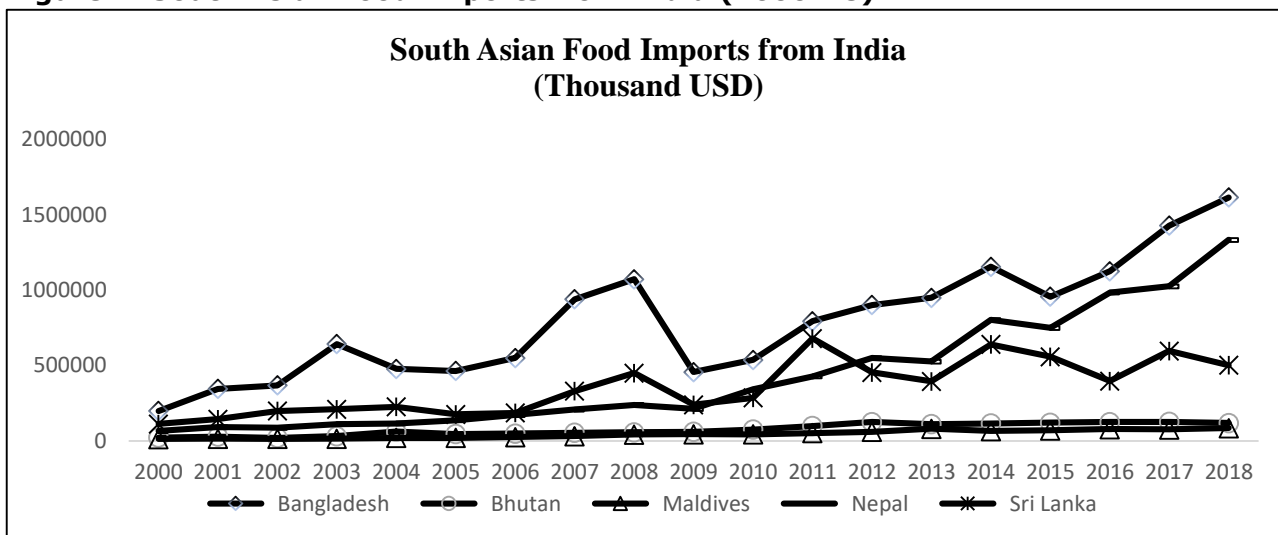
Source: United Nations conference on Trade and Development (UNCTAD)

Notes: (a) Exports from Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka are plotted against India.

(b) Product classification is in line with United Nations International Standard Industrial and Trade Classification (ISITC) Revision 3.

¹ The graphical illustration of subject macroeconomic variables is given before the world-wide eruption of Covid-19.
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Figure 2: South Asian Food Imports from India (2000-18)²



Source: United Nations conference on Trade and Development (UNCTAD)

Notes: (a) Food imports by Bangladesh, Bhutan, Maldives, Nepal and Sri Lanka are plotted against India.

(b) Food imports include all the items included in in categories 0, 1, 22 and 4 of United Nations International Standard Industrial and Trade Classification (ISITC) Revision 3.

Coming towards South Asia, India enjoys close and well-integrated economic linkages with its regional neighbours. The smaller economies like Bhutan, Maldives and Nepal are being benefited from the exchange rate unification with Indian rupee. The primary objective of this exchange rate coherency is to ensure stability and to exercise some good degree of control over inflation in these economies (Ishaq, Ghouse, & Bhatti, 2022). Besides, India serves as their largest trading partner. In Maldives, tourism demand originating from India constitutes 3 percent of country’s total demand for tourism. Similarly, India’s heavy energy demand which is being efficiently met by Bhutan brings ample export earnings for Bhutan. Not only this, but India has also extended heavy grants and loans to Bhutan for the joint development of hydroelectric power projects there.

On part of Bangladesh, the two countries share close trade relations since 1990s. India constitutes 9% of Bangladesh’s total exports and a free trade agreement between the two is under consideration. Trade and investment are thriving aspects of the relationship between India and Sri Lanka. Within the South Asian region, India's most important trading partner is Sri Lanka. In return, Sri Lanka's most important commercial partner worldwide is India. The India-Sri Lanka Free Trade Agreement was signed in March of 2000, and this was the catalyst for a significant acceleration in the growth of trade between the two nations. Over the subsequent eight years, there was an almost fivefold increase in the volume of trade between the two countries. In 2012, the total value of trade between the two countries was \$4.01 billion USD. Sri Lanka has long been considered a top destination for foreign direct investment from India. India became the fourth largest overall investor in Sri Lanka in 2012, with investments of approximately 160 million United States dollars (out of a total of 1279.15 million United States dollars).

Pakistan is the only economy in the South Asian territory which comes up with weak economic relationship with India. The political rifts between two states prevented the development of passionate and well-coherent economic linkages. However, it is an undeniable fact that the informal trade volume between two countries, which accounts for \$250 million to \$2 billion, exceeds far more than the official trade, worth less than \$250 million.

