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Savings transition in Asia: Unity in diversity

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January 2023

Working Papers in Trade and Development

No. 2023/01

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Savings transition in Asia: Unity in diversity*

Prema-chandra Athukorala and Wanissa Suanin

Abstract

This paper examines the national saving behaviour in the process of economic growth through a comparative analysis of countries in developing Asia from a historical perspective. Developing Asia provides an ideal laboratory for the study with considerable differences in the saving behaviour among countries and over time within individual countries, notwithstanding the 'model saver' image of the region that is based mainly on the experience of high-performing East Asian economies. The empirical analysis distinguishes between private and government saving rates, with specific emphasis on the former. The results of the empirical analysis are consistent with the view of a 'virtuous circle' between growth and saving, with growth initiating the saving transition. No evidence to suggest that a prior phase of promoting saving through specific policy initiatives is needed to initiate the process of growth and structural transformation. The private saving rate is also associated positively with export orientation of the economy, and net foreign capital inflows and negatively with the young dependency ratio of the population and domestic credit availability.

Key words: developing Asia, savings, investment, life cycle model, export-led growth.
JEL classification: D15, E21, O47, O53

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* : This paper was written for the multi-country research project on Domestic Savings Shortfall in Developing Countries, UN World Institute of Development Economic Research, Helsinki, 2021–22. We are grateful to Tony Addison and Kunal Sen for excellent comments and suggestions, Arianto Patunru for help with writing the Box on the Indonesian fiscal rules, and Wannaphong Durongkaveroj for compiling data on corporate savings.

1. Introduction

The literature on national saving in the process of economic development and structural change has evolved around two separate but interrelated issues: what is the relationship between the saving rate and growth, and why do saving rates differ across countries and over time in a given country? The debate on the first issue has been virtually settled, even though there has been some controversy about why a given saving rate is associated with different growth rates and in what way the causality runs. In the formative stage of development thinking during the early post-war years, the Harrod-Domar model, which held sway as the workhorse of development policy, linked growth directly and almost exclusively to the saving rate (Meier, 1984). Given the perceived structural constraints on domestic saving mobilization in developing countries, foreign saving (foreign capital inflows) was considered a key prerequisite for economic take-off. The supremacy of saving (and hence investment) in the growth process was, however, questioned by the neoclassical growth model (Solow, 1956) that received increased attention in the policy debate from the late 1960s. It postulated that an increase in saving rates generates higher growth only in the transition between steady states, and long-term growth depends solely on technological progress. From about the late 1980s, the new endogenous growth models have, however, provided theoretical support for the view that investment results in a permanent increase in growth rates. New multi-country empirical growth studies spawned by these theoretical advances have supported the notion that the rate of investment is the single-most most robust correlate of long-run growth (Levine and Renelt, 1992; Sala-i-Martin, 1997; Bond et al., 2010).

In contrast to the emerging consensus on the saving-growth nexus, the issue of why some countries save more than others remains an unresolved issue. What is the process by which a community that was previously saving a low percentage of national income dramatically increases its saving? Do countries need to start with specific saving proportion policies to initiate the growth process or by harnessing foreign capital inflows? Alternatively, would initiation of the growth process through economy-wide market-oriented reforms generate a 'virtuous cycle' of growth-induced saving, resulting in a further increase in saving to generate even higher saving and growth? The purpose of this paper is to contribute to this debate through a comparative analysis of saving behaviour in countries in developing Asia from a historical perspective. The focus on Asia is motivated by two reasons. First, the experiences of these countries as 'model savers' figure prominently in the contemporary policy debate on the role of domestic saving in economic development and how to bridge the domestic investment-saving gap that constrains the growth process in most developing countries (Ranis, 1995; Stiglitz, 1996). Second, notwithstanding the 'model saver' image, which is based mainly on the experience of high-performing East Asian economies, there are considerable differences in the saving behaviour among countries and over time within individual countries in the region. Therefore, the region provides an ideal laboratory to study the determinants of saving in the process of economic growth and structural transformation.

The chapter aims to add to the existing knowledge of the saving behaviour of countries in developing Asia in several ways. First, for the first time in the study of comparative saving behaviour in the region,[1] the analysis distinguishes between private and the government saving rates, with specific emphasis on the former. The specific focus on private saving is important from the policy point of view because public saving is mostly driven by unobservable political factors. Second, export orientation in the development process is explicitly included in the saving function as a conditioning variable in examining the relationship between the saving rate and per capita income growth. Third, benefiting from recent improvement in the national data reporting systems, we use an annual balance panel data set for the period 1980–2019, encompassing countries in Northeast Asia, Southeast Asia, and South Asia. Finally, we use improved econometric techniques in estimating the saving function . to allow for unobserved heterogeneity among countries, a common problem in estimation with cross-sectional data, while addressing endogeneity bias in the saving-growth nexus.

The next section presents a comparative analytical narrative of saving performance in Asia in the global context, with emphasis on policy regime shifts. This is followed by an an econometric analysis of the determinants of the saving rate. The key findings are summarised in the concluding section.

2. Saving behaviour in developing Asia: a historical perspective

2.1 Overall patterns

The saving rates in Asian countries were not unusually large in the early post-war years. Rosenstein-Rodan (1961), in a pioneering study undertaken to inform the policy debate on international development aid, estimated the average gross saving rate of Asian countries at 7.0 per cent compared to 9.4 per cent in Latin America and only one percentage higher than that in Africa (5.9 per cent). Interestingly, at the individual country level, Burma (Myanmar) and India had a higher similar saving rate of 8.5 per cent compared to Taiwan (8.0 per cent) and South Korea (6.5 per cent) (Rosenstein-Rodan, 1961, Table 3-A).

The patterns began to change from about the late 1960s. By the early 1970s, the average Asian saving rate exceeded that of Latin America and was more than double the average rate recorded in Sub-Saharan Africa. During the ensuing years, the gap between the Asian rate and those of the other major regions and the overall world saving rate has widened. Overall, the Asian saving rates have also been much more stable (Figure 1 and Table 1).

[1] The previous comparative studies of aggregate national saving in Asia are Collins, 1991; World Bank, 1993; ADB, 1997; Horioka and Terada-Hagiwara, 2012.

Figure 1 about here

Table 1 about here

At the formative stage of the emergence of development economics as a separate discipline, Sir Arthur Lewis (1954) made the following highly cited observation on the role of the saving transition in the process of economic development:

> The central problem in the theory of economic development is to understand the process by which a community which was previously saving and investing 4 or 5 per cent of its national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 per cent of national income or more. This is the central problem because the central fact of economic development is rapid capital accumulation (including knowledge and skills with 'capital'). We cannot explain any 'industrial' revolution (as the economic historians pretend to do) until we can explain why saving increased relatively to national income (Lewis, 1954, 155).

