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Feldstein-Horioka Paradox – The Case of South Asian Association for Regional Cooperation

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Abstract
Empirically, the positive association between domestic savings and capital formation is well recognized in research works where the extent of contribution of domestic savings to domestic investments varies among the courtiers. Considering both the significance of Feldstein-Horioka Paradox and the gradual rise in global importance for the South Asian nations from political and economic contexts, this research paper has been designed to trace out the impact of domestic savings, foreign aid, dynamism in capital mobility over time and the extent of trade openness on domestic capital formation for the 8 SAARC economies with a view to comment on the status of the Feldstein-Horioka puzzle. We have covered 34 annual observations for the time span 1980-2013 and installed several alternative static linear panel estimation techniques (POLS, FEM, REM) with a slight modification of the specification used by Isaksson (2001). Empirically, apart from foreign aid, all the other regressors have been found to be significant. The results also demonstrate that during the timeframe both gross savings and trade openness have positively affected domestic investments, which is absolutely in line with the previous research works. Moreover, it is also evident that foreign aid hasn't contributed well in capital accumulation in this region and gradual financial liberalization along with other initiatives has made the global capital more accessible to the economies.
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1. Introduction

Empirically, the positive association between domestic savings and capital formation is well recognized as there have been numerous research works to testify that. But the extent of contribution of domestic savings to domestic investments could vary among the courtiers, where several factors could be attributed to that vast range of deviation. (Schmidt-Hebbel and Serven, ,1999) Even in their seminal paper, linking both international capital mobility and domestic savings to domestic capital accumulation, seasoned economists Martin Fieldstien and Charles Horioka did ultimately end up with paradoxical findings (Fieldstien and Horioka, 1980). They predicted that increased financial integration should decrease the correlation between domestic investments and savings rates, but practically, they detected a large savings-investments coefficient for major industrialized economies. Later on, this instigated the following economists to come up with various empirical studies which covered both the developed and the developing economies, incorporating a wide range of econometric techniques to resolve the puzzle. In this era of globalization of financial markets, close integration among the financial markets across the globe through policy deregulations has speed up the international capital mobility several folds. This liberalization of financial markets has unleashed tremendous opportunities for exorbitant business expansion to stimulate economic growth through providing an easy access to a colossal pool of investible funds at competitive rates which also ensures stability in the long run. Setting aside the Keynesian notion of "paradox of thrift", it is perceived that both fiscal and monetary policies could fortify the positive relation between domestic savings and investments. That's why capturing the contribution of domestic savings in financing domestic investments is of paramount importance to the policy makers to have a grasp on both the effectiveness of tax regime as well as monetary stimulus and on their influences on the savings-investments behaviour. As the developed economies are believed to have initiated extensive and swift deregulatory measures to liberalize the financial markets along with ensuring less restriction on capital account transactions as compared to the developing world, so, cross-border capital flows are supposed to be phenomenal over there. But, as mentioned earlier, different researchers have detected high correlation between domestic savings and investments for the developed world implying low capital mobility which has pushed the F-H paradox to the forefront. Empirically, the low magnitude of domestic savings-investments correlation among the developing countries has simply augmented the paradox.

After the United States and China, combined economy of South Asian Association for Regional Cooperation (SAARC) countries is the 3rd largest in the world in the terms of GDP (PPP) and the 5th largest in the terms of Nominal GDP. (Press Release, World Bank, 2015). Moreover, SAARC nations capture 3% of the world's area and hold 21% (around 1.7 billion) of the world's whole population and around 9.12% of global

economy as of 2015. Propelled by a strong expansion in India accounting for nearly 80% of SAARC's economy, coupled with favorable oil prices, from the last quarter of 2014, South Asia become the fastest-growing region in the world. All these signify the gradually growing importance of the region (Press Release, World Bank, 2015). In spite of robust economic growth of the recent years, as a whole the pace of development within the region is moderate as nearly 40 percent of its inhabitants are still poor and daunting challenges such as terrorism and security concerns, climate change, environmental degradation, political instability, increasing inequalities etc. pose serious threats to South Asia's growth and prosperity.

