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The Integration of Financial Markets: Empirical Evidence from South Asian Countries

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I. Introduction

Globalization and rapid spread of information technology is helping the countries by bring them closer to each other, opening up their economies, accelerating trade and merging financial markets. The volume of merchandized trade and mobility of capital flows have been enhanced. Investors are able to diversify their portfolios by investing their capital almost allover the world. The merging markets are adopting more prudent policies by eliminating capital controls and introducing market friendly approach[1] to attract foreign capital inflows in the form of foreign direct investment.

Developing countries are moving towards free trade but the WTO agenda is being followed with cautious approach. Although, the process of liberalization in developing countries started in the late 1980s but this process got impetus in the 1990s. Therefore these economies are not fully liberalized yet. The currency crises of ASEAN economies in 1997 compelled some of the countries to be more vigilant in following free capital mobility policies. The capital mobility is considered a two way process i.e. capital inflow, as well as, its outflow. Since some of the developing countries are still having capital controls, therefore, degree of capital mobility is low. This idea requires some countries specific empirical evidences. Haque and Montiel (1994) argued that in the presence of capital controls, it is yet to be seen that how effective these controls are? Offshore accounts, remittance decision and repayment of debt are the modes which indicate capital mobility in the presence of capital controls. Hence the degree or extent of capital mobility or market integration is quite appropriate to test the inflow of capital to these countries.

The region like South Asia also started opening up its economies in the late 1980s. The peculiar features of South Asia are highly populated, heavily indebted and massively poverty ridden region in the world[2]. Pertaining to South Asia, there is a limited body of literature on the extent of market integration or capital mobility and it's over time change in South Asia.

The degree of market integration can be assessed in a number of ways e.g. covered and uncovered interest parity conditions, real interest parity and saving and

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[1] The developing countries are having the fear that the developed countries will capture their markets and the developed countries will not open up their markets for the products produced in the developing countries.

[2] For details see: A Profile of Poverty (2000), MHCHD, Islamabad. Also see: Human Development in South Asia, (1997), MHCHD, Islamabad.

investment correlation technique. The covered and uncovered interest parity conditions are used for the comparison between countries. The overall trade and portfolio capital flows among South Asia countries are quite negligible. Furthermore, these conditions require data on offshore financial assets denominated in domestic currency or data on forward exchange rate. Most of the developing countries including South Asia nations do not have these effective markets. The governments often regulate domestic interest rate and data on market interest rate (kerb ate) are often not available. It is therefore appropriate to use the saving investment correlation technique to estimate the degree of financial market integration.

Feldstein and Horoika (F-H) used annual data of OECD countries for the period 1960-74, to test the financial market integration. Gross domestic investment as ratio of Gross Domestic Product (GGDI) was regressed on gross domestic savings as ratio of GDP (GGDS). The estimated coefficient is closed to one, which tends to explain the fact that saving remained invested in the host country and capital mobility was negligible. It also implies that financial market is not integrated with rest of the world.

Feldstein (1983), Tobin (1983), Penati and Dooley (1984), Dooley et.al. (1984), Sinn (1992) and Bayoumi (1990) also confirmed high Saving-Investment correlation, which indicate low capital mobility. Monadjemi (1990) used both direct and indirect approaches and came up with the same conclusion that capital is not perfectly mobile. Haque and Montiel (1994) estimated the degree of monetary autonomy in developing countries and concluded that the degree of capital mobility is much higher.

Taylor (1994) detected omitted variable bias in F-H (1980) model and favored enhanced integration view over time. Yamori (1995), Jansen (1996), Ghosh and Ostry (1995) and Moosa and Bhatti (1997) favored higher capital mobility. Bayoumi and Klein (1997), Baxter and Jermann (1997) and Helliwell and Mckitrick (1999) favored limited capital mobility view by using alternate techniques.