When assume a capital consumption allowance of 10 per cent, the saving threshold Lewis consider for lifting a country on to a sustainable growth path is a national saving rate of 22 to 25 percent (Srinivasan, 1994).

The countries in Northeast Asia and Singapore[2] had already passed the 'Lewisian threshold' by the early 1980s, all major Southeast Asian countries other than Indonesia and the Philippines by the early 1990s, and India in the early 2000s. Bangladesh, Pakistan and Sri Lanka and Philippines remain short of reaching the threshold throughout the periods under study (Table 1, and Table SM2-1 in Supplementary Materials).

2.2 Private and government saving

The data on gross national saving disaggregated by private and public (government) saving are summarized in Table 2 for 13 Asian countries for which data are available at least for the past three decades. It is important to note that these data are not strictly comparable with those reported in Table 1. The gross national saving rate additionally captures remittances by migrant workers. The saving rates reported here are, therefore, larger for

[2] From about the early 1980s, Singapore has recorded the highest saving rate in the region (and perhaps in the world). This is partly the result of a unique government policy that required all workers to make an annual contributions to a pension fund.

countries that receive a significant inflow of migrant worker remittances (in particular in Sri Lanka and the Philippines). Nonetheless, overall, the general picture presented is comparable.

Overall, both intercountry differences in national saving behaviour and intertemporal patterns within countries are dominated by private saving. The rate of public (government) saving is not as high as observed in some comparative studies. For instance, Edwards (1996) wrote that government saving accounted for between 30 per cent and 40 per cent of total national saving in East Asian countries. However, during 1980–2009, on average, government saving in Asia as a percentage of gross national income amounted to 4 per cent compared to a private saving rate of 26 per cent. That is, the government directly accounted for only about 15 per cent of total national saving in the region.

Government saving in the East Asian countries are notably higher than in South Asia. During 1980–2019, the combined government saving rates in Northeast Asia and Southeast Asia were 2.8 per cent and 4.2 per cent, respectively, compared to just 1.5 per cent in South Asia. The government saving rates are notably high in Singapore and Indonesia, averaging to around 9–11 per cent of gross national income in both countries. The high government saving rate in Indonesia, notwithstanding its relatively lower raking in overall saving performance in East Asia, seems to reflect the country's longstanding strict fiscal discipline, enforced by a rule that prohibits the government from borrowing domestically to finance expenditures (Blöndal et al. 2009; ADB, 1997).

Table 2 about here

2.3 Corporate savings

In analysing behaviour of private saving, it is important to examine how corporate saving have behaved compared to household and government saving. Unfortunately, disaggregated data are not available for a sufficient number of countries in the regional for a comparative analysis. The available data for China, Taiwan, Korea, the Philippines, and India are plotted in Figure 2 in Athukorala & Suanin (2022). In Korea and Taiwan, corporate saving has been the prime mover of national saving over the past two decades or so, with the gap between household and corporate saving widening over the years. In China, corporate and household saving have contributed almost equally to increase in national saving during the entire period of 1992–2019, without any notable change in their relative contribution. Corporate saving in India has begun to show a modest increase following the first wave of liberalization reforms in the mid-1980s and gained impetus from the second-wave reforms initiated in the early 1990s

2.4 Domestic savings—investment gap and capital mobility

By definition domestic investment is the sum of domestic saving and foreign saving (net foreign capital inflow). To want extend the Asian countries have relied on foreign saving to finance investment? This question is directly relevant for the ensuing analysis of the saving-growth nexus because the Asian economies have become increasingly opened not only through current account transaction but also through capital account transactions during the period under study. In this context, the degree of dependence on foreign saving investment could weaken the postulated link between the national saving and growth.

There are notable intercountry differences in terms of the capital-importing ('deficit' saving) and capital-exporting ('excess' saving) status (Athukorala and Suanin 2022, Table 3). In Northeast Asia, Taiwan has been a net capital exporter throughout this period, with capital exports relative to domestic national income increasing over the past three decades. China and Korea have become net capital exporters in the 2000s, following drawing on foreign saving to meet the investment-saving gap in the 1980s and 1990s. Countries in Southeast Asia exhibit a mixed picture. Malaysia, Thailand, and Singapore have become capital exporters over time, with Singapore becoming by far the largest capital exporter relative to national income in the Asian region. The four South Asian countries, have continued to rely on foreign saving to fill the domestic investment – saving gap. However, even in these countries domestic saving has accounted for over 90% of total domestic investment, after allowing for the exceptional cases of Bangladesh and Sri Lanka in the 1980s. Interesting, unlike in Latin America, net capital flows in all countries during most of the period under study have generally dominated by foreign direct investment (FDI), rather than portfolio capital which are more volatile and susceptible to external shocks (Athukorala & Rajapatirana, 2003).

3. Saving rate determination: empirical analysis

The section undertakes an econometric analysis of the determinants of saving using a panel data set for 12 Asian countries[3] for which data are available for the entire period 1980–2019. We focus specifically on private saving because preliminary analysis suggested that public saving is mostly driven by unobservable political factors. Data are not available for disaggregating private saving into household saving and corporate saving (retained earnings). Apart from this data constraint, the focus on aggregate private saving is justified by the 'consideration that corporate saving, just like personal (or household) saving, will tend to result, at least in the long run, in an increase in private net worth by way of its net effect on the market value of corporate equity' (Modigliani, 1966). Provided the shareholders look through the *corporate veil* and take into account

[3] The countries listed in Table SM2-2 except Vietnam.

corporate saving (retained earnings) in their lifetime saving/consumption decisions, no separate treatment of household and corporate saving is needed to understand the saving behaviour of the economy. This view is no doubt an approximation (Gersovitz, 1988; Poterba, 1991). Shareholders may be myopic and fail to devote the necessary resources to monitor corporate performance. Various factors impacting on business operations such as liquidity constraints, tax policies, and other kinds of capital market imperfections could limit shareholders' ability to pierce the corporate veil. Perhaps these factors would have because increasingly important in contributing to the dichotomy between personal saving and corporate saving in recent decided in the context of the shrinking of labour share in relation to corporate profit in private income as an integral facet of the ongoing process of economic globalisation (Redeker, 2022).[4]

3.1 The model

The saving function is formulated based on the life cycle model (LCM). The attractiveness of the LCM for our analysis lies in both its elegant formulation of the impact of income growth and demographic dynamics, which are central to understanding the saving transition in the process of growth and structural change (Deaton, 2005).