In 2009, Wahid et al. investigated on the savings-investments dynamics of the largest five South Asian economies deploying the ratio based panel cointegration method to extract the advantage from enhanced information embedded in a panel data set. The results revealed cointegartion between domestic savings and investments for the selected economies as a whole bearing an indication about the inapplicability of the F-H puzzle within the region. Those findings were not as decisive and apparent to comment on the savings-investments correlation and the pattern of capital mobility in South Asia. In this research, we have endeavored to analyze the impact of domestic savings, foreign aid, dynamism of capital mobility over time and the extent of trade openness on domestic capital formation for a panel data set comprising of 8 SAARC economies resorting to several alternative panel data estimation techniques.

Beginning with the backdrop in Section 1, Section 2 of this paper entails a brief discussion on the mathematical models used to examine the F-H puzzle empirically along with a comprehensive overview of the literature. The deployed empirical model, methodology and the data set are featured in Section 3. Section 4 captures the descriptive analysis along with the empirical findings. Finally, Section 5 wraps up the paper with the concluding remarks.

2. The F-H Model in light of Previous Empirical Works

Feldstein and Horioka (1980) predicted that increased financial integration should have a dampening impact on the correlation between domestic investment and saving rates. The investment rate of country i can be expressed as

$$(I/Y)_i = \alpha_i - \beta_i r_i + \nu_i \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, I is the level of domestic capital accumulation, Y is the national output level, r is the domestic real interest rate, α is the intercept, and ν represents all the other factors influencing investments. Since it is assumed that the national saving rate is a function of the real interest rate, so, Fieldstien and Horioka used the following equation for estimation

$$(I/Y)_i = \alpha_i + \mu_i (S/Y)_i + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

In this equation, S is measured as gross national product minus private and government consumption which is nothing but domestic savings, α and ε are the intercept and error terms respectively. With perfect capital mobility, an increase in the saving rate in country i would cause an increase in both domestic investments as well as in the investment rates across all countries. Assuming a relatively small economy, which does not exert any influence on the global economy, the slope coefficient μ, given perfect capital mobility, would be close to zero. For big economies, the values of the slope coefficients are expected to correspond in magnitude to their shares of gross global capital. In order for μ to have values close to zero, parity in real interest rates must hold, the world real interest rate must be exogenous and uncorrelated with the saving rate, as well as there must not be endogeneity problem or no correlation between the savings rate and the stochastic error term. But critically from econometric view point, both savings and investments are pro-cyclical and there exists simultaneous bias, with both reacting to population and productivity growth as well as government expenditures, which might result in endogeneity problem (Isaksson, 2000). To deal with this endogeneity problem, amongst several alternative options, we have preferred using instrumental variables (IV) as it has manifold other advantages as well as well as considered gross capital formation to take care of pro-cyclicity. Theoretically, the supposition of exogeneity of real interest rate can also threaten as large economies could influence the global real interest rate. Although different economists have opined differently in this regard but we can easily ignore this large country critique in this paper as none of the developing economies, in the present paper is large enough to affect the global real interest rate.

Feldstein and Horioka detected that the coefficient of saving rate in Eq "(2)" was approaching unity rather than zero, as opposed to the usual expectations of mobile capital indicating the retention of domestic savings in high proportions. High exchange rate risk and uncertainty of repatriation, which are more pronounced for long-term investments, institutional rigidities as well as official restrictions on capital outflow, international differences in tax regimes and double taxation, might have prevented domestic savings from leaving the home country (Isaksson, 2001). Gordon and Bovenberg (1996) also argued that asymmetric information across economies discourages domestic investors for cross border investments to tackle the high transaction costs. However, the Feldstein–Horioka's terming of high cross-section slope coefficient in Eq. "(2)" as an evidence of low capital mobility has been criticized, although many researchers have obtained similar results. Obstfeld (1986) argued that since growth of a nation's labour-force positively affects the savings and the profitability of

