International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

International Capital Mobility of Bangladesh, India, Pakistan, and Sri Lanka

Dr. P J Kumarasinghe

Senior Lecturer, Department of Business Economics, University of Sri Jayewardenepura, Nugegoda, Sri Lanka

Abstract: ***The degree of capital mobility and the long-run relationship between domestic saving and investment have various policy implications for a county. Feldstein and Horioka (1980) argue that in a world of perfect capital mobility, domestic saving and domestic investment would not be correlated to each other. Economists have studied extensively the relationship between saving and investment for developed countries but the same is not true for developing countries. We study the relationship between saving and investment rates for the four countries, namely, Bangladesh, India, Pakistan and Sri Lanka. We use advanced econometric methods for the study. We use both Jansen (1996) and Johansen cointegration tests to study international capital mobility. We study pair wise Granger causality tests in the VAR setting and use the bivariate Granger causality test. The results show that there is no long run relationship between saving rate and investment rate for the South Asian countries. Hence, we conclude that there is international capital mobility for these countries.***

Keywords: Capital Mobility, Error correction Model, Granger causality

1. Introduction

According to economic theory, in a closed economy, saving constitutes the only source of investment and the two must be equal by definition. In the controversial paper, Feldstein and Horioka (1980) argue for the first time that in a world of perfect capital mobility, domestic saving and domestic investment for a country would not be correlated to each other. Conventional wisdom is that capital mobility has increased in the recent years because of capital account liberalization in many developing and developed countries. Empirical findings of Feldstein and Horioka, which show a high correlation between domestic saving and domestic investment in OECD countries, is a puzzle. Economists have studied extensively the relationship between saving and investment for developed countries but the same is not true for developing countries.

Schneider (1999) points out that studying the degree of capital mobility for developing countries is a recent phenomenon. The degree of capital mobility and the long-run relationship between domestic saving and investment have various policy implications for a county. Schmidt (2001) points out that if there is a strong relationship between saving and investment, policy makers can alter investment through the introduction of policies that alter domestic saving. In contrast, if a high percentage of country's domestic investment is financed by foreign capital inflows, the government of that country has to take policy measures to ensure macroeconomic stability of the country.

2. Brief Literature Review

After the Feldstein and Horioka study, two competing fields of study have emerged. One branch of studies revisits the Feldstein and Horioka puzzle using a long sample period or dividing the sample period into two based on the date of change in exchange rate system. The second group of studies re-examine the Feldstein and Horioka puzzle by using alternative hypotheses such as intertemporal budget constraints, level of financial market development and so forth. Narayan (2005) re-examines the Feldstein and Horioka puzzle and studies the relationship between saving and investment for Japan. He indicates that there are limitations associated with panel data and cross-sectional data such as the problem of heterogeneity. Many econometric studies have approached international capital mobility by using either direct or indirect measurements of capital mobility. Kant (2005) analyzes capital mobility for the USA and it is different because he empirically measures international capital mobility by using capital inflows and outflows of the USA. Kant suggests that there is capital mobility for the USA. Kim et al. (2005) point out that majority of the Asian countries has removed the government controls on capital accounts and has liberalized their capital accounts since the late 1970s. If capital mobility has increased in the South Asian region, there would be no strong relationship between domestic saving and investment in the South Asian countries. Thus, an increase in one county's saving would be shared among the other countries with favorable investment opportunities in the region.

Some empirical studies show that government's response to current account targets can affect the relationship between saving and investment. Coakley et al. (1998) suggest that a high degree of capital mobility and a strong relationship between saving and investment can co-exist with current account targeting by the governments. Jansen (2000), Ho (2002), and Narayan (2005) argue that saving and investment are cointegrated if a country satisfies the solvency constraint or the intertemporal budget constraint.

3. Model building for the relationship between saving and investment and capital mobility

The fundamental insight of the model for saving and investment analysis is taken from Schneider (1999) and Claus et al. (2001). The familiar open economy's national income and balance of payment identities are used to establish the theoretical relationship between saving and

investment and capital mobility.

In an open economy, gross domestic product (GDP) is given as follows,

$$GDP = C+I+ G+(X-M) \quad (1)$$

where, C and G are household and government consumptions, respectively. I is investment. X and M are exports and imports, respectively.

Let's assume that the trade balance is in a surplus, i.e. exports exceed imports, and the country's net credit position with the rest of the world is a positive number which is denoted by B. Then, the country earns a world interest rate r for the claims. Thus, gross national product (GNP) is GDP plus the net factor income from the rest of the world. The country's GNP is given as follows.

$$GNP = Y= C + I + G + (X-M) + rB \quad (2)$$

If we rearrange equation (9.2), we can show that the current account is equal to the difference between saving and investment of the country. Equation (9.3) shows the relationship between saving and investment and current account balance or international capital flows into the country.

$$CA= (X-M) + rB = (Y-C-G)-I= S-I \quad (3)$$

In equation (9.3), S is gross national saving and S is defined as S=Y-C-G Also, S is equal to the sum of private and government saving. If the economy is closed to international capital movements, total domestic saving is equal to total domestic investment. In contrast, if the country is not closed to international capital movements, total domestic saving does not equal total domestic investment. If for a country, domestic saving exceeds domestic investment, the country will have a current account surplus and will accumulate net foreign factor income from the world.