The LCM originated in Modigliani and Brumberg (1954), which worked out a theory of spending based on the postulate that working age people make provision for their retirement by tailoring consumption patterns to income at different ages over life time, independently of the income at each age.[5] Modigliani and co-researchers subsequently extended the theory into an analytical framework applicable to the economy as a whole that led to the important prediction that national saving depends on the rate of national income growth, not its level, and demographic profile of the economy (See Modigliani, 1986 and works cited therein). In an economy in which national income is growing so that each generation is better off than their parents, the young will be saving on a large scale than the old are dissaving, so that faster the growth, the higher the saving rate: Saving is therefore the consequence of growth, not wellspring of growth. At the same time, an increase in the population growth rate increases the working-age population (savers) relative to the number of retirees (dissavers). Thus, even if all the individuals in two given economies have the same saving profile over their life cycles, the aggregate saving rate can be different depending on population dynamics. A sizeable body of literature over the past five decades has further expanded and enriched the core model to deal with wide range of variables that have the potential to impact the saving rate by conditioning the impact of economic growth and population dynamics.

[4] The findings of Horioka (1991) for Japan, Ha et al. (2010) for South Korea, and Aron and Muellbauer (2000) for South Africa supports the hypothesis of households piercing of the corporate veil.. Poterba (1991) has come up with mixed results for the United States, UK, and Canada.

[5] For a succinct formal presentation of the basic model, see Gersovitz (1988, Section 2.1).

The core model postulates that the savings rate is related to the growth of per capita income, *not* the current level of per capita income as postulated by the standard Keynesian absolute income hypothesis. This postulate stems from the assumption that individuals are forward-looking and, therefore, base their savings decisions on lifetime income rather than current income. a significantly large core of households that are able to carry over resources to provide for old age at a standard of living commensurate with that of preretirement. This assumption holds fairly well for developed countries where significantly large core of households are able to carry over resources to provide for the old age. However, in developing countries the portion of the population in the bottom rungs of the income distribution may find it impossible or too burdensome to set aside resources now in order to provide for later consumption. For these reasons, 'conceivably for a sufficiently low value of per capita income, … the saving-income ratio for given growth would … tend to rise with [the level of] income' (Modigliani (1993, 276).

There is a sizeable body of empirical evidence that the degree of export orientation of the development strategy plays an important role in explaining intercountry differences in growth and the savings rate (Maizels 1971; Weisskopf 1972; Balassa 1989). Export orientation leads to better growth performance than policies favouring import substitution by facilitating resource allocation according to comparative advantage; allowing for greater capacity utilization and scale economies and greater technological improvement in response to competition from abroad; and contributing to employment growth. To the extent that the propensity to save is associated with marginal rates of growth exceeds that associated with the average rates, the rates of savings would be higher under export orientation. Moreover, in a labour surplus economy growth through greater export orientation has the potential to tilt income distribution in valour of the entrepreneurs whose propensity to save might be higher (Lewis 1954). We therefore include export orientation on its own (to capture the direct effect of export orientation on the savings rate) as well as interactive with economic growth (to capture the growth-enhancing effect of export orientation on the saving rate) as explanatory variables in the model.

The hypothesized link between income growth and the savings rate is based on the assumption of perfect capital markets that enable households to borrow freely against future income in order to smooth consumption over their lifetime. If the households are liquidity constrained—they are unable to borrow freely against future income—the consumption behaviour might be linked to current income rather than to lifetime income. Thus, the borrowing constraint, in addition to forcing households to maintain consumption at current income levels, can in fact convert a negative saver into a positive saver by forcing them to save more at present in order to undertake lumpy (indivisible) expenditure plans in the future (Gersovitz 1988).

The LCM is also assumes certainty of future income streams in the mind of the individual. However, if income prospects are uncertain, saving is not only about accumulation for future consumption but also about consumption smoothing in the face of volatile incomes. In other words, a precautionary motive rooted in economic uncertainty can be an important driver of savings behaviour (consideration behind saving). We therefore include the rate of inflation to capture precautionary savings effects of macroeconomic uncertainty.

Inflation can have a positive effect on saving, as uncertainty about future real incomes in an inflationary environment may encourage saving for maintaining future consumption levels. However, it can also have negative effects on saving by increasing the uncertainty about future value of accumulated savings (Corbo and Schmidt-Hebbel 1991; Deaton 1989; Loayza et al. 2000).

Social security payments could have a negative impact on personal savings as individuals substitute these expected government transfers for personal savings accumulated for retirement (Modigliani & Sterling 1983, Modigliani & Cao 2004). As in the case of social security payments, the existence of bequests (inherited wealth) has the potential to weaken the postulated impact of income growth on the national saving rate. However, the available evidence suggests that the bequest motive affects the saving/consumption behaviour of rather small number of households mostly belonging to the highest income brackets an therefore it is possible to go a long way in analysing national saving behaviour without dealing with wealth inheritance (Modigliani 1986; Deaton, 2005).

The real interest rate has two countervailing effects on savings depending on whether the person is a net borrower or a net lender. In the former case, a higher interest rate increases the present price of consumption relative to the future price and thus provides an incentive to increase savings (the substitution effect). By contrast, in the latter case, an increase in the interest rate raises lifetime income and thus tends to increase consumption and decrease savings (the income effect).

The impact of foreign resource inflows ('foreign savings') on domestic savings remains a debatable issue (Papanek 1972, Weisskopf 1972; Reinhart and Talvi 1998; Obstfeld 1999). Foreign savings can act as a substitute for domestic savings if the agents draw on foreign savings to smooth current expenditure over time. However, there is room for developed-oriented governments to harness foreign resources to meet the gap between domestic investment and domestic savings without an adverse effect on domestic savings. Also, foreign resource inflows are not a homogenous phenomenon. Foreign direct investment, which directly contributes to the domestic production capacity of the economy unlike concessionary foreign aid and other forms of capital inflows, has the potential to help promote domestic savings.

The fiscal policy can affect private savings behaviour through two possible channels with opposing effects. First, the Ricardian equivalence proposition (Barro 1974) postulates that government dis-saving (budget deficit) results in an equal increase in private savings because the private sector saves anticipate a future increase in taxes to service the deficit. Second, government savings behaviour can be indicative of the soundness of macroeconomic management, including a lower rate of inflation, prudential exchange rate policies, and capable monetary management. Stable economies, in turn, lower the risk for investors and therefore lower the cost of capital for long-term investment and encourage savings (and investment) by the private sector.