The present study intends to use Feldstein and Horoika (1980) proposed domestic saving and domestic investment relationship as test of degree of financial market integration in five South Asian economies. Further we intend to analyze the impact of liberalization on the degree of financial market integration in the 1990s in the region. This is to estimate the change in the β coefficient and the intercept α in each country.

Hereafter the study is organized as follows. Section 2 provides decade average of the composition of capital flows in South Asia. The model for the testing of market integration, sources of data and methodology is discussed in part 3. In Part 4, we presented empirical findings and discussion. Conclusion and policy implications are provided in the last section.

II.   International Capital Flows and Its Compositions in South Asia

Capital moves across borders in various shapes. The inward and outward mobility of capital depends upon a number of factors including the stage of development. In this section, the changes in composition of capital flow in five South Asian economies: Pakistan, India, Bangladesh, Sri Lanka and Nepal are presented (Table 1).

Table 1: Composition of Capital Flows in South Asia

Countries	WR	Agg-NRF	FDI-Nin	Equity flow	NFD-Total	NFD-LR	NFD-SR
1970s							
Bangladesh	82.55	734.47			474.06	405.70	53.00
	[88.9]	[62.4]			[48.5]	[47.3]	[64.3]
India	810.09	1274.53	41.32		1014.63	833.94	115.55
	[106.9]	[42.6]	[79.9]		[84.0]	[45.8]	[156.0]
Nepal	22.08	38.97			20.66	16.21	1.75
	[21.02]	[94.93]			101.30	[95.98]	[812.7]
Pakistan	546.24	712.04	22.14		[676.32]	557.57	67.00
	[110.2]	[41.20]	[99.06]		[40.96]	[36.57]	[154.75]
Sri Lanka	48.50	149.17	8.41		129.15	83.70	19.98
	[111.6]	[77.4]	[215.26]		[71.06]	[66.9]	[162.60]
South-Asia	2410.01	3032.06	71.90		2241.60	1835.90	222.50
	[65.3]	[49.4]	[80.8]		[63.0]	[42.8]	[137.3]
1980s							
Bangladesh	558.04	1334.11	1.30		705.83	699.60	-5.73
	[29.2]	[20.12]	[113.6]		[24.4]	[25.8]	[-700.12]
India	2329.60	4888.00	109.91	104.20	4943.17	4134.96	727.30
	[12.51]	[40.21]	[67.81]	[75.8]	[27.97]	[45.4]	[37.3]
Nepal	49.31	228.50	1.38		123.44	122.26	1.29
	[29.52]	[41.6]	[145.13]		[47.4]	[43.5]	[1895.2]
Pakistan	2313.58	1078.40	125.96		875.40	631.58	244.70
	[14.9]	[30.80]	[55.22]		[45.24]	[43.82]	[88.2]
Srilanka	319.80	527.61	40.71		318.56	302.69	17.44
	[15.2]	[12.5]	35.01		[48.24]	[23.6]	[726.5]
South-Asia	5570.90	8611.50	[284.02]	2051.11	7062.40	5867.60	992.50
	[7.5]	[32.45]	[49.30]	[99.6]	[26.3]	[40.08]	[38.03]
1990s							
Bangladesh	1196.20	1260.40	61.70	14.30	434.02	456.10	11.08
	[26.92]	[21.2]	[133.5]	[79.37	[55.3]	[44.80]	[486.9]
India	7814.50	6240.82	1385.40	1831.67	1399.92	2219.90	-500.11
	[44.5]	[28.7]	[89.09]	[93.66]	[159.13]	[95.7]	[-274.5]
Nepal	88.60	279.80	9.50		122.18	122.50	2.50
	[34.6]	[11.5]	[75.96]		[33.97]	[20.7]	[917.7]
Pakistan	1512.20	2297.20	529.10	373.67	1263.60	1344.01	-150.40
	[15.9]	[34.6]	[41.3]	[81.91]	[76.9]	[34.98]	[-706.2]
Srilanka	770.80	655.90	167.60	39.24	331.18	302.20	44.08
	[26.8]	[33.13]	[67.18]	[85.2]	[55.5]	[58.3]	[466.8]
South-Asia	12085.50	11898.08	2501.41	2051.10	4351.70	5023.80	-462.60
	[20.07]	[22.8]	[58.3]	[99.6]	[61.5]	[51.6]	[-445.62]