3. Methodological Framework

There is a dearth of empirical research on South Asian economic integration. This can be due to multiple reasons. The first important reason could be the recent advent of regionalization in South Asia, which is seriously taken by member economies not more than a decade earlier. The second equally important reason is poor data quality and its availability for South Asian states. The situation is graver for smaller economies i.e. Bhutan, Maldives, Nepal and

² The graphical illustration of subject macroeconomic variables is given before the world-wide eruption of Coivid-19.

Afghanistan. For the sake of analysing Indian economic growth spill overs on its regional neighbours, establishing a methodological framework was never an easy task. However, some guideline has been taken from a few empirical studies done on regional economic growth spill overs in East Asia (Ahuja & Nabar, 2012; Bende-Nabende, Ford, & Slater, 2001; Ishaq, 2016; Moneta & Ruffer, 2009) and Europe (Gardiner, Martin, & Tyler, 2012; Kutan & Yigit, 2009; Rodríguez-Pose & Crescenzi, 2008).

Owing to limited data availability for South Asia, there are fewer macroeconomic variables available to establish the causality relationships between India and its neighbouring states. The spill over effects of Indian economic growth on other South Asian economies will be analysed through country's bilateral exports to India, Indian WPI based food inflation and CPI based overall inflation. The functional form of the model can be represented as:

$$X_t = f(Z_t) \quad (1)$$

And the estimable version of the model can be states as:

$$X_t = c + \beta_1 Z_{i,t} + \varepsilon_{1t} \quad (2)$$

Where X_t is a vector of country's GDP, food inflation and overall inflation for each of India's South Asian trading partners. Z_t , a vector of explanatory variables, channelizing Indian economic growth spill overs to South Asian states, is composed of country's exports to India, Indian WPI based food inflation and CPI based overall inflation. One may certainly have more reliable empirical estimates for the above given model, however, limited data availability serves as the primary constraint. Data on regional trade and transport facilitation, information and technology assistance provided by India to smaller South Asian states, development of regional energy markets by India with collaboration of Bhutan and Nepal, regional FDI inflows from India, etc. are few of those important determinants which may parameterize India as growth driver of South Asia in a more efficient manner.

4. Empirical Methodology and Results

In order to empirically verify the impact of Indian economic growth spill overs to other regional neighbouring states, the impacts of Indian business cycles on its neighbour economies will be investigated at both short- and long horizons of time, over a sample data period ranging from 1991 to 2019. Short run analysis of economic variables points to a situation where an economic time series may absorb the effects of some endogenous or exogenous event temporarily. For a few periods, the variable may leave its natural dynamics and may follow the path of the shock. However, the series will be mean reverting over longer periods of time. Thus, in short run, a variable may temporarily absorb the effect of some endogenous or exogenous change but in long run it displays a strong potency of reverting back to its original levels. On contrary, long run analysis refers to a type of analytical exploration where economic variables are found to be co-moving in some meaningful way. They are cointegrated over long horizons of time. Thus, one variables receiving a shock, the other variables of the system may follow its trend over longer time periods or permanently.

The growth spill overs of Indian economy for South Asia will be studied over both shorter and longer periods. The short run dynamics of the model will be analysed through Impulse Response Function (IRF) under Vector Autoregressive (VAR) specifications. The long run analysis will be more robust as growth spill overs are better seen over long periods of time. As a robustness check of long run estimates, below given two distinct empirical methodologies will be employed:

- A country by country (time series) study of each of the South Asian state against Indian economic growth spill over through Autoregressive Distributed Lag (ARDL) model, and
- A panel analysis by employing
 - Pedroni residual based cointegration test, and
 - Johansen-Fisher combined cointegration test