The final consideration relates to the role of financial deepening (increasing provision of financial services) in the economy (*FND*) in promoting saving. Financial deepening has the potential to increase in private saving rate through encouraging financial saving, by improving the accessibility to banking facilities (Athukorala and Sen, 2004).

Informed by this literature, and tailored to data availability, we specify the saving function in a panel data setting as follows:

$$PSR_{it} = \beta_0 + \beta_1 GY_{it} + \beta_2 YD_{it} + \beta_3 YDEP_{it} + \beta_4 ADEP_{it}, + \beta_5 EOR_{it} + \beta_6 EOR*GY_{it} + \beta_7 CRP_{it} + \beta_8 RID_{ti} + \beta_9 INF_{ti} + \beta_{10} SSP_{it} + \beta_{11} FND_{it} + \beta_{12} FS + \beta_{13} BBL_{it} + \gamma_i + \eta_t + \epsilon_{i,t} \quad (1)$$

where *PSR* is a private saving rate; γ_i and η_t are country- and time-specific effects; β'_{ik}.

The explanatory variables are defined below with the expected signs of β'_{ik} given in brackets:

GY (+) The rate of growth of per capita private income

YD (+) Per capita real private income

YDEP (-) Young dependency measured as the ratio of the population aged 15 and under to the working-age population (aged 16–64)

ADEP (-) Aged dependency measured as the ratio of the population aged 65 and older to the working-age population (aged 16–64)

EOR (+) Export orientation measured as exports relative to GDP

RID (?) The real interest rate on bank deposits

INF (?) Inflation rate

CRP (-) Institutional lending to the private sector as a ratio of private income

SSP (-) Social security payments as a ratio of private income

FND (-) Financial deepening of the economy

FS (?) Foreign capital inflow as a percentage of gross national income

BBL (?) Government budget balance as a percentage of gross national income

3.2. Data source, variable measurement

The estimation of the saving function is undertaken using an annual unbalanced panel data set of 12 Asian countries, covering the period 1980–2019. Data on the saving rate for all countries other than Taiwan are compiled from the *Key Indicators of Asia and the Pacific* (KIAP) database of the Asian Development Bank, which is based on the official records of individual ADB member countries. In the national accounts of these countries, the data on national saving are estimated indirectly, subtracting net resource inflows ('foreign saving') (after allowing for changes in the holding of foreign exchange reserves) from aggregated domestic investment. Data on national saving disaggregated into private saving and public saving are available from the national data systems only for India and South Korea. For the other countries, we derived private saving by deducting government saving from total national saving. Government saving is derived as the difference between government revenue and government recurrent expenditure. Any data series that is derived as a 'residual' from two other national account aggregates naturally incorporates possible estimation errors of the latter two magnitudes. Therefore, the use of the saving date used in the econometric analysis is based on the assumption that the estimation errors remain consistent over the period under study (Srinivasan, 1994). The data on the other variables are collected or compiled from several sources. The deposit interest rate of India is compiled from the reserve bank of India. The data on deposit interest rates of other countries and money stocks are retrieved from the International Monetary Fund. All other data series (except for Taiwan) are extracted from the World Bank World Development Indicator database. All data series for Taiwan are compiled from various issues of the *Taiwan Statistical Data Book* (Council for Economic Planning and Development, Taipei).

Nominal private income is converted into real terms using the consumer price index (CPI =2010). The results are remarkably resilient to the use of the GDP deflator as an alternative price deflator The young-age dependency ratio (*YDEP*) is the percentage of the population aged 15 and under relative to the working population aged 15–64. Similarly, the old-age dependency ratio (*ADEP*) is constructed by dividing the population aged 65 and older by the working population aged 15–64. The results are remarkably resilient to the use of the GDP deflator as an alternative price deflator. Financial deepening is proxied by broad money supply (M3) as a percentage of GNI. Social security payments are measured by the government transfer payment, including subsidies, grants, and other social benefits. The real interest rate (*RID*) is measured as $ln[(1 + NID)/(1 + INF)]$, where *NID* is the average time deposit rate in commercial banks and *INF* is the current rate of inflation calculated from the CPI. All variables (except all dummy variables) are used in percentage form.

3.3 Econometric procedure

We began the estimation process by examining the time series properties of the panel data using the Im-Persara-Shin (CIPS) test (Pesaran, 2007). The results indicated that the private saving series, *PSR*, and all other explanatory variables except *GY*, *RID*, and *FS* are non-stationary (I(1)). Based on this result, we conducted test to examine the existence of a long-run relationship among the variables (Pedroni, 2004). The results indicated that two of the four test statistics relating to cointegration of the 'within dimension' of the data panel and one of the three relating to cointegration of the 'between dimension' of the data panel are

statistically significant. These results (Athukorala and Suanin 2022, Tables 4 and 5) provide sufficient grounds to use the panel-data ARDL estimator to estimate the saving function.

Equation (1) can be rewritten in ARDL form as follows:

$$PSR_{i,t} = \sum_{k=1}^{p} \phi_i PSR_{i,t-k} + \sum_{k=0}^{q} \beta'_{ik} X_{i,t-k} + \gamma_i + \eta_t + \epsilon_{i,t} \quad (2)$$

where $X_{i,t}$ is a vector of explanatory variables; and ϕ_i is the coefficient of the lagged dependent variable.

When Equation 2 is reparametrized in error correction form:

$$\Delta PSR_{i,t} = \rho_i \left[PSR_{i,t-1} - \lambda'_i X_{i,t-1} \right] + \sum_{k=1}^{p-1} \zeta_{ik} \Delta PSR_{i,t-k} + \sum_{k=0}^{q-1} \beta'_{ik} \Delta X_{i,t-k} + \gamma_i + \eta_t + \epsilon_{i,t} \quad (3)$$

where $\rho_i = -(1 - \phi_i)$ is the speed of adjustment coefficient (expected that $\rho_i < 0$), representing the speed of adjustment of imports to a shock to move back to the long-run equilibrium; λ'_i is the vector of long-run coefficients; $ECT = \left[SR_{i,t-1} - \lambda'_i X_{i,t-1} \right]$ is the error correction term that captures speed of convergence to equilibrium; and ζ_{ik} and β'_{ik} are the short-run coefficients.

Equation 3 permits us to examine short- and long-run dynamics and the speed of adjustment of the model to equilibrium. This formulation is 'robust to integration and cointegration properties of the regressors, and for sufficient lag-orders, could be immune to the endogeneity problem, at least as far as the long-run properties of model are concerned' (Pesaran, 2015, p 726). Since we work with an annual panel data set of sufficient time coverage (39 years) that permits systematically testing lag orders, possible endogeneity bias could be asymptotically negligible due to the super consistency property resulting from the parametrization of the model in levels and divergences.