Source: World Bank (2001)
Figures in parenthesis show coefficient of variation.
WR=Workers Remittances $ US Million.
Agg-NRF=Aggregate Net Resource Flows $ US Million.
FDI-NiN=Foreign Direct Investment Net Inflow $ US Million.
NFD-Total=Net Flow of Total Debt $ US Million.
NFD-Total=Net Flow of Total Debt $ US Million.
NFD-SR=Net Flow of Short Term Debt $ US Million.
NFD-LR=Net Flow of Long Term Debt $US Million.

Bangladesh

As Bangladesh came into being in 1971, it was too early for an infant nation to attract FDI in the 1970s. Although, the workers remittances were $82 million, the co-efficient of variation was too high showing higher volatility. In case of net flow of debt, the long-term debt had a greater share. Only $53 million were in the category of short term out of total debt of $474 million. In the 1980s there was a magnificent increase in workers Remittances. The increase was more than six times the level of 1970s, showing more stable pattern as compared to the 1970s. The average net inflow of Foreign Direct Investment was more than $1 million but its volatility over the 1980s was quite high. The net short-term debt showed negative figure of – 5.73 million with very high volatility. The share of long-term debt remained high in total debt and remained high even in 1990s. The remittances more than doubled also show less volatility than in the 1980s. In Bangladesh workers remittances and Foreign Direct Investment are the main sources of capital inflow. FDI were around sixty times more in 1990 as compared to the 1980s. The share of long-term debt is also high in total debt: however, the extent of capital outflow is not very high.

INDIA

India is the largest country in South Asia. The Foreign Direct Investment averaged $41 million per year in 1970s, which is more than 50% of the total FDI in South Asia. The workers remittances were more than $800 million. Furthermore, out of more than $1 billion of net total debt inflow, the long-term debt marked a major share.

There were three times more average remittances in the 1980s as compared to 1970s with co-efficient of variation at 12.5, very low than the 1970s. Foreign direct investment more than doubled. Equity portfolios flows in the 1980s, were more than $. In the 1990s, Remittances increased three times as compared to the 1980s and reached $7.8 billion approximately. The equity flows were more than FDI, which were $1.8 billion on average in the 1990s. The net short-term debt showed a negative statistic of $500 million with very high co-efficient of variation. Out of the total equity flows of around $2 billion to South Asia, $1.8 billion went to India. It all showed that the 1990s, workers remittances was the main source of capital.

In the 1990s, almost 90% of the equity and 50% of FDI flows of the whole region were invested in India.

NEPAL

Nepal is mostly dependent on India for Trade. In the 1970s workers remittances were $22 million with lower volatility. The share of long-term debt was higher as compared to short-term debt. In 1980s and 1990s workers remittances were consistent and on average almost doubled in every decade.

In the 1980s FDI flows reached $1.4 million. They rose to $9.5 million in the 1990s. The share of short-term debt remained negligible in over all debt liability.

The decade average of the overall FDI and equity flows remained lowest, in nominal terms, in the region.

PAKISTAN

In the 1970s workers remittances (WR) were almost half a billion dollars. The FDI flows were $22 million (Table 1). FDI and remittances both were second highest in the region, after India. Long-term debt had a lion's share in total debt liabilities.

In the 1980s WR showed impressive figure of $2.3 billion, which were almost equal to India's. Its volatility remained very low through out the 1980s. The short-term debt stood on average at $244 million but its overall share increased over time FDI in Pakistan was $125 million.