investments, so, it is the international immobility of labour that is behind the high savings–investments correlation. A similar effect can be anticipated from higher productivity growth. These explanations were, however, dismissed by Feldstein and Bacchetta (1991) through the inclusion of growth variables, failing to affect the slope coefficient significantly. Bayoumi (1990) explained that if the government is successful in systematically targeting the current account deficit, then there will be a distinct cross-section correlation between savings and investments, in spite of high capital mobility. Deploying a quantitatively restricted model, Baxter and Crucini (1993) as well as Ho (2003) found that high (time-series) correlation between savings and investments is consistent with high capital mobility, where the correlation is increasing with the size of the economy. Harberger (1980) also advocated that larger economies are more diversified with more shock-absorption capacity and therefore, requiring lesser quantum of capital movement. Wong (1990) pointed out that high correlation between savings and investments is possible even under perfect capital mobility if both traded and non-traded goods are considered within the model. Schmidt-Hebbel et al. (1996) identified the close link between corporate investments and retained earnings, to evade currency risk and political risk as a possible explanation of the contradiction.

Furthermore, to justify the skepticism about F-H interpretation of the puzzling findings, several other economists came up with numerous other explanations. Obstfeld (1986) held the pro-cyclical nature of savings and investments as responsible for the high correlation; Frankel (1992) argued about restrictive assumptions such as covered interest parity, zero exchange risk premium, zero expected real depreciation within the F-H framework; Oakley (1996) along with other researchers attributed high coefficient to be a reflection of inter-temporal budget constraint and current account solvency; Sachsida and Caetano (2000) pointed out that the savings retention coefficient didn't measure capital mobility rather measured the extent of substitutability between domestic and external savings.

For the developing economies, detection of either low or insignificant savings-investments coefficient evidencing relatively mobile capital had been elucidated by a number of economists through several rationales. Dooley et al. (1987) and Isaksson (2001) attributed this to foreign aid inflow; Wong (1990) presented evidence regarding the size of non-traded sector and the degree of trade openness; while Kasuga (2004) emphasized that country's financial structure could have influenced the size of savings retention coefficient. Obstfeld (1986), previously explained that, during the sample time span, if the economy does not diverge much from its steady-state ratio of net-foreign assets to income, and if nominal income growth remains moderate, then the difference between savings and investments can, on average, be small even under perfect capital mobility. In this way, he justified the low cross-section savings-investments correlations in developing economies, before the debt crisis, as compared to the industrial ones. However, this reasoning appears to be more valid in a mature economy, with transitory inter-temporal trade gains rather than the developing economies where unexplored investment opportunities indicate a shortfall of external debts, well below the steady-state levels.

Studies based on the F-H approach did incorporate cross-section and time-series and analyses. In cross-sectional studies each observation consists of a country's average investment and saving rates along with average values of other regressors over a given period to eliminate the influence of short-run fluctuations around long-run means.Time-series estimation captures the short-run relations well specifically when the regression is run in first differences, where each observation consists of a country's investment and saving rates as well as values of other independent variables per period. Although both estimation techniques are instrumental in assessing capital mobility, but not necessarily the slope coefficients from the two methods contain the identical information. It is very much possible that in a sample of N countries, average saving and investment rates are strongly correlated on a cross-section basis, while for each specific country, the deviations of saving rates from their time-series averages are poorly correlated to those for investment rates. Obstfeld (1995) exhibited that if cross-section observations are country averages over T periods, then OLS estimates of the slope coefficient will be high if N and T are sufficiently large and the time-series slope coefficient could be close to zero for each country. However, a school of researchers believed cross-section estimation methods to be advantageous. Some very recent research papers did also employ panel-data techniques.