4. Methodology and data sources

Two error correction models are employed in the analysis of saving and investment relationship in the South Asian region. We employ two models to check the robustness of the findings and to compare the results of the two methods. First, we use the error correction model that was used by Jansen (1996). Second, we use the Johansen cointegration tests. The model shows both the short-run and the long-run relationships of saving and investment rates. Also, the model captures co-movement of saving and investment rates in response to shocks that hit the economy in the recent past. Baharumshah et al. (2003) and Sinha (1998) point out that cointegration does not imply causality. According to Gujarati (1995), Granger causality is a technique for studying whether one time series is useful in forecasting another time series. We use the Breusch-Godfrey serial correlation test to test the serial correlation and AR(1) procedure is used if the results are encountered by the serial correlation. Annual data from 1960 to 2004 are used for Pakistan and for Sri Lanka. Data cover the period from 1965 to 2004 and from 1973 to 2004 for India and Bangladesh, respectively.

5. Long rung relationship between saving and investment for the four countries

This section presents the results of the relationship between saving and investment for the four South Asian countries. AR(1) procedure is used for Pakistan because the Breusch-Godfrey serial correlation test shows that the OLS results of Pakistan have the problem of serial correlation. Though the error correction model, Jansen (1996), can be estimated without considering the order of integration of the variables, time series properties of saving and investment rates are studied before analyzing the relationship between saving and investment. The results of the Ng-Perron tests indicated that both saving and investment rates are integrated order one i.e. I(1) at the 5% level for all the countries except for Sri Lanka.

Table 1: Results of the error correction model

Country	α	β	γ	δ	R^2	DW	BD	JB
Bangladesh	0.1583 (0.1406)	0.1924 (2.1067)	-0.0672 (-0.4271)	-0.0105 (-0.2550)	0.40	2.34	0.95	3.77
India	-0.8544 (-1.4743)	0.3695 (5.8482)	0.3603 (4.4650)	0.0479 (1.6274)	0.54	1.84	0.18	2.22
*Pakistan	9.9278 (1.1970)	0.0557 (0.6081)	0.5407 (1.109)	-0.6371 (-1.2269)	0.26	1.77	0.16	0.93
Sri Lanka	1.5908 (0.6754)	-0.0781 (-0.4433)	0.1145 (1.5777)	-0.0418 (-0.2592)	0.07	1.61	0.44	2.18

Notes: The first four rows show the estimated coefficients of the error correction model. The model is as follows:

$$\Delta IR = \alpha + \beta \Delta SR_t + \gamma (SR_{t-1} - IR_{t-1}) + \delta SR_{t-1} + \varepsilon_t .$$

Values in parentheses are the t-statistics. Durbin-Watson statistics is given in the DW column. BD column shows the p-value of the Breusch-Godfrey serial correlation test and JB

shows the Jarque-Bera test statistics at the 5% level.

* The results are for the AR (1) procedure.

The test results show that the long run saving and investment rates' coefficient i.e γ is statistically significant for India at the 5% level of significance and 10% level of significance for Sri Lanka. The statistically significant values for $SR_{t-1} - IR_{t-1}$ shows that there is a long-run relationship between saving and investment and thus, saving and investment rates are cointegrated for Sri Lanka and India. This implies that the intertemporal budget constraint is obeyed for India and Sri Lanka. The coefficient β which shows the short-run relationship between saving rate and investment rate, is statistically significant at the 5% level for both Bangladesh and India. Judging by the Feldstein and Horioka criterion, the statistically significant values for ΔSR_t implies that there is capital mobility for India and Bangladesh. The short-run relationship between saving and investment rates is not statistically significant for Pakistan and Sri Lanka. The coefficient of SR_{t-1} is statistically significant at the 10% level only for India and thus, it implies that there is evidence of international capital mobility for India.

5.1 The Results of the Johansen cointegration test

Sinha (2002) points out that in Johansen cointegration tests, the time series are required to be nonstationary in their levels to proceed with the cointegration test. Moreover, it is important that all time series are I (1). The unit root results show that both saving and investment rates are integrated of order one for all countries except for Sri Lanka. Based on the unit root results, IR and SR of India, Pakistan and Bangladesh are used for the cointegration test. The unit root results show that we can not proceed with the Johansen cointegration test for Sri Lanka. The results of the trace tests and maximum eigenvalue tests are given in Table 2.

Table 2: Results of the cointegration tests between saving and investment rates for Bangladesh, India, and Pakistan

Country	Trace tests		Maximum eigenvalue tests	
	Test statistics	Critical values	Test statistics	Critical value
Bangladesh	14.2991	15.4947	14.1647	14.2646
India	15.3066	15.4947	12.9725	14.2646
Pakistan	9.8525	15.4947	9.3816	14.2646

Notes: The null hypothesis for both the tests is r=0.
Critical values are at the 5% significance level.