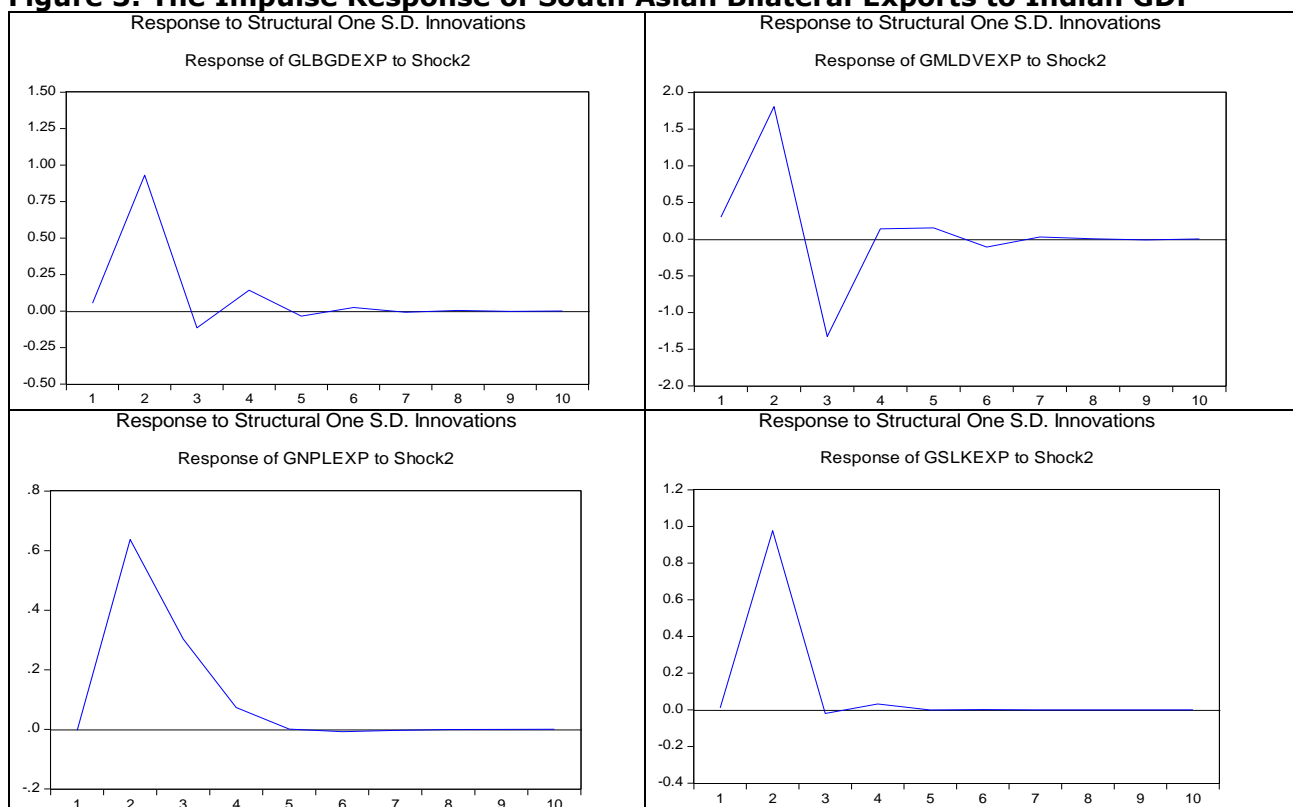
Panel data analysis is always preferred over time series estimations due to enhanced statistical power of the tests involved, combating the issue of low number of observations, an issue pertaining to time series studies.

4.1 Impulse Response Functions (IRFs)

The response functions of each South Asian states' exports towards a positive shock to Indian GDP is shown in figure 3. Under SVAR specification, one standard deviation positive exogenous impulse is generated to Indian GDP. A short run restriction is imposed on South Asian exports on their incapability to explain Indian GDP, on receiving an exogenous shock. The highest positive effect on South Asian exports, generated by Indian GDP, is obvious in first three to four years for each South Asian state. But after five to six years of time, the fluctuations caused by Indian GDP to South Asian exports become smooth, thus making the series to revert back to its previous levels. However, the case of Sri Lanka is relatively different where the fluctuations damp immediately after third year.

Figure 4 displays the response of South Asian countries' food inflation towards Indian food inflation, when the Indian series receives one standard deviation exogenous positive shock. Under SVAR dynamics, short run restriction is imposed on South Asian food inflation, thus making the series incapable of determining Indian food inflation. A positive exogenous shock received by Indian food inflation causes South Asian food inflation to rise initially for first two to three years. After six to seven years, the South Asian states' food inflation start dampening to its normal levels and except Bangladesh, the responses dampen completely after a lapse of eight to nine years.