Deploying cross-section estimation techniques, Feldstein and Horioka (1980) covered 16 OECD economies for the period 1960–1974, again Feldstein (1983) used 17 OECD countries for the period 1974–1979, Bayoumi (1990) entailed 10 OECD countries for covering 1965–1986. All these studies ultimately did end up with similar findings of high savings-investments correlation although those had subtle variations in postulation. Penati and Dooley (1984), Dooley et al. (1987), Vos (1998) and Tesar (1991) also detected a high correlation. Wong (1990) had a sample consisting of 45 developing economies for the sample period 1975–1981 and depicted that correlation could be effected by choice of sample as well as inclusion of more regressors. Dooley et al. (1987) constructed a combination of 14 industrialized and 50 developing economies along with splitting the dataset into two distinct periods. The OLS estimation of the slope coefficient for the industrialized economies exceeded the developing ones where over time the coefficient went up rather than the coming down.

Pioneered by Miller (1988), numerous studies resorted to cointegration techniques to analyze the

dynamics of savings-investment relationship. Hoffmann (1998), De Vita and Abott (2002, 2003), Ang (2007) all established cointegrated relationship between savings and investment for different countries with different time dimensions. However, some researchers like Schmidt (2003) and Narayan (2003) failed to detect cointegrated relationship between savings and investments. Adebola and Dahalan (2012), based on Autoregressive Distributed Lag (ARDL) Model and Granger causality test, have identified the existence of long run relationship where two-way causality validating the low capital mobility as per the F-H hypothesis.

Constructing a sample composed up of low and middle income countries and OECD-countries, Vamvakidis and Wacziarg (1998) are believed to be the first to investigate savings–investments correlations using panel-data methods which again showed the OECD countries to display larger slope parameters than the developing countries. The other studies employing panel estimation techniques by Coakley et al. (1996), Jansen (2000), Corbin (2001), Ho (2002), Coakley et al. (2004), Payne and Kumazawa (2005) and Kollias et al. (2008) had mixed findings. It was apparent from the findings of the previous studies that endogeneity failed to explain the F-H puzzle and the basic F-H equation tended to produce sensible results with respect to intra-national capital movements rather than the international ones.

Of late, some researchers have deployed sophisticated econometric estimation methods such as Pooled Mean Group (PMG), Fully Modified OLS (FMOLS), Dynamic OLS Panel Cointegration techniques to analyze the paradox.

Using numerous alternative panel data estimation techniques for diversified datasets, varying both in terms of panels and timeframe, Payne and Kamazawa (2005), Adedeji and Thornton (2006), Bangake and Eggoh (2010, 2011) have detected moderate to high correlation between savings and investments, where the magnitude of coefficient has varied markedly depending upon the estimation methodology and structure of dataset. In spite of criticisms, for a panel data of 21 OECD countries during 1962 to 1990, considering business cycle effects, Krol's point estimate for savings-investment correlation of β has been quite low. In his venture, Afzal (2007), covering developing economies and using cointegration techniques, has found no long-run relationship between savings and investment for 7 countries of the sample, implying high degree of capital mobility along with getting the evidence of both bi-directional and uni-directional causality between savings and investment, which later on inspired Esso and Keho (2010) as well as Olugbenga, Oluwole, and Florence (2011) to investigate the F-H paradox for the West African Economic and Monetary Union (UEMOA) and for the 8 European Union economies respectively. For USA, UK, China, and India Sanjib and Joice (2012) have showed a cointegrating relationship between savings and investments in an attempt to comment on the paradox.

3. Methodology and Data Description

In this paper, we have expanded the analysis of Isaksson (2001) through covering the influence exerted by trade openness on domestic investments. So, the augmented version of the F-H specification is expressed as

$$(I/Y)_{it} = \alpha_{it} + \beta(S/Y)_{it} + \gamma(NODA/Y)_{it} + \delta(T*(S/T))_{it} + \Theta(MT/Y)_{it} + \epsilon_{it} \ldots\ldots\ldots(3)$$

