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Future of Asia's Finance: How Can it Meet Challenges of Demographic Change and Infrastructure Needs?

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Future of Asia's Finance: How Can It Meet Challenges of Demographic Change and Infrastructure Needs?

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Abstract

There is a role for Asia's financial sector to play to address the challenges associated with the region's changing demographics and infrastructure investment needs. Enhancing financial innovation and integration in the region could facilitate intra-regional financial flows and mobilize resources from the aging savers in industrialized Asia to finance infrastructure investment in emerging Asia. Strengthening the financial ties within the region as well as with the global financial markets alongside appropriate prudential frameworks could also help diversify sources of financing and reduce the cost of funding in emerging Asia. Finally, financial deepening could help ease the potential overheating from scaling up infrastructure investment and hence achieve a more balanced growth in the region.

I. Introduction

1.   In this paper we explore the potential role of Asia's financial sector in addressing the region's main challenges—the changing demographics and large infrastructure investment needs. Diverse demographic trends across Asia are likely to affect aggregate savings and thereby intraregional financial flows in the long run. Population aging in the industrialized and several emerging Asian economies could affect returns on asset classes and change the structure of re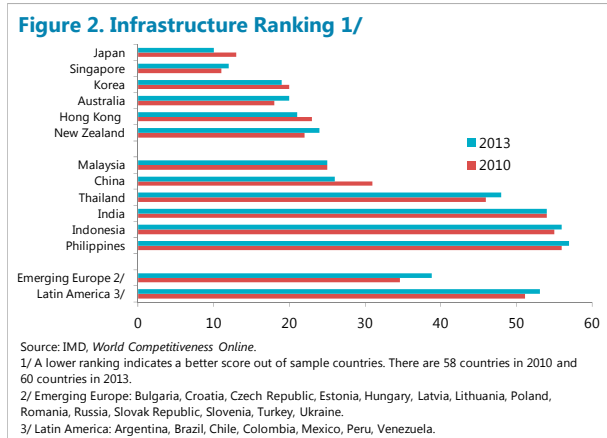gion's financial markets. In an aging society, challenge also remains as how to address downward pressures on savings and ensure adequate returns through diversification to high growth emerging Asian assets. On the other hand, in some other emerging Asian economies, the share of working age population is expected to continue to rise in the coming decades and could bring higher growth and savings. However, despite their favorable demographic and growth prospects, these economies export capital and suffer from underdeveloped infrastructure partly related to their shallow financial systems, that constrain growth prospects. Mobilizing financial resources for infrastructure investment to harness the so-called demographic dividend in emerging Asia through financial deepening and innovation remains a key challenge.

2.   Aging trends within Asia are expected to become more diverse, exacerbating the long-term challenge of downward pressures on aggregate savings. Population aging is a looming issue in China and in the industrialized Asia, including Japan and Korea, thanks to the sharp drop in fertility rates and an increase in life expectancies due to higher income and medical advances (Figure 1). Given that overall Asia is facing a demographic shift that will see its population age significantly over the next half century, aggregate savings are likely to reduce, with people running down their savings during retirement. Aggregate saving is one of the key channels through which population aging affects capital flows and financial markets (IMF 2010), such as a reduction of external surpluses, declining asset prices, and higher risk aversion. At the same time, public savings could also come under pressure from rising pension and aging-related expenses. Access to a wider array of financial instruments with superior risk-return characteristics in emerging Asian economies could entice aging Asian savers to reduce home bias and investments in low return advanced economy assets.

Figure 1. Working Age Population Ratio in Asia
(in percent)

Source: United Nation
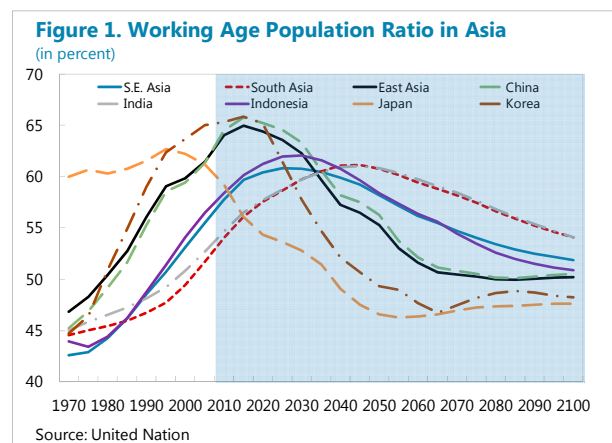
3.   At the same time, several emerging Asia economies with favorable demographic transition will face the challenge in mobilizing resources to finance infrastructure investment. Despite their favorable demographic transition that would raise growth potential, emerging Asian countries such as India, Indonesia, and the Philippines continue to suffer from