The Akaike information criterion (AIC) is used to decide the appropriate lag length.[6] Two alternative estimators are used to explore the potential heterogeneity of parameters among the countries within the data panel: the dynamic fixed effects (DFE) estimator and the mean group (MG) estimator (Pesaran, 2015). The DFE estimator allows the intercepts to differ freely across groups, while all other coefficients and error variances are constrained to be the same. The MG estimator allows coefficients to differ freely across groups, by first estimating one equation per group (a country in our case) and taking the average across groups (countries). The Hausman test is used to identify the appropriate estimator (Hausman, 1978).

3.4 Results

[6] The results are robust to the use of the Schwarz Bayesian criterions (SBC).

The saving function was estimated for the 12 countries, and the countries other than China. In both cases, the DFE was the appropriate estimator in terms of the Hausman test. The results are reported in Table 3. A comparison of the two equation helps understand the possible sensitivity of the results to China's dominance in the overall saving performance in Asia.

Per capita real private income (*YD*) was dropped by the ARDL estimator because of its high collinearity with the growth rate of *GY*. In alternative estimates that excluded *GY*, the coefficient of *YD* was not statistically significant even though it had the expected positive sign. Dropping *YD* for the final estimates was supported by the standard variable deletion *F* test. .The social security payment (SSP) is dropped from the reported equations because data were not available for three countries (China, Indonesia, and India) and data for some years are missing for other countries. In the equation estimated for the other nine countries, the coefficient had the expected negative sign but was not statically significant, and its inclusion had no notable impact on the estimated coefficients of the other variables. [7]

Given our focus on saving transition in the growth process, we are interested mainly in the long-run estimates. In both equations, the coefficient of the ECM term is highly statistically significant with the expected negative sign, suggesting a moderate (about 1.4 years) speed of convergence of *PSR* to equilibrium.

In the equation for all countries (Equation 1), the coefficients of *GY* is statistically significant at the one per cent level. The results suggest that a one percentage point increase in the growth rate of per capita private income is a 1.27 percentage point increase in the long run. The results are remarkably resilient to the exclusion of China from the country coverage (Equation 2).

Table 3 about here

Relating to the interpretation of this result, an important issue is the possible endogeneity of *GY* in the model (Deaton, 2005). However, as noted, the panel ARDL estimator has the advantage of minimizing possible endogeneity of the right-hand variables by reparametrizing the model in levels and differences. As a further test, we performed the Granger causality test and impulse response function (IRF) analysis using the panel-data vector auto regression procedure developed by Abrigo & Love (2016). The rest results are reported in Table 4 and Figure 2. According to the Granger causality test, the null hypothesis that *GY* does not cause *PSR* is rejected; but the hypothesis that *PSR* does not Granger-cause GY is not rejected, at the 0.05 significant level. The Impulse Response Functions (IRFs) confirms this finding (Compares the bottom left and the top rights graphs in Figure 2). Thus, there is strong evidence that growth drives saving rather than the reverse.

[7] The alternative estimates are available on request.

Table 4 about here

Figure 2 about here

This inference receive further empirical support when we place the the time profile of saving patterns among and within the Asian countries, (as surveyed in Section 2) wihtin the contest of the extensively-documented reform process and growth trajectories of these countries.[8] In particular, we can see a clear relationship between the timing and nature of market-oriented policy reforms and saving transitions. Korea, Taiwan, and Singapore were the earliest reformers in the region in the late 1960s. These countries had decicively passed Lewisian saving threshold by the early or mid-1980s. Malaysia and Thailand followed Singapore about a decade later. A comparison of the saving rates of these countries for the past three decades with those during 1965–79 points to the impact of policy regime shifts on saving. In Indonesia, the domestic saving rate has recorded a notable increase following reforms that began earlier in that decade. The dramatic saving transition in China began following the country's gradual shift from 'plan to market' in the late 1970s. India has begun to catch up following the liberalization reforms initiated in the early 1990s. Sri Lanka recorded a significant increase in the saving rate following the liberalization reforms in the later 1970s, but the trend has begun to reverse in recent years, underpinned by a notable reversal of reforms. Vietnam began to replicate the early experiences of Korea and Taiwan in the early 1990s.

[8] See World Bank (1993), Perkins (2013) and Athukorala (2021) for surveys.

There is strong evidence that export orientation (*EOR*) is significantly associated with the intercountry difference in the saving rate. A one percentage point increase in the degree of export orientation is associated with a 0.03 per cent increase in the saving rate in the long run. Moreover, the coefficient of *EOR*GY* indicates that export orientation adds 0.09 percentage point to the association between the per capita income growth rate and the saving rate.

The coefficient of *YDEP* is statistically significant with the expected negative sign, suggesting that a one percentage point increase in the share of young dependents in the population contributes to a 0.17 percentage point decline in the saving rate. However, interestingly, there is no statistically significant evidence to support the standard LCM that aged dependency (*ADEP*) contributes to dampening saving propensity. This result is not consistent with the available evidence for development countries (eg., Leff, 1969; Horioka, 1991; Bloom et al. 2007). There are a number of possible reasons that support our result. First, given the prevalence of informal sector employment and the limited coverage of retirement benefit schemes even in formal employment, the line of demarcation between the working age and formal retirement remains blurred in the Asian context. Second, the rise in life expectancy as an integral facet of economic growth could have a significant effect on saving behaviour in old age, particularly in the East Asian high-performing countries where mortality transition has been very rapid (Kinugasa & Mason, 2007). Third, households in developing countries generally tend to be larger than in advanced countries, and resources are shared between members actively engaged in the labour force and dependents (Deaton, 1989; Gersovitz, 1988).

There is strong evidence that foreign capital inflows (*FS*) are complementary to private saving. This finding is consistent with the evidence that foreign capital inflows to Asian countries by and large have mostly taken the form of direct foreign investment (which directly contributes to the production capacity of the countries) rather than foreign aid which mostly takes the form of budgetary supports and/or investment in public sector projects (Athukorala & Rajapatirana, 2003; Reinhart & Talvi, 1998).

The bank credit variable (*CRP*) has a significant negative effect on private saving, as expected. This result is consistent with the hypothesis that, in the presence of easy access to bank credit, there is no compelling reason for people to save more at present in order to undertake lumpy (indivisible) expenditure plans in the future. The coefficient of financial deepening (*FND*) has the expected positive sign but is not statistically significant.