In the 1990s, the average WR were $1.5 billion, less than the average of the 1980s. The FDI reached almost half a $billion and equity flows reached $373 million on average.

SRI LANKA

Sri Lanka on average received Workers Remittances (WR) around $48 million and also attracted $8.4 million of FDI in the 1970s. The aggregate net resource flows stood at around $150 million. But the overall capital flows, including LR and SR debt were highly volatile in the 1970s (Table 1).

The decade of the 1980s was marked with stability in capital flows for Sri Lanka. The WR crossed $300 million figure and FDI also increased 5 times as compared to the 1970s. The share of SR debt remained negligible in over all debt liability. WR more than doubled and FDI increased 4 times more in the 1990s. The short-term debt remained very low in over all terms.

III. METHODOLOGY AND DATA SOURCES

To test the financial market integration we used domestic saving and investment approach. Following Feldstein-Horoika (1980), Dooley (1987), Kim (1993) and summer (1995) we formulated model for financial market integration as

$$GGDI = \alpha + \beta\ (GGDS) + \delta\ (IMPSH) + \varepsilon_1 \qquad\qquad (1)$$

Where GGDI is ratio of gross domestic investment to GDP, GGDS is the ratio of gross domestic saving to GDP. The null hypothesis of perfect capital mobility is rejected if β is not significantly different from one and α is not different from zero. The IMPSH is

imports to GDP ratio used as the inverse proxy of the size of non-tradable sector as another explanatory variable. If the coefficient of GGDS is significant and close to one indicates low financial market integration and vice versa.

First of all, the fundamental Feldstein-Horoika (1980) equation has been estimated for the period 1972-2002. Second, an Additional variable of Imports to GDP ratio is added as an explanatory variable in the original model. Third, in order to capture the effect of liberalization process the intercept and slope dummy for the 1990s is used.

The data for the time period 1972-2002 has been used in this study. The main data sources for this study is IMF's international Finance Statistics (IFS), World Tables of World Bank and Global Development Finance. Five countries of South Asia, Pakistan, India, Bangladesh, Sri Lanka and Nepal are included in the sample. The data for individual countries is in million of local currency.

IV. Empirical Analysis

In order to check the stationarity of the data, Augmented Dickey Fuller (1979, 1980) test was applied to all the variables. The results are presented in the Table No 2. As can be seen from the Table investment-GDP ratio is I (1) for all countries, saving-GDP ration is I (1) for Pakistan and India and imports-GDP ratio is I (0) for all countries. The results are mixed indicating that the variables to be included in the model are of different order of integration. It implies that the cointegration technique is difficult to apply for this model. Cointegration method requires that all variables to be included in the model should be of the same order. Therefore in we move to estimate the model by OLS.

Table No. 2   ADF test of Unit Root

	GGDI			GGDS			IMPSH		
	Level	Lag	Ist Diff	Level	Lag	Ist Diff	Level	Lag	Ist Diff
Pakistan	-1.08	1	-3.92**	-2.6	1	-5.43*	-3.5*	1	-6.05*
India	-2.42	1	-7.91*	-2.6	1	-6.67*	-1.12	1	-4.19*
Bangladesh	-2.04	1	-6.29*	-4.39*	1	-5.34*	-1.71	1	-4.82*
Sri Lanka	-2.13	1	-3.2***	-4.31*	1	-5.15*	-2.95	1	-3.67**
Nepal	-2.72	1	-4.2**	-2.93	1	-4.15**	-1.54	1	-3.2***

Note: *, **, ** indicate significance level at one, five and ten percent level

Note: GGDI=Ratio of Gross Domestic Investment Million LCU (Capital Formation) to Gross Domestic Product current Million LCU,

GGDS=Ratio of Gross Domestic Savings Million LCU to Gross Domestic Product current million LCU.

IMPSH= Ratio of Imports million LCU to GDP current million LCU.

GGDP=Annual growth rate of GDP.