Neither the maximum eigenvalue nor the trace tests rejects the null hypothesis of no cointegration at the 5% level for all the three countries. The failure to reject the null hypothesis of r = 0 means that saving and investment rates are not cointegrated and there is no long run relationship between saving rates and investment rates for the three South Asian countries. According to the Feldstein and Horioka interpretation, the results could be seen as evidence of high international capital mobility for Bangladesh, India and Pakistan.

5.2 Results of the causality test between saving rate and investment rate

Sinha (1998) suggests that when the variables are cointegrated or they are stationary, then the causality test can be conducted. In our case, saving rate and investment rate are not cointegrated for all countries. However, saving rate and investment rate are stationary in their first differences for all countries and thus, we use first differences of saving rate and investment rate for the causality test. The results indicated that there is no evidence of Granger causality in either direction between saving rate and investment rate for India, Pakistan and Sri Lanka. Also, bivariate Granger causality tests show that the results are not sensitive to the choice of lag length for India, Pakistan and Sri Lanka.

6. Conclusions

We study the cointegration and Granger causality tests for four South Asian countries. The Granger causality tests show that saving and investment rates are statistically independent for India, Pakistan and Sri Lanka. For Bangladesh, there is a causality running from saving rate to investment rate and there is a reverse causality. The results show that there is no cointergration between saving and investment rates for the South Asian countries. Thus, we conclude that there is no long run relationship between saving rate and investment rate for the South Asian countries.

References

[1] Feldstein, M., and Horioka, C., (1980), "Domestic Saving and International Capital Flows", *The Economic Journal*, vol. 90, no. 358(June), pp. 314-329.
[2] Schneider, B., （1999）, "Saving-investment Correlations and Capital Mobility in Developing Countries with Special References to India", Indian Council for Research on International Economic Relations, Working Paper no.48, New Delhi, India.
[3] Schmidt, M. B., (2001), "Saving and Investment: Some International Perspectives", *Southern Economic Journal*, vol. 68, no. 2 (Oct), pp. 446-456.
[4] Bahmani-Oskooee, M., Chakrabarti, A., (2005), "Openness, Size, and Saving-Investment Correlations", *Economic Systems*, vol. 29, pp. 283-293
[5] Kim, H., Oh, K., and Jeong, C., (2005), "Panel Cointegration Results on International Capital Mobility in Asian Economies", *Journal of International Money and Finance*, vol. 24, pp. 71-82.

[6] Coakley, J., Kulasi, F., and Smith, R., (1998), "The Feldstein-Horioka Puzzle and Capital Mobility: A Review", *International Journal of Finance and Economics*, vol. 3, pp. 169-188.
[7] Ho, T., (2002), "The Feldstein –Horioka Puzzle Revisited", *Journal of International Money and Finance*, vol. 21, pp. 555-564.
[8] Jansen, W. J., (2000), "International Capital Mobility: Evidence from Panel Data", *Journal of International Money and Finance*, vol.19, pp. 507-511.
[9] Narayan, P., (2005), "The Relationship between Saving and Investment for Japan", *Japan and the World Economy*, vol. 17, pp. 293-309.
[10] Claus, I., Haugh, D., Scobie, G., and Tornquist, J., (2001),"Saving and Growth in an Open Economy", New Zealand Treasury, *Treasury Working Paper Series*, vol. 01, no. 32, Wellington, New Zealand.
[11] Baharumshah, Z. A., Thanoon, M. A., and Rashid, S., (2003), "Saving Dynamics in the Asian Countries", *Journal of Asian Economics*, vol.13, pp. 827-845.
[12] Sinha, D., (1998), "Saving and Economic Growth in Thailand", *Philippine Review of Economics of Business*, vol. 35, pp. 177-86.
[13] Johansen, S., (1995). "Likelihood-based Inference in Cointegrated Vector Autoregressive Models", Oxford University Press, Oxford.
[14] Johansen, S., and Juselius, K., (1990). "Maximum Likelihood Estimation and Inferences on Cointegration—with applications to the demand for money," *Oxford Bulletin of Economics and Statistics*, vol. 52, pp. 169–210.
[15] Sinha, D., (2002), "Saving-investment Relationships for Japan and Other Asian Countries", *Japan and the World Economy*, vol. 14, pp.1-23.
[16] Granger, C. W. J., (1969), "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods," *Econometrica*, vol. 37, pp. 424–438.
[17] Gujarati, D. N., (1995). *Basic Econometrics*, 3rd Edition, New York: McGraw-Hill.
[18] Hayami Y., 2001, *Development Economics*, 2nd Edition, Oxford University Press, London.
[19] Narayan, Paresh Kumara, (2005), "The Relationship between Saving and Investment for Japan", *Japan and the World Economy*, vol. 17, pp. 293-309
[20] Kant, Chander, (2005), "Capital Mobility among Advanced Countries" *Journal of Policy Modeling*, vol.27, pp. 1067-81.