Figure 3: The Impulse Response of South Asian Bilateral Exports to Indian GDP

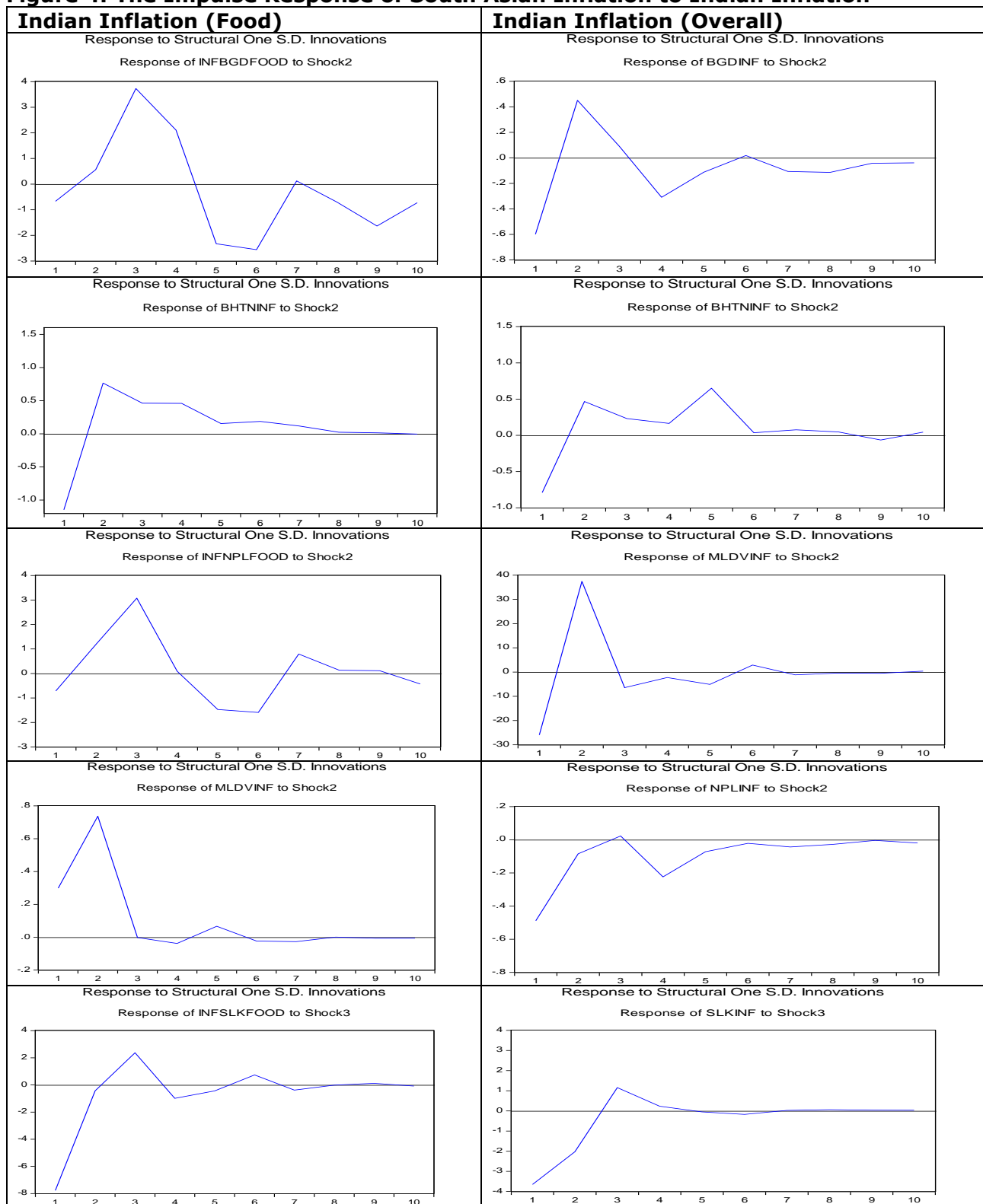


Note: SIC suggested 1 lag under VAR lag length selection

Lastly, the responses of South Asian inflation towards Indian overall inflation fluctuations are given in figure 4. On receiving one standard deviation positive exogenous shock, the Indian overall inflation expectedly causes inflation of all the South Asian countries to see a sharp rise for first two to three years. The series keeps on responding to the shock received by Indian inflation till six to seven years, as apparent from the figure. After this time, the South Asian inflation series come back to their old levels. However, for Bangladesh, these fluctuations persist for relatively longer periods i.e. eight to nine years. Sri Lankan IRFs are generated somewhat differently from other regional trading partners of India. Since 2005, due to heavy intervention of Sri Lankan Central Bank (CBSL), rupee has depreciated sharply, reflecting a decline in export growth and a rise in import growth. In order to control for that part of Sri Lankan inflation which is contributed by nominal depreciation of Sri Lankan rupee, bilateral nominal exchange rate series

of the country against Indian Rupee is incorporated while empirically establishing the short run and long run co-movements of country's inflation with Indian economy.

Figure 4: The Impulse Response of South Asian Inflation to Indian Inflation³



Concluding the discussion, the short run analysis reveals some important facts (a) Impulse Response Function generates such results which strongly support our proposed hypothesis; Indian economic growth bears significant effects on the trend movements of important macroeconomic variables of other South Asian states, and (b) as a robustness check, we gave positive exogenous shocks to three Indian macroeconomic variable analysing the

³ Due to non-availability of Bhutan and Maldives' food inflation, their overall inflation is regressed over Indian food inflation.
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response of South Asian macro economies. South Asian states are responding towards Indian food inflation and overall inflation most significantly, and (c) these findings pave way to see the long run association between Indian macroeconomic fundamentals with their South Asian counter-parts. This practice will help us in accepting/rejecting our initial postulation that Indian economic growth may effectively drive the regional economic growth trends.