IV.1 Financial Market Integration in Pakistan

The model is estimated for Pakistan and the results are presented in Table 3. In equation 1, fundamental F-H (1980) equation is estimated. In the simple model the estimated coefficient of savings is insignificant. The model was re-estimated by adding ratio of imports of GDP (IMPSH). The estimated model shows that the coefficient of savings became significant. The value of the coefficient is less than one which implies that there is intermediate kind of capital mobility. The IMPSH has the expected sign and it is also highly significant.

Table 3   Financial Market Integration in Pakistan

	α	GDS/GDP	IMP/GDP	DUMS-90	DUM-90	R^2	DW
Pakistan							
Eq. 1	0.16	0.12				0.58	1.71
	(15.26)*	(1.45)*					
Eq. 2	0.03	0.35	0.53			0.73	1.65
	(0.79)***	(3.84)*	(3.93)*				
Eq.3	-0.0004	0.38	0.68	0.19	-0.04	0.83	1.57
	(-0.01)***	(2.74)*	(5.46)*	(1.08)***	(-1.93)**		

Note: * shows 5% and less, ** 10% level of significance and *** insignificance.

To test the impact of liberalization we used two dummy variables such as intercept dummy and slope dummy. The results indicate that both are insignificant implying that there is no significant change in the market integration in Pakistan after liberalization.

IV.2 Financial Market Integration in Bangladesh

The hypothesis of financial market integration is tested for Bangladesh. The results are given in Table 4. The results of simple model (Equation 1) indicate that the coefficient of GGDS is significant at 5% level. The results of extended model show that the estimated parameters are significant with expected signs. The coefficient of GGDS is less than one indicating some degree of integration of Bangladesh financial market with the world.

Table 4   Financial Market Integration in Bangladesh

	α	GDS/GDP	IMP/GDP	DUMS-90	DUM-90	R^2	DW
Bangladesh							
Eq. 1	0.18	0.21				0.94	2.18
	(5.6)*	(2.44)*					
Eq. 2	0.05	0.49	0.50			0.98	2.04
	(3.49)*	(9.7)*	(8.9)*				
Eq. 3	-0.01	0.92	0.69	-0.68	0.06	0.97	1.81
	(-0.59)***	(18.05)*	(9.25)*	(-5.3)*	(3.66)*		

Note: * shows 5% and less, ** 10% level of significance and *** insignificance.

The impact of liberalization is captured by dummy variable. Dummies are significant in the model. It implies that the liberalization has affected the investment–saving relationship. We can safely conclude that the openness the decade of 1990s increased the financial market integration process in Bangladesh.

IV.3 Financial market Integration in India

In this section we presented the results of the model. As can be seen from the table 5, the coefficient of GGDS (Equation 1) is 0.97 and it is significant with the expected positive sign. The results from extended mode are presented in equation 2, table 5.

The empirical evidences lead us to conclude the Indian financial market is not integrated with the world. In order to capture the effect of the decade of 1990s slope and intercept dummies are added in the model. Insignificance of shift and slope dummies indicates that there is no change in the Indian situation after liberalization

Table 5   Financial Market Integration in India

	α	GDS/GDP	IMP/GDP	DUMS-90	DUM-90	R^2	DW
India							
Eq. 1	0.02	0.97				0.91	1.65
	(1.33)	(14.46)*					
Eq. 2	-358.15	0.97	0.50			0.94	2.26
	(-0.00)***	(14.39)*	(2.81)*				
Eq. 3	0.01	0.94	0.16	0.14	-0.04	0.93	1.64
	(0.71)***	(9.74)*	(1.73)**	(0.83)***	(-1.2)***		

Note: * shows 5% and less, ** 10% level of significance and *** insignificance.