underdeveloped infrastructure—although infrastructure in these economies has improved over the last decades, investment has fallen short of the pace of rapid economic and population growth. In the *World Competitiveness* database published by the International Institute for Management Development (IMD), emerging Asia generally scores lower in the infrastructure category than its industrialized peers in the region and remains in the higher half in the global ranking (Figure 2), in particular related to electricity generation and road networks.[2] With rising public debt constraining public infrastructure investment EM Asia, the inadequate infrastructure could be partly related to the limited private sector participation and lack of long-term capital market financing (ADB 2013). The infrastructure deficits are estimated to have impeded growth. For instance, the drop of infrastructure investment in Indonesia from 5-6 percent of GDP in early 1990s to 2-3 percent in the last decade has limited growth by as much as by 3 to 4 percentage points of GDP (Tahilyani et al 2011). Meeting the infrastructure gap solely with fiscal spending would significantly add to the fiscal burden that would eventually pose greater risks to growth.

Figure 2. Infrastructure Ranking 1/

Source: IMD, *World Competitiveness Online*.
1/ A lower ranking indicates a better score out of sample countries. There are 58 countries in 2010 and 60 countries in 2013.
2/ Emerging Europe: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovak Republic, Slovenia, Turkey, Ukraine.
3/ Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela.

4.   In measuring the adequacy of infrastructure, estimates usually rely on the stock of infrastructure relative to income, urbanization, population density, and the economic structure across countries. In that regard, the greatest infrastructure gap or shortfall in emerging Asia appears to be electricity generation (Figure 3). The median electricity-generating capacity in the region is approximately 90 percent of the median for Latin America (IMF 2010). Road networks seem most in need of upgrading in countries including Bangladesh, Myanmar, Mongolia and the Philippines. And, despite the rapid spread of telephones and mobile phones in the region in the past decade, emerging Asia continues to lag behind Latin America in its stock of telecommunications infrastructure. The most comprehensive

Figure 3. Estimated Infrastructure Needs in Developing Asia
(in billions of USD)

Sources: ADB and ADBI.

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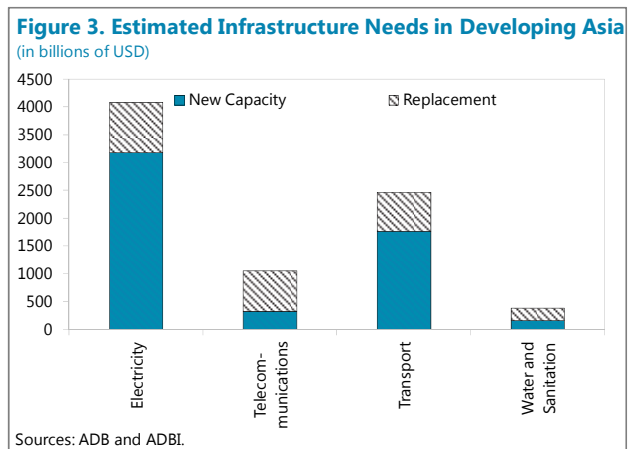
[2] A higher ranking indicates a lower score out of the sample countries.

estimate of Asia's infrastructure investment needs, compiled by the ADB in 2009, put the total investment needs at $8 trillion dollars over ten years.[3] That is roughly 4 percent of the region's GDP for the ten consecutive years. How to finance this vast infrastructure investment is a key challenge for the region's policy makers.

5.   Financial deepening and innovation in the region may change the policy landscape in addressing these long-term challenges. In designing policies to address the long-term challenge of demographic transition and infrastructure needs, policymakers would need to consider the implications of rapid financial growth and innovation. Should further financial sector development help address these challenges, policymakers could focus on the following.

- Financial innovation and integration in the region could improve the allocation of savings and strengthen domestic resilience against external shocks. With sound prudential frameworks and pricing of risks, financial innovation and a more integrated financial market across Asia would help channel large savings in the aging economies to finance infrastructure gaps in emerging Asia, while achieving higher yields in return. At the same time, an integrated financial sector across Asia would allow countries to have greater ability in sharing risks. Risk sharing captures the degree to which countries succeed in insuring each other against shocks. The newly industrialized Asian economies are found to share risks substantially with the United States, but much less so with emerging Asian economies while intraregional risk sharing is low, in general, within Asia (IMF 2011).

- Financing deepening by improving domestic financial inclusion and capital market development could help harness the increased saving from rising working-age population in emerging Asia, which can be intermediated to finance the infrastructure investment in these economies. At the same time, higher financial inclusion could raise financial savings and allow households better access to credit. Addressing the impediments to developing corporate bond markets and institutional investor base highlighted in Goswami and others (2014) and below will be critical to channel financial savings from greater inclusion and the region to infrastructure.