The coefficient of the real interest rate variable (*RID*) is not statistically significant, and its magnitude is barely different from zero. It seems that the income effect of the real interest rate counterbalances its substitution effect in the Asian context. The coefficient of the budget balance to GNI ratio (*BBL*) does not support for the Ricardian equivalence hypothesis. This result is consistent with the LCM proposition that private saving, being controlled by life cycle considerations, should be nearly independent of the government budget stance (Modigliani, 1986).

We estimated the saving equation for the total national saving rate (*NSR*) for comparison (Athukorala and Suanin 2022, Table 8). T Both the long-run and short-run coefficients of *GY* are highly significant as in the private saving equations, but their magnitudes are slightly smaller. The coefficients of the other variables except *EOR&GY* are broadly similar in terms of the signs and statistical significance, but their magnitudes are notably different. The negative and statistically significant coefficient of *EOR*GY* perhaps captures the fiscal costs (tax incentives and other expenditures) involved, which counterbalance the direct positive effect of export orientation on national saving under the export-oriented development strategy. . In sum, this comparison alerts the risk of making inferences about the saving behaviour using aggregate national saving data because of the impact of exogenous political factors on government saving.

To comment on the short-run results, the coefficient of *GY* is statistically significant at the one percent level, with a much smaller (0.25) compared to the long-run coefficient of 1.26 (Equation 1). This different is consistent with the standard life cycle postulate that accumulation of saving is an intertemporal process within the working age. Interesting, the coefficients of the two crisis dummies (*AFC* and *GFC*) are statistically significant with the perverse (positive) sign. Presumably, the crisis-propelled economic uncertainly may have induced private saving (Kim, 2001). Moreover, as already noted, there was also no massive disruption in export-oriented production in the East Asian economies because of the remarkable resilience of *FDI* to the crises. The result for *RID* suggests modest negative effect of real interest rate (*RID*) on the private saving rate. Presumably, increase in *RID* raises expected lifetime income of net savers and thus tends to increase consumption and decrease saving in the short-run before moving towards the steady state based on life cycle considerations. The coefficient of *BBL* is statically significant with the negative sign suggesting that the Ricardian equivalence proposition holds in the short run. However, this result is not inconsistent with the long-run results reported earlier given the LCM proposition that the private saving rate in eventually determined by life cycle considerations.

How do our multi-country results for Asia compare with the findings of the previous individual country studies of private saving in the region (Sun & Liang,1982; Athukorala & Tsai, 2003; Athukorala & Sen, 2004; Modigliani & Cao, 2004; Park & Rhee, 2005; Ang & Sen, 2011; Jongwanich, 2010; Curtis, Lugauer & Mark, 2015; Ge et al. 2018)? The only explanatory variable commonly used in all studies is the per capita income growth rate. The results for this variable support a positive association between income growth and private saving rates, with the magnitude of the office varying in the range of 0.3 to 1.7 per cent. Only Athukorala & Tsai (2003) for Taiwan and Jongwanich (2010) for Thailand have included young and aged dependency ratios separately for testing the impact of the demographic transition on the private saving rate. The results in both studies suggest that both young and aged dependency have a negative impact on the private saving rate and the impact of the former is greater in magnitude compared to that of the latter. However, household survey-based studies of Park & Rhee (2005) for South Korea and Curtis, , Lugauer, & Mark, (2015) for China failed to detect a significant impact of population aging on the saving rate. These

mixed results seem consistent with the failure of our saving function estimates to detect a negative relationship between population ageing and the saving rate. Consistent with our results, Ang & Sen (2011) for Malaysia and India, and Jongwanich (2010) for Thailand find that access to bank credit is negatively associated with the saving rate.

4. Concluding remarks

The national gross saving rates in Asia were broadly comparable to those in the rest of the developing world in the early post-war years. The patterns began to change from around the late 1960s. During the ensuing year, the difference between the average Asian saving rate and those of the other major regions and the overall world saving rate has widened. By the late 2010s, the average Asian saving rate was about 37 per cent compared to the global average of about 28 per cent.

The regional average hides substantial sub-regional and individual country differences in saving behaviour in Asia. Countries in Northeast Asia top the saving rate ranking followed by Southeast Asia. Saving rates in countries in South Asia, though much lower compared to Southeast Asia, are higher compared to the other regions. Within Northeast Asia, the high saving rates of Taiwan and South Korea began to decline around the late 1990s, but the spectacular increase in saving in China has more than counterbalanced this decline. China now accounts for over two-thirds of total national saving (in value) in the region. Within Southeast Asia, the saving rate of Singapore has continued to increase in contrast to the recent decline in the saving rates of Korea and Taiwan. In Southeast Asia, a comparison of the saving rates for the past three decades with those during 1965–79 points to the impact policy regime shifts on saving. Notwithstanding these differences, a unifying theme of overall saving behaviour in Asia is that policy regime shifts in favour of an outward-oriented development strategy have underpinned the time patterns of saving behaviour. The trends and patterns of saving in Asia have been predominantly driven by the private sector: the governments directly accounted for only about 15 per cent of total national saving in the region.

The findings of the econometric analysis are consistent with the LCM hypothesis that growth is the wellspring of saving, not the consequence of prior saving accumulation. There is no evidence to suggest that the prior phase of promoting saving through a specific policy initiative to promote domestic saving or filling the investment-saving gap is needed to initiate the process of growth and structural transformation. There is strong evidence that export orientation contributes to higher private saving both by its direct contribution and by compounding the impact of the rate of income growth on the saving rate. Foreign capital inflows are complementary to domestic saving.

As regards the nexus of demographic transition and domestic saving, only the change in the young dependency ratio seems to have significant impact on national saving behaviour. The pattern of the aged

dependency ratio dampening national saving in developed countries is not revealed by the data in Asia presumably because, given the prevalence of informal sector employment and the limited coverage of retirement benefit schemes even in formal employment, the line of demarcation between working age and formal retirement remains blurred in these countries.

Finally, it is important to emphasize that the econometric evidence reported in the paper simply reflects the *average* macroeconomic pattern of the saving behaviour of the 12 countries covered in the analysis. Obviously there can be notable exceptions to the depicted average pattern. Also, the results are subject to the well-known limitations of saving data derived as a residual from the related macroeconomic variables (the 'tyranny of residual'). Presumably, the magnitude of the measurement error varies among countries and even over time in given countries. Because of these reasons, the inferences made in this paper need to be treated only as *a point of departure* for informing the policy debate in individual countries. Multi-country studies, regardless of methodological issues, are not a substitute for systematic case studies of individual countries undertaken by taking into account socio-economic and structural peculiarities and paying due attention to data quality and consistency.