Here, subscripts i stands for the country and t counts for the years. (I/Y) is denoting gross fixed capital formation per GDP which consists of outlays in addition to the fixed assets of the economy plus net changes in the level of inventories, expressed as a percentage of GDP. We have incorporated it within the model to take care of the pro-cyclicality issue. (S/Y) stands for gross savings per GDP and calculated as gross national income less total consumption, plus net transfers as a percentage of GDP. The parameter β measures the correlation between investments and savings for the whole period, which is expected to be positive. NODA expresses net official development assistance consisting of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare. Again NODA is considered as a percentage of GNI or NODA/Y. As it is hypothesized that foreign aid would positively influence investment rates, so, γ, the coefficient of NODA/Y, is expected to have a positive sign. (T *(S/T)) is nothing but the interactive time dummy with savings which will rather signify the impact of financial liberalization on capital mobility. The parameter δ indicates whether the slopes are different between the pre and post liberalization periods, where most of the SAARC countries initiated liberalization during the early 90s. So, this interactive dummy is 1 for 1992 and the following years, presuming the liberalization had some lagged impact. Consequently, β is the 'overall' measure of capital mobility and δ is an indicator to verify the dynamism in capital mobility over time. If financial liberalization has increased capital mobility over time, then δ is expected to take a significant negative value, hence indicating a smaller slope parameter (more open capital account) during the post-reform period. A significant positive parameter would suggest less-capital mobility, while an insignificant δ might indicate unchanged capital mobility. (MT/Y) represents the extent of trade openness where MT is the sum of merchandise exports and imports and again it is expressed as a proportion of GDP. For, all these SAARC economies, as the contribution of service trade is very insignificant, so, we have considered sum of merchandise trade to portray trade openness. As trade openess positively influences domestic capital formation, so, the parameter Θ is anticipated to have a positive sign. To deal with the endogeneity

problem we have picked general government final consumption expenditure (% of GDP) and age dependency ratio (% of working-age population) as instrumental variables with the assumptions that both the IVs do influence domestic savings. For the quantitative assessment, we used a panel data set of eight SAARC countries for the time span 1980-2013 obtained from the World Bank Indicators.

The pooled OLS (POLS) model yields consistent and efficient estimates of both the intercept and the slopes and it is estimated using ordinary least squares on the cross-sectional time-series data for all countries. But this is unlikely that all countries will have an identical intercept as this restrictive model generates only a single overall intercept.The fixed effect model (FEM) is OLS on time-demeaned data that captures country-specific heterogenous unobservable effects which are consistent over time. In essence, the heterogeneity across countries is simply due to parametric shifts of the regression function. The FEM is better than the POLS as it can verify the presence of time-invariant country-specific unobservable effects. The random effect model (REM) considers the country-specific unobservable effects to be randomly distributed but assumes that these effects are uncorrelated with the other regressors. The Hausman specification test is used to justify whether REM is rejected over the FEM and the Bruesch-Pagan Lagrangian Multiplier test is to judge between the POLS and country-specific unobservable effects models. The FEM-IV and REM-IV tackles the endogeneity problem within the panel framework.

4. Empirical Findings

From the analysis of the Table 1, containing some descriptive statistics for the selected variables of the individual countries in the sample, it is detected that amongst the countries Afghanistan has both the lowest gross savings (% of GDP) and the lowest gross capital formation (% of GDP), which is quite understandable for the war ravaged economy. Surprisingly, the small economy Bhutan has come up with both the highest gross savings (% of GDP) and the highest gross capital formation (% of GDP), where questions could be raised about the authenticity of the dataset. Nepal and Sri Lanka exhibit more stable pattern in gross capital formation (% of GDP) and gross savings (% of GDP) respectively, with the lowest standard deviations. Again, for net ODA received (% of GNI), Afghanistan has very extreme values. The dearth of foreign assistance during the war and the post-war influx of assistance could explain this well. Before, the liberalization of early 90s, India perused a restricted trade regime, which is evident from India's lowest merchandise trade GDP ratio. Surprisingly, Maldives has appeared with the highest merchandise trade GDP ratio. In terms of volatility, the largest economy India has the least variation in receiving net ODA (% of GNI) and the other big economy Pakistan has least fluctuation in merchandise trade GDP ratio.