4.2. Estimating Long Run Cointegrating Relationship: Autoregressive Distributed Lag (ARDL) Bound Testing Approach, FMOLS and DOLS Estimators

For establishing a long run cointegrating relationship amongst model variables, one needs to test the participant economic series for their order of stationarity at first. If the series turn out to be unit root in levels, this displays their potency of absorbing endogenous shocks permanently, thus following the trend movements of explanatory variables over longer periods of time. After testing through time series cointegration by employing ARDL bound testing approach, the long run cointegrating vectors will be estimated through Fully Modified OLS (FMOLS).

The key argument in favor of these two estimators is their ability to correct endogeneity bias and serial correlation, thus allowing for standard normal inference. Similar to the situation of short run dynamics, here also, South Asian bilateral exports and inflation are tested against Indian GDP, food inflation and overall inflation respectively. The results of unit root test and ARDL bound test are reported in table 2. The values of F-Statistics state that there exist long run cointegrating vectors in Bangladesh, Maldives, Nepal, Sri Lanka and Bhutan.

Table 2: Summary Results for South Asian Bilateral Exports and Indian GDP

Countries	Unit Root Test Results		ARDL Critical Value Bounds				
			Unrestricted Intercept and No Trend by Pesaran and Shin (1996, 2001)				
	ADF	DFGLS	10%		5%		1%
I(0)			I(1)	I(0)	I(1)	I(0)	I(1)
South Asian Bilateral Exports and Indian GDP							
INDIAN GDP	I (1)	I (1)					
BANGLADESH EXP	I (0)	I (1)			$F_{Exp} = 16.71$		
MALDIVES EXP	I (0)	I (1)			$F_{Exp} = 4.85$		
NEPAL EXP	I (1)	I (0)			$F_{Exp} = 5.91$		
SRILANKA EXP	I (1)	I (0)			$F_{Exp} = 13.95$		
South Asian Inflation and Indian Inflation (Food)							
INDIAN FOOD INF	I (1)	I (0)					
BANGLADESH INF	I (0)	I (0)			$F_{FOODINF} = 6.20$		
BHUTTAN INF	I (1)	I (0)			$F_{FOODINF} = 7.90$		
MALDIVES INF	I (1)	I (0)			$F_{FOODINF} = 15.08$		
NEPAL INF	I (0)	I (1)			$F_{FOODINF} = 7.93$		
SRILANKAINF	I (0)	I (1)			$F_{FOODINF} = 11.96$		
South Asian Inflation and Indian Overall Inflation							
INDIAN INF	I (1)	I (0)					
BANGLADESH INF	I (0)	I (0)			$F_{INF} = 4.79$		
BHUTTAN INF	I (0)	I (0)			$F_{INF} = 7.70$		
MALDIVES INF	I (0)	I (0)			$F_{INF} = 17.55$		
NEPLINF	I (0)	I (1)			$F_{INF} = 7.71$		
SLK INF	I (0)	I (1)			$F_{INF} = 8.50$		

Table 3 reports the single cointegrating vector obtained through ARDL model by regressing South Asian bilateral exports over Indian GDP. For all the regional member countries, except Maldives, who presents a long run association significant at 10 percent level, all the other economies come up with considerably high degree of long run association with India, significant at 5 percent level or better. The incidence of rejection of null hypothesis i.e. no cointegration is more frequent in case when South Asian food inflation is regressed on Indian food inflation.

The rationale behind detecting the possible presence of long run association amongst South Asian food inflation and Indian food inflation is the escalating food prices in the region and export restrictions imposed by India since 2007. India is the second largest producer of rice world-wide, one of the staple food items of South Asia. A restrictive attitude towards rice exports

and other important food articles by India are likely to bear strong impacts on regional food inflation.

The results are reported in second column of table 3. All the regional member of South Asia displays a valid cointegrating relationship between domestic food inflation rates and Indian food inflation. However, Sri Lanka comes up with an insignificant long run elasticity. However, if one takes into account the strong evidence of short run and long run co-movements on Indian and Sri Lankan food inflation, the insignificant long run elasticity should be ignored.

The third column of table 3 shows the ARDL regression results for the case of South Asian Inflation and India's overall CPI inflation. The amount of evidence in favor of long run cointegrating relationship between model variables is relatively weak as two out of five countries show absence of long run association with Indian inflation. For Bangladesh and Sri Lanka, the null of no cointegration can be rejected at 10 percent and 5 percent significance levels respectively. However, the long run elasticities for two countries, obtained through DOLS estimator are statistically insignificant.