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Table 1: Gross domestic saving rate (%)

Country/region	1960–69	1970–79	1980–89	1990–99	2000–09	2000–09	2020
Developing Asia,[1,2]	16.5	30.5	29.5	31.1	31.5	35.3	35.6
East Asia,[1,3]	18.1	34.4	32.6	33.0	32.5	36.8	37.5
Northeast Asia[1]	21.6	31.9	33.1	37.1	40.0	41.4	39.2
China	30.7	36.7	35.0	39.6	44.2	47.1	45.2
Hong Kong SAR, China	24.0	30.8	33.6	32.0	31.6	24.5	20.8
Korea, Rep.	8.7	22.5	33.0	37.7	33.9	35.4	35.5
Taiwan	20.3	31.2	33.2	27.4	29.8	26.2	25.3
Southeast Asia[1]	12.9	22.9	28.6	31.7	30.9	33.1	30.0
Cambodia	12.4	---	---	-0.3	12.4	17.8	24.9
Indonesia	5.1	19.9	26.7	28.4	28.3	33.8	31.7
Malaysia	21.4	28.0	33.3	40.6	43.0	34.0	26.2
Philippines	0.0	0.0	23.1	18.2	17.2	16.9	9.6
Singapore	9.7	28.8	43.0	49.0	48.0	53.8	54.6
Thailand	25.7	21.4	26.0	35.7	31.5	32.3	29.4
Vietnam	---	---	---	16.2	27.5	26.9	25.4
South Asia[1]	8.6	11.4	14.6	21.8	26.9	28.1	26.2
Bangladesh	8.4	1.9	12.3	15.4	20.6	22.7	23.8
India	8.2	12.5	15.7	23.9	29.9	31.3	28.9
Pakistan	10.8	10.2	9.7	15.3	14.0	7.9	7.9
Nepal	0.0	6.0	11.0	12.0	10.6	10.0	6.3
Sri Lanka	11.8	15.2	17.8	18.0	16.9	23.1	18.9
Memo items							
Japan	---	37.0	33.3	32.9	27.2	24.1	25.5

Latin America and the Caribbean	21.3	22.1	22.9	19.5	21.1	19.7	19.2
Sub-Saharan Africa	---	0.0	32.4	21.8	23.5	20.6	19.7
Middle East and North Africa	25.7	32.8	24.9	24.9	33.9	28.5	15.6
OECD member countries	---	24.9	23.7	24.1	22.2	21.9	22.5
World	---	25.6	24.4	24.3	24.4	26.5	26.98

Note: (1) GDP-share weighted average, (2) East Asia and South Asia, (3) Northeast Asia, Southeast Asia, Pacific Island small economies, and Central Asia.

Source: World Bank, World Development Indicators database.

Table 2: Gross national saving (percentage of GNP), 1980–2019

	Total national saving				Government saving				Private saving			
	1980–89	1990–99	2000–09	2010–19	1980–89	1990–99	2000–09	2010–19	1980–89	1990–99	2000–09	2010–19
Northeast Asia	32.5	34.2	40.7	44.8	5.0	-0.6	1.7	5.2	27.5	34.8	39.0	39.6
China	34.4	37.3	44.7	46.9	6.9	-2.6	1.5	5.2	27.5	39.8	43.1	41.7
Korea	27.3	33.5	33.5	35.4	-0.4	-0.4	1.2	6.4	27.7	34.0	32.3	29.0
Taiwan	33.3	27.4	29.8	29.6	6.2	4.0	2.5	2.2	27.1	23.4	27.3	27.5
Southeast Asia	28.1	32.8	31.4	32.7	6.6	9.7	6.9	5.0	21.6	23.1	24.5	27.6
Indonesia	28.9	28.7	26.1	32.7	8.3	10.3	10.0	6.5	20.6	18.4	16.1	26.1
Malaysia	29.2	37.5	37.5	30.2	10.5	12.0	9.4	4.3	18.7	25.5	28.0	25.9
Philippines	20.8	18.5	23.7	25.2	4.7	6.5	3.9	3.1	16.1	12.0	19.8	22.1
Singapore	33.1	48.3	46.0	48.3	1.8	15.2	5.7	8.1	31.2	33.0	40.3	40.2
Thailand	25.8	34.0	30.2	31.0	3.4	7.6	5.2	5.1	22.5	26.4	25.0	25.9
Vietnam	---	9.5	31.1	28.5	---	5.9	-0.9	-3.0	---	10.2	31.9	31.5
South Asia	16.6	23.0	30.4	31.2	0.1	0.0	0.8	-0.4	16.5	23.0	29.6	31.6
Bangladesh	3.6	17.6	22.5	27.4	-2.7	5.3	6.0	5.9	6.4	12.3	16.4	21.6
India	17.8	23.9	32.4	32.9	-0.3	-1.4	-0.3	-1.5	18.1	25.3	32.7	34.3
Pakistan	16.2	21.3	21.9	20.3	4.2	4.8	4.5	3.1	12.0	16.5	17.4	17.2
Sri Lanka	10.0	19.2	22.0	29.0	8.4	7.1	2.1	4.5	1.6	12.1	20.0	24.5
Asia	26.7	31.7	37.3	41.0	3.9	1.8	2.5	4.3	22.8	29.9	34.9	36.7
Asia excluding China	23.8	29.5	31.5	32.7	2.7	3.5	2.9	3.1	21.0	26.0	28.6	29.6
Memo item												
China's share (in total value) (%)	35.1	34.5	54.5	67.8	48.6	53.7	43.3	70.1	32.8	39.1	55.4	67.5

Source: Compiled from Asian Development Bank *Key Indicators for Asia and Pacific* database.