IV.4 Financial Market Integration in Sri Lanka

In the case of Sri Lanka the estimated model (Equation 1) is presented in the Table 6. The estimated parameter of GGDS is insignificant. Furthermore, the intercept is highly significant. Indicating the fact that the correlation between domestic savings and investment is zero, therefore there is high degree of financial market integration in Sri Lanka.

As it is well known that the decade of 1990s is considered to be the decade of liberalization and openness, the use of dummy variable is imperative. In Equation 3 slope dummy with two variables is added. The slope as well as shift dummy is significant and it has expected negative sign. It indicates the fact that the savings and investment became less correlated in the 1990s. The openness and liberalization increased the degree of financial integration.

Table 6   Financial Market Integration in Sri Lanka

	α	GDS/GDP	IMP/GDP	DUMS-90	DUM-90	R^2	DW
Sri Lanka							
Eq. 1	0.24	-0.03	`			0.64	1.71
	(6.46)*	(-0.17)					
Eq. 2	-0.15	0.54	0.73			0.89	1.64
	(-2.37)*	(4.0)*	(7.39)*				
Eq. 3	-0.14	0.54	0.74	-0.03	0.11	0.90	1.62
	(-2.23)*	(3.59)*	(6.92)*	(-0.5)***	(0.25)***		

Note: * shows 5% and less, ** 10% level of significance and *** insignificance

IV.5 Financial Market Integration in Nepal

The empirical estimates pertaining to Nepal are presented in table 7. The intercept term and GGDS coefficient of the model is significant. The coefficient of 0.5 is less than one, indicating imperfect capital mobility in Nepal.

Table 7   Financial Market Integration in Nepal

	α	GDS/GDP	IMP/GDP	DUMS-90	DUM-90	R^2	DW
Nepal							
Eq. 1	0.18	0.54				0.93	1.92
	11.26	5.36					
Eq. 2	0.04	0.52	0.43			0.90	1.54
	(2.77)*	(3.45)*	(7.14)*				
Eq. 3	-0.01	0.62	0.68	-0.86	0.06	0.95	1.70
	(-0.85)***	(5.50)*	(10.24)*	(-5.35)*	(3.41)*		

Note: * shows 5% and less, ** 10% level of significance and *** insignificance

If over all results are analyzed it may be said that in Nepal the capital mobility is neither perfectly mobile nor immobile. Nevertheless the null hypothesis of perfectly capital mobility, which in turn indicates financial market integration with rest of the world, can be rejected. But it is evident that the degree of integration increased in the post-liberalization period.

V.   Conclusion and Policy Implications

The study analyses financial market integration in the five countries of South Asia, Pakistan, India, Bangladesh, Sri Lanka and Nepal. Extended Feldstein-Horoika (1980) model has been used. In addition to the original model dummy variable for the 1990s has been incorporated in the model. How did the change in the 1990s, caused by the process of liberalization effect the degree of market integration in each country of the

sample, by introducing slope and intercept dummies, has been estimated. The overall findings are summarized below:

The empirical findings tend to indicate that the hypothesis of perfect capital mobility can be rejected for the five countries of South Asia namely Pakistan, India, Bangladesh, Sri Lanka and Nepal. The decade of the 1990s provide evidence in favour capital mobility in Bangladesh and Nepal only. In the case of India, Pakistan and Sri Lanka no considerable evidence is found in favour of increased financial integration in the 1990s. The slope and intercept dummies are estimated to be insignificant for these countries.

The overall results indicate that the degree of financial market integration is higher in Pakistan as compared to the other countries of South Asia. Conversely in India, the degree of market integration is the lowest in the region. In the case of Bangladesh, Sri Lanka and Nepal, empirical evidence indicates moderate degree of capital integration.

In short, the financial markets of South Asia are not perfectly integrated with rest of the world. The imperfect capital mobility or integration of financial markets indicates the fact that in these economies monetary policy may be effectively used for macro economic stability. Furthermore, according to portfolio theory of investment foreign investors can invest in these economies in order to diversify their risk.

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