Table 3: Results for Long Run (ARDL Bound Testing Approach to Cointegration)

Indian Regional Trading Partners	Indian GDP/S.A X/GDP	Indian Food Inflation/S.A Overall Inflation	Indian Overall Inflation/S.A Overall Inflation
Bangladesh	Cointegration: Yes*** LR Coefficient: 2.742*** 2.659***	Cointegration: Yes* LR Coefficient: 0.320*	Cointegration: Yes* LR Coefficient: 0.049
Maldives	Cointegration: Yes* LR Coefficient: 4.106*** 4.163***	Cointegration: Yes*** LR Coefficient: 1.132**	Cointegration: Yes*** LR Coefficient: 1.721*
Nepal	Cointegration: Yes** LR Coefficient: 2.563*** 2.654**	Cointegration: Yes*** LR Coefficient: 0.845***	Cointegration: Yes** LR Coefficient: 0.955**
Sri Lanka	Cointegration: Yes*** LR Coefficient: 5.041*** 5.246***	Cointegration: Yes*** LR Coefficient: 0.243***	Cointegration: Yes*** LR Coefficient: 0.421

Note: ***, ** and * are representing significance of sample statistics at 1%, 5% and 10% levels respectively, The Long Run (LR) coefficients for SA exports and Indian GDP regressions are obtained through both FMOLS and DOLS estimators. However, for other two type of regressions the long run coefficients are obtained through DOLS estimator only, The two cases of Sri Lankan inflation also contain the effects of nominal depreciation of Sri Lankan Rupee.

4.3. Panel Data Estimations

In order to see the robustness of my results, the model variables are tested through two panel cointegration tests. The purpose of applying two varying approaches of panel cointegration is to affirm the consistency of results obtained through establishing the long-run causation amongst the model variables i.e. Pedroni Residual Based Cointegration Test (1999, 2004) and Fisher-Johansen Combined Panel Cointegration Test and then Estimating the Long Run Cointegrating Vectors: Panel FMOLS and DOLS Estimators.

After obtaining a moderate amount of evidence in favor of long run cointegrating relationship between Indian GDP and South Asian exports and considerably strong evidence in favor of two types of inflation in the region, let's have a robustness check of these results by employing two panel cointegration tests. As a pre-requisite while establishing long run co-movements, the first thing to do is to formally test the panel of South Asian exports and the series of Indian GDP using three different unit root tests.

Section 1 in table 4 displays the results of three panel unit root tests i.e. Fisher ADF and Fisher PP unit root tests and Hadri stationarity test. For the South Asian exports, the dominant number of unit root tests (at least two out of three tests) indicate that the two series are integrated of order one. Thus the two series are unit root in levels. For Indian GDP, all three unit root tests indicate that the series is unit root in levels, thus I (1). This makes South Asian exports series eligible for developing a cointegrating relationship with Indian GDP. However, for two cases of inflation, both the South Asian and Indian inflation are turning out to be stationary in levels i.e. I (0). This prevents us to test two cases for establishing any long run cointegrating relationship.

Table 4: Summary of Results for Panel Unit Root and Cointegration Tests for South Asian Bilateral Exports and Indian GDP

Panel Unit Root Test Results (Order of Integration as Determined by)			
	<i>Fisher ADF</i>	<i>Fisher PP</i>	<i>Hadri</i>
South Asian Exp/GDP	I (1)	I (1)	I (0)
Indian GDP	I (1)	I (1)	I (1)
Pedroni Panel Cointegration Test Results Common AR Coefficients (Within Dimension)			
South Asian Exports, <i>Sample Stat</i>			
Panel v -Statistics		2.97 ***	
Panel ρ -Statistics		-2.36***	
Panel PP-Statistics		-2.47***	
Panel ADF-Statistics		-2.26**	
Individual AR Coefficients (Between Dimension)			
Group ρ -Statistics		-0.90	
Group PP-Statistics		-2.21**	
Group ADF Statistics		-2.11**	
Johansen-Fisher Panel Cointegration Test			
Hypothesized No of C.Es	Fisher Stat (From Trace Stat)	Fisher Stat (From Max-Eigen Stat)	
For South Asian Exports			
None	33.12***	32.88***	
At most 1	15.39	15.39	
Long Run Vectors Obtained through Panel FMOLS and DOLS Estimators			
Indian GDP	<i>FMOLS</i> 0.47** [2.77]	<i>DOLS</i> 0.61*** [4.33]	

Note: ***, ** and * are representing significance of sample statistics at 1%, 5% and 10% levels respectively. [] contains t-statistics.

In table 5, the results of Pedroni residual based cointegration test and Johansen Fisher panel cointegration test display a strong support in favor of existence of long run cointegrating association between model variables. The Fisher test also yields one cointegrating vector, thus proving the model variables having cointegrating relationship between South Asian exports and Indian GDP.

The long run coefficients are reported in third panel of table 5. Looking at the long run elasticities obtained through panel FMOLS and DOLS estimators, Indian GDP is bearing a positive coefficient for both the estimators. The coefficients are statistically highly significant. These findings the earlier results obtained through two panel cointegration tests where Indian GDP is significantly explaining the export volumes of regional economies.