Table 3: Determinants of private saving (PSR)[1]

	All 12 countries	**Excluding China**
Long-run estimates		
GY [Growth rate of GNI (%)]	1.268***	1.448***
	(0.124)	(0.241)
YDEP [Young dependency (%)]	-0.169***	-0.169***
	(0.054)	(0.044)
ADEP [Aged dependency (%)]	0.286	0.371
	(0.417)	(0.403)
EOR [Export/GNI (%)]	0.032***	0.030***
	(0.005)	(0.007)
*GY*EOR*	0.085***	0.048**
	(0.020)	(0.023)
RID [Real interest rate (%)]	0.387*	0.419*
	(0.226)	(0.225)
BBL [Budget balance/GNI (%)]	0.347	0.290
	(0.291)	(0.308)
INF [Inflation rate (%)]	-0.018	0.020
	(0.485)	(0.555)
FS [Foreign capital inflow/GNI (%)]	0.300***	0.279***
	(0.043)	(0.020)
CRP [Bank lending/GNI (%)]	-0.159**	-0.159**
	(0.065)	(0.071)
FND [Financial deepening; M3/GNI (%)]	0.026	0.022
	(0.138)	(0.155)
ECT	-0.154***	-0.156***
	(0.016)	(0.013)
Short-run estimates		
ΔGY_t	0.252***	0.256***
	(0.050)	(0.056)
ΔRID_t	-0.061**	-0.063*
	(0.030)	(0.035)
ΔBBL_t	-0.101**	-0.115***
	(0.044)	(0.040)
AFC	0.004**	0.004***
	(0.002)	(0.002)
GFC	0.005***	0.005***
	(0.000)	(0.000)
Constant	0.109***	0.108***
	(0.033)	(0.032)
ARDL	(1,1,0,0,0,0,1,1,0,0,0,0)	(1,1,0,0,0,0,1,1,0,0,0,0)
Hausman test (MG, DFE)	0.01	0.01
Estimator	DFE	DFE
Adjust-R square	0.317	0.360
Number of observations	444	407
Number of countries	12	11

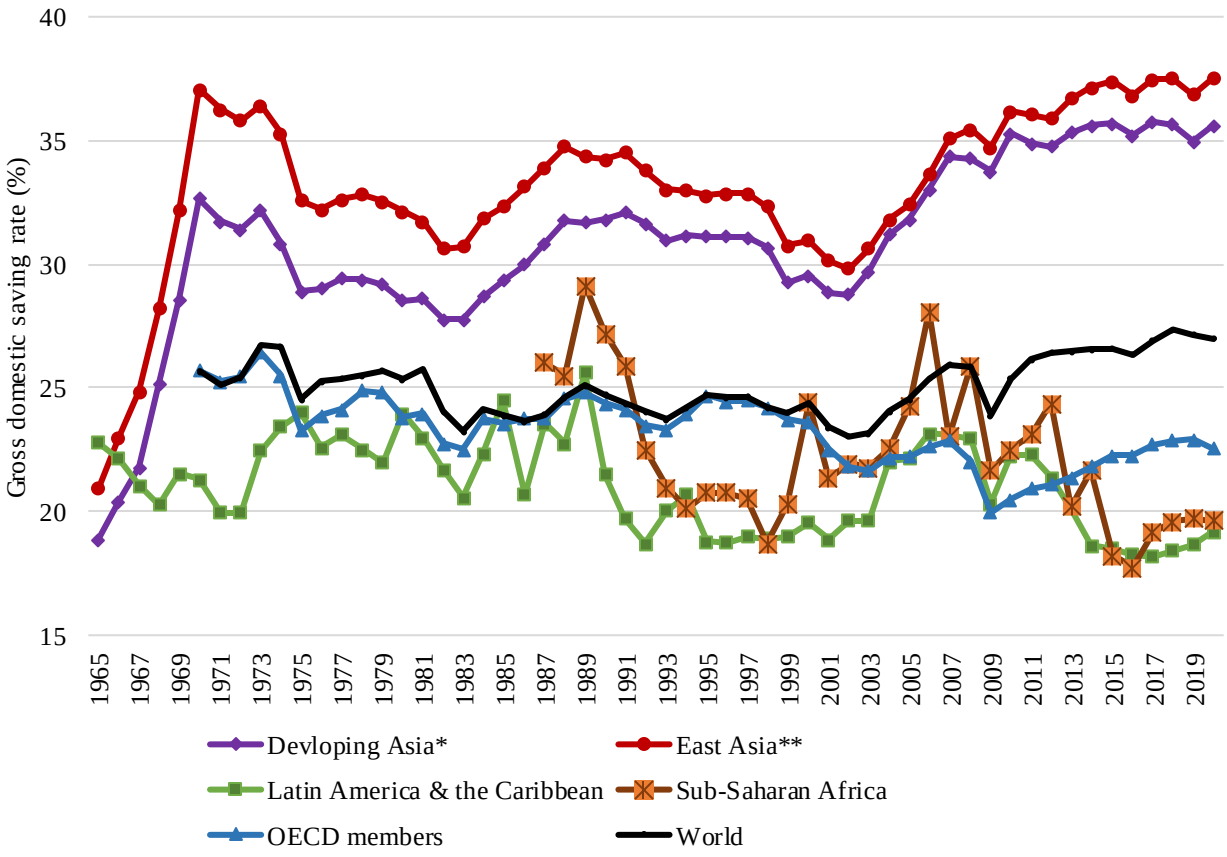
Note: (1) Heteroscedasticity corrected standard errors are in parentheses; ***, **, and * denote statistically significant at 0.01, 0.05, and 0.1 levels, respectively; ARDL indicates the appropriate lag length of each variable detrmined in the estimation process.

Table 4: Panel VAR-Granger causality Wald test

Null hypothesis (Ho)	Chi-Square ($\chi 2$) Stats	Prob > chi2
GY does not Granger-cause PSR	21.43	0.000
PSR does not Granger-cause GY	0.85	0.655

Note: The test is based on the panel VAR model with 2 lags.

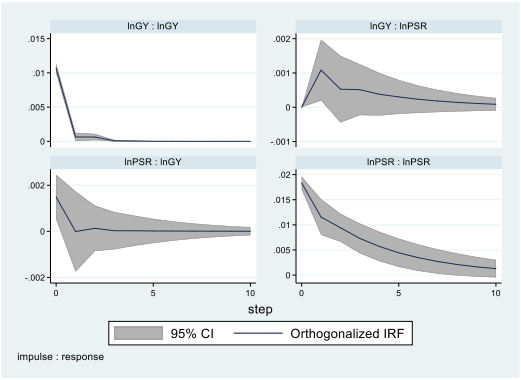
Figure 1: World's gross domestic saving rates by major regions, 1965–2019 (%)



Note: * Member countries of the Asian Development Bank (ADB); ** Countries of Northeast Asia and Southeast Asia.

Source: World Bank, *World Development Indicators* database.

Figure 2: Impulse Response Functions (IRFs)[1] for ln*GY* and ln*PSR*



Note: (1) The IRF depicts how an endogenous variable responds to a standard deviation shock in another endogenous variable while all other variables and shocks are given. The word 'step' is the response over the time during 10 years. The bottom left graph suggests that PSR has no effect on GY: IRF remains zero within the confidence intervals throughout. The top right graph suggests that PSR has a motive effect on GY throughout: IRF remain positive with the confidence interval throughout.