Table 1
Descriptive Statistics for selected variables across SAARC, 1980-2013

Country	*Mean*	*Std. Deviation*	*Min*	*Max*
Afghanistan I/Y	23.29	8.32	12	38
S/Y	.85	16.97	-19	19
NODA/Y	33.82	16.60	.07	50.3
MT/Y	44.77	10.67	30	71.7
Bangladesh I/Y	20.88	4.22	14	28
S/Y	24.58	8.67	5	40
NODA/Y	3.88	2.16	1.1	7.4
MT/Y	27.85	10.15	15.9	47.2
Bhutan I/Y	44.94	10.78	30	68
S/Y	37.63	9.58	26	53
NODA/Y	15.33	6.65	7.1	29.9
MT/Y	69.65	14.08	49.4	100.4
India I/Y	25.29	3.94	18	33
S/Y	26	5.35	17	37
NODA/Y	.49	.31	.1	1.2
MT/Y	20.60	10.29	9.8	42.3
Country	*Mean*	*Std. Deviation*	*Min*	*Max*
S/Y	27.18	13.98	11	44
NODA/Y	7.63	5.01	1.9	16.9
MT/Y	81.69	15.06	49.3	121
Nepal I/Y	20.64	1.61	17	23
S/Y	21.12	7.04	10	37
NODA/Y	8.16	2.55	4	14.1
MT/Y	32.38	7.61	20.2	43.3
Pakistan I/Y	17.06	2.19	13	21
S/Y	22.74	3.17	17	30
NODA/Y	2.1	.87	.9	4.6
MT/Y	30.96	2.87	25.6	37.8
Sri Lanka I/Y	25.23	3.01	20	34
S/Y	21.36	2.02	18	25
NODA/Y	4.97	3.19	.8	10
MT/Y	59.63	9.28	41.3	77.2

Analysis of Table 2 unfolds the details about overall, between and within variations. On an average, I/Y or gross capital formation (% of GDP) is around 26% overall, with minimum value of 12% and maximum value of 68%. Here, overall variation is the highest and within variation is the lowest. On average, S/Y or gross savings (% of GDP) is around 23% overall, with minimum value of -19% and maximum value of 53%. Here, overall and between variations are almost equivalent and on the higher side whereas, within variation is the lowest. On average NODA/Y or net ODA received (% of GNI) is around 7% overall, with minimum value of .07% and maximum value of 50%. Here, overall and between variations are almost equivalent and on the higher side whereas, within variation is the lowest. On average, MT/Y or merchandise trade (% of GDP) is around 46% overall, with minimum value of 10% and maximum value of 121%. Here, overall and between variations are almost equivalent and on the higher side whereas, within variation is the lowest.

Table 2
Variation in selected variables across SAARC, 1980-2013

Variation in Variable	Mean	Standard Deviation	Min	Max
I/Y				
Overall	25.62931	10.18447	12	68
Between		8.509633	17.05882	44.94118
Within		5.50022	10.68813	48.68813
S/Y				
Overall	23.06736	9.238203	-19	53
Between		10.26689	.875	37.625
Within		7.210278	3.192358	41.19236
NODA/Y				
Overall	7.666958	9.450891	.07	50.3
Between		10.81509	.4848485	33.81929
Within		5.170172	-26.08233	24.14767
MT/Y				
Overall	46.03004	23.85045	9.8	121
Between		22.06065	20.60294	81.69706
Within		10.4556	13.63298	85.33298