Table 5: Results for Long Run (Panel Cointegration Models- Indian GDP/S.A X/GDP)

Pedroni Residual Based Panel Cointegration Test Results				
Common AR Coefficients (Within Dimension)		Individual AR Coefficients (Between Dimension)		Conclusion
Panel v -Statistics	Yes***	Group ρ -Statistics	No	Strong Cointegration exists
Panel ρ -Statistics	Yes***	Group PP-Statistics	Yes**	
Panel PP-Statistics	Yes***	Group ADF Statistics	Yes**	
Panel ADF-Statistics	Yes**			
Fisher-Johansen Combined Panel Cointegration Test				
No of Cointegration Equations	Fisher Stat (From Trace Stat)	Fisher Stat (From Max-Eigen Stat)		Conclusion
1	Yes***	Yes***		Strong Cointegration exists
Long Run Vectors Obtained through Panel FMOLS and DOLS Estimators				
<i>Indian GDP</i>	<i>FMOLS</i> 0.47**	<i>DOLS</i> 0.61***		

Note: ***, ** and * are representing significance of sample statistics at 1%, 5% and 10% levels respectively.

5. Conclusion

One of the principal motivations behind establishing regional trade agreements is to ensure inclusive growth, to uplift the financial standing of all regional players equally, so that all large and small regional states could move hand in hand on the trajectory of growth. The economic cooperation between South Asian countries (under the agreement of SAARC) is one of most noticeable regional economic integration agreement in Asian continent. Nevertheless, the region-wide economic performance of this cooperation agreement has always remained under question, particularly, in the context of growth spillovers imparted by region's largest economies towards their small and poor neighbour states.

This paper investigates India in capacity of 'Regional Growth Leader' for imparting growth spillovers on its regional neighbours through three main macroeconomic channels including each of the sample South Asian country's bilateral exports to India, Indian WPI based food inflation and India's CPI based overall inflation. The impacts of Indian business cycles on its neighbour economies is studied at both short- and long horizons of time, over a sample data period of annual values ranging from 1991 to 2019 (the time before the world-wide eruption of Covid-19). The short run dynamics of the model is analysed through Impulse Response Function (IRF), with some special kind of short-run restriction introduced under Structural VAR (SVAR). Intuitively, we require seeing the influence of Indian GDP and inflation on smaller regional economies' exports and inflation and not vice versa. Therefore, a short-run restriction under SVAR is imposed according to which Indian GDP and inflation are not explained by exports and inflation of smaller South Asian economies.

The response functions of each South Asian states' exports towards one standard deviation positive exogenous impulse to Indian GDP is generated. Except for Sri Lanka, positive effect on South Asian exports, generated by Indian GDP, is obvious in first three to four years for each South Asian state. For the case of Indian food inflation, a positive exogenous shock received by Indian food inflation causes South Asian food inflation to rise initially for first two to three years. After six to seven years, the South Asian states' food inflation start dampening to its normal levels. Lastly, the responses of South Asian inflation towards Indian overall inflation fluctuations are even more pronounced. The Indian overall inflation expectedly causes inflation of all the South Asian countries to see a sharp rise for first two to three years and the countries revert back to their same old levels of inflation in a period of six to seven years.

The long run analysis tends to be more robust as growth spillovers are better seen over long time horizons. The long-run co-movement between model variables is established under two distinct empirical methodologies of time-series and pooled data econometric testing procedures. First, through time-series estimator of ARDL bound testing approach to cointegration, with the exception of Maldives only, all the regional members come up with considerably high degree of long-run association with India, significant at 5 percent level or better level of statistical significance.

Relative to the situation of bilateral exports and overall regional inflationary trends, cointegration is established most frequently where South Asian food inflation is regressed on Indian food inflation. The rationale behind such a high degree of long-run impact is the escalating food prices in the region and export restrictions imposed by India since 2007. A restrictive attitude towards rice exports and other important food articles by India are likely to bear strong impacts on regional food inflation.

For having a robustness check of our time-series estimates, two pooled data estimators are employed. Discussing the test statistics obtained from Pedroni residual based panel cointegration test first, dominant number of test statistics (six out of seven, both within dimension and between dimensions) are rejecting the null hypothesis of no cointegration at 5 percent significance level or better. These results display a strong support in favor of existence of long run cointegrating association between model variables.

Almost same amount of statistical evidence is acquired from our other test of panel cointegration that is Johansen-Fisher Combined Maximum Likelihood based estimator of cointegration. The test yields one cointegrating vector, thus proving the model variables to be cointegrated in long-run. Summarizing the results obtained from two cointegration tests,

relatively stronger evidence is found (than what is obtained from ARDL model) in support of presence of a cointegrating relationship between South Asian exports and Indian GDP.

The paper demonstrates an extensive econometric exercise around modelling the role of Indian economy in driving regional economic growth trends. The study investigates the statistical significance of those important economic channels which are proposed to serve as catalyst for transmitting the growth spillovers of India towards its regional trading partners. However, the empirical findings are somewhat deficient, with no significant representation of inter-country differences concerning the organizational and institutional capacities, which otherwise may (plausibly) describe growth convergence dynamics with better degree of conviction.