Other than NODA/Y, all the regressors have significant coefficients, at 5% level of significance, implying that for all the SAARC countries during the time span, NODA haven't contributed much in domestic capital formation, which is consistent with the expectation, where the bulk of the ODA is directed for poverty reduction and enhancement of social welfare rather than financing infrastructure or private and public investment. Moreover, there are concerns over the effectiveness of aid within this region as it is renowned for poor governance and this has resulted in mixed findings propagating micro-macro paradox. Both S/Y and MT/Y have positive influence on I/Y, in line with the standard theories which also satisfies the findings of the previous research works. Both the coefficients are relatively low, exhibiting almost similar contribution to domestic capital formation. The negative coefficient of interactive time dummy also reveals that, overtime, gradually the extent of capital mobility has been notching up, as all the economies have been resorting to slow but gradual financial liberalization. Estimation results without the interactive time dummy reveals its important as, if it is omitted, then the correlation between savings and investments weakens for both REM and FEM, thus implying more financial openness than actually the case is. This absolutely matches with the previous research works. But in the region, as a whole, most of the countries are still having restrictions on capital outflow. However, the results depict the gradual surge in overall capital inflow in the region as it possesses several emerging economies, with tremendous potentials in form of both massive domestic market and enormous export opportunities.

Table 3
Savings-Investment Specifications

Gross Capital Formation (% of GDP)	POLS	FEM	REM	REM VCE	F-H
Gross Savings (% of GDP)	.4366308*	.1637861*	.224751*	.224751*	.44886*
Net ODA received (% of GNI)	.0919382	.272097	.0859577	.0859577	12.785*
Merchandise Trade (% of GDP)	.1841325*	.2212195*	.2371981*	.2371981*	
Interactive Time Dummy	-.058806	-.0315651	-.0665931**	.0665931**	
Constant	6.265383*	9.616514*	9.708431*	9.708431*	
R square	0.5257				.27
R square-within		.33	.32	.32	
R square-between		.48	.69	.69	
R square-overall		.36	.45	.45	
Rho		.86	.46	.46	

POLS, pooled ordinary least squares; FEM, fixed-effects model; REM, random-effects model; * indicates signifiance at 1%, ** indicates signifiance at 5%.

Both the Hausman Test (checking between REM and FEM) and the BPLM Test (comparing between POLS and individual specific effect models) suggest that REM is more appropriate. Slope coefficient of S/Y is higher in the basic model. The estimated results derived from both the IV-REM and IV-FEM seem to be not that much meaningful, where general government final consumption expenditure (% of GDP) and age dependency ratio (% of working-age population) are used as IVs for gross savings (% of GDP) as mentioned earlier. This is quite expected, where the contribution of public savings towards gross domestic savings is all most non existing as all the economies have been burdened with significant budget deficits. As through the standard tests, 1st order

serial correlation and hetroskedasticity have been detected, so, re-estimation has been done through both robust estimates and correcting for autocorrelation and hetroskydasticity. As there is not much of difference in the values of coefficients, so, only vce robust estimates are tabulated.

5. Conclusions

This research paper has been designed to trace out the impact of domestic savings, foreign aid, dynamism of capital mobility over time and the extent of trade openness on domestic capital formation for the 8 SAARC economies with a view to comment on the status of the F-H puzzle. We have covered 34 annual observations and installed several alternative static linear panel estimation techniques with a slight modification of the specification used by Isaksson (2001). It is believed that this study is the first one on that specific issue for the South Asian economies. Empirically, apart from foreign aid, all the other regressors have been found to be significant. The results also demonstrate that during the timeframe both gross savings and trade openness have positively affected domestic investments, which is absolutely in line with the previous research works. Moreover, it is also evident that foreign aid hasn't contributed well in capital accumulation in this region and gradual financial liberalization along with other initiatives has made the global capital more accessible to the economies. Different diagnostic tests have recommended that REM, corrected for hetroskedasticity and within panel serial correlation is the optimal model resulting in moderate savings coefficients for the chosen economies, which is absolutely consistent with general predictions about the F-H puzzle.

Younas (2005) has pointed out a major limitation of the F-H specification used in this paper. In an open economy, domestic investment is financed by the pool of global savings and as conceptually, it has been argued that FDI is not financed by the savings of the residents of the recipient country, the savings retention coefficient derived by excluding FDI from gross investments would have more precisely reflected the true extent of capital mobility for the F-H puzzle. Empirically, capital has been detected to be remarkably more mobile when FDI is excluded from domestic investments of the recipient country. This view point could be considered in future research on this topic for the SAARC region to have a grasp of any deviation.

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