Disparity in trade-led growth performance can fairly be attributed towards heterogeneous degrees of country-specific technical efficiency and disproportionate growth performance of institutions, obstructing intra-regional commodity trade, labor movement and transfer of knowledge. It is therefore advisable to pay equal attention to culminating such intra-state technical and institutional disparities, since, they evidently are no less effective in hampering the growth performance of developing and low-income. Investment targeted towards curbing structural rigidities and easy inter-state factor mobility in the region may serve as high way towards realizing the dream of inclusive growth.

References

- Ahuja, M. A., & Nabar, M. M. (2012). *Investment-led growth in China: Global spillovers*: International Monetary Fund.
- Arizala, F., Bellon, M. M., & MacDonald, M. M. (2019). *Regional Growth Spillovers in Sub-Saharan Africa*: International Monetary Fund.
- Bende-Nabende, A., Ford, J., & Slater, J. (2001). FDI, regional economic integration and endogenous growth: Some evidence from Southeast Asia. *Pacific economic review*, 6(3), 383-399. doi:<https://doi.org/10.1111/1468-0106.00140>
- Campos, N. F., Coricelli, F., & Moretti, L. (2019). Institutional integration and economic growth in Europe. *Journal of Monetary Economics*, 103, 88-104. doi:<https://doi.org/10.1016/j.jmoneco.2018.08.001>
- Dabla-Norris, E., Espinoza, R., & Jahan, S. (2015). Spillovers to low-income countries: importance of systemic emerging markets. *Applied Economics*, 47(53), 5707-5725. doi:<https://doi.org/10.1080/00036846.2015.1058903>
- Gardiner, B., Martin, R., & Tyler, P. (2012). Competitiveness, productivity and economic growth across the European regions. In *Regional competitiveness* (pp. 55-77): Routledge.
- Ghosh, T., & Parab, P. M. (2021). Assessing India's productivity trends and endogenous growth: New evidence from technology, human capital and foreign direct investment. *Economic Modelling*, 97, 182-195. doi:<https://doi.org/10.1016/j.econmod.2021.02.003>
- Grossman, G. M., & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European economic review*, 35(2-3), 517-526. doi:[https://doi.org/10.1016/0014-2921\(91\)90153-A](https://doi.org/10.1016/0014-2921(91)90153-A)
- Ishaq, M. (2016). Productivity-real exchange rate nexus: revisiting the Balassa-Samuelson hypothesis for emerging Asia.
- Ishaq, M., Ghouse, G., & Bhatti, M. I. (2022). Another prospective on real exchange rate and the traded goods prices: Revisiting Balassa-Samuelson hypothesis. *Sustainability*, 14(13), 7529. doi:<https://doi.org/10.3390/su14137529>
- Kumar, R. (2020). India & South Asia: Geopolitics, regional trade and economic growth spillovers. *The Journal of International Trade & Economic Development*, 29(1), 69-88. doi:<https://doi.org/10.1080/09638199.2019.1636121>
- Kutan, A. M., & Yigit, T. M. (2009). European integration, productivity growth and real convergence: Evidence from the new member states. *Economic Systems*, 33(2), 127-137. doi:<https://doi.org/10.1016/j.ecosys.2009.03.002>
- Masha, I., & Ding, D. (2012). India's Growth Spillovers to South Asia. *IMF Working Papers*, 2012(056).
- Moneta, F., & Ruffer, R. (2009). Business cycle synchronisation in East Asia. *Journal of Asian Economics*, 20(1), 1-12. doi:<https://doi.org/10.1016/j.asieco.2008.08.001>
- Poirson, H., & Weber, S. (2011). *Growth spillover dynamics from crisis to recovery*: International Monetary Fund Washington, DC.

- Rodríguez-Pose, A., & Crescenzi, R. (2008). Research and development, spillovers, innovation systems, and the genesis of regional growth in Europe. *Regional studies*, 42(1), 51-67. doi:<https://doi.org/10.1080/00343400701654186>
- Seck, A., Fall, F. A., & Aidara, K. (2020). Regional integration and growth spillovers: Is Africa an economic space? *Journal of African Trade*, 7(1/2), 37-44.
- Wang, Y., Gunasekarage, A., & Power, D. M. (2005). Return and volatility spillovers from developed to emerging capital markets: the case of South Asia. In *Asia Pacific financial markets in comparative perspective: Issues and implications for the 21st century* (pp. 139-166): Emerald Group Publishing Limited.
- Xia, C., Qamruzzaman, M., & Adow, A. H. (2022). An asymmetric nexus: Remittance-led human capital development in the top 10 remittance-receiving countries: Are FDI and gross capital formation critical for a road to sustainability? *Sustainability*, 14(6), 3703. doi:<https://doi.org/10.3390/su14063703>