- Greater financial integration can help channel savings to the most productive investment opportunities across the region; however, it also has the potential costs of amplifying shock propagation and synchronization in the region (IMF 2014a), as well as making portfolio flows and asset prices more sensitive to global "push" factors and posing challenges to financial stability (IMF 2014b). In particular, if regional financial integration involves freer capital accounts and greater foreign participation in financial markets, policymakers will need to be vigilant and strengthen regional

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[3] Asian Development Bank (ADB), 2009, "Infrastructure for a Seamless Asia."

safety nets, international policy cooperation, and implement appropriate macroprudential policies.

6.   The rest of the paper is organized as follows. We present stylized facts of Asia's demographic changes and infrastructure gaps in Section II. In Section III we present some empirical evidence on how demography could affect saving rates. We also use a dynamic general equilibrium model to illustrate the macroeconomic impact of certain financial sector developments and discuss their potential benefits when the regional is faced with demographic and infrastructure financing challenges. Section IV discusses the role of the financial sector in addressing these challenges and the plausible policy implications, and Section V concludes.

II. Asia's Main Challenges

7.   Asia has experienced a demographic shift over the last half century, with diverse trends across countries. Industrial economies in Asia have mostly faced aging of the population. The elderly dependency ratios increase by 4-21 percentage points since 1980, notably in Japan, Korea, and Hong Kong SAR. Aging of the population is modest for emerging Asian economies, with an exception in Thailand and China (Table 1, Figure 4). The divergence in the region is likely to be more evident over the next few decades with a few rapidly aging economies (China, Japan and Korea) while other emerging economies continue to face demographic dividends as the youth population enters the labor force (e.g., Cambodia, India, Indonesia, Laos, Malaysia, and the Philippines). As the working-age population increase in the economy, it generally contributes to a notable rise of per-capita income. The relationship, however, tapers off when the per-capita income level reaches a certain threshold (Figure 4).

8.   Demographic change could affect the economies in several ways. First, demographic transition affects the labor force participation, which in turn affects the growth potential. Second, for aging economies, fiscal positions could come under pressure from rising pension and other aging-related spending. Third, aggregate saving would also fall with population aging, as people run down their savings during retirement. Investment may also fall as the capital stock shrinks in tandem, and the interplay of investment and saving will affect capital flows and financial markets. Asset returns could be affected as risk appetite changes, with the elderly population tends to favor less risky investment. Financial product structures may also change in response to age-related demand.

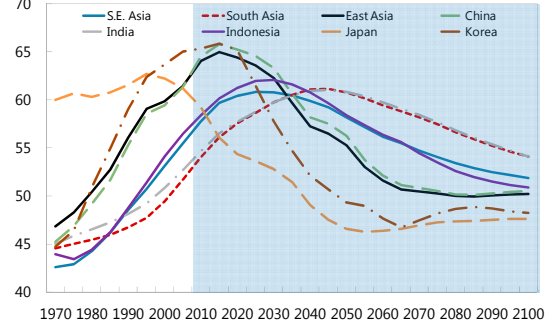| Table 1. Age Dependency Ratios					
	1981-1985		2008-2012		Net change between 1985 to 2012	
Emerging Asia	Elderly	Youth	Elderly	Youth	Elderly	Youth
Thailand	6.4	61.6	12.5	29.4	6.1	-32.2
China	8.8	52.5	11.2	27.2	2.4	-25.3
Bhutan	5.3	78.3	7.2	45.6	2.0	-32.8
Indonesia	6.4	70.7	8.2	40.4	1.8	-30.3
India	6.3	68.4	7.6	47.9	1.3	-20.5
Malaysia	6.2	66.5	7.3	47.2	1.1	-19.4
Cambodia	5.2	72.2	5.9	50.6	0.7	-21.7
Bangladesh	6.9	85.2	7.1	49.5	0.2	-35.7
Myanmar	7.4	69.4	7.4	37.5	0.0	-32.0
Philippines	5.9	86.9	5.9	58.6	0.0	-28.2
Brunei Darussalam	5.1	66.7	5.0	37.6	-0.1	-29.1
Vietnam	8.9	72.2	8.5	34.2	-0.3	-38.1
Lao PDR	6.9	84.2	6.3	57.2	-0.6	-26.9
Average	*6.6*	*71.9*	*7.7*	*43.3*	*1.1*	*-28.6*
Advanced countries						
Asia:						
Japan	14.3	33.2	34.9	20.9	20.6	-12.4
Korea, Rep.	6.4	49.3	15.2	23.1	8.7	-26.2
Hong Kong SAR	10.0	34.5	16.8	15.6	6.8	-19.0
Singapore	7.3	36.4	12.2	24.0	4.9	-12.5
Australia	15.3	36.8	19.8	28.2	4.5	-8.6
New Zealand	15.7	39.8	19.4	30.9	3.7	-8.9
Average	*11.5*	*38.4*	*19.7*	*23.8*	*8.2*	*-14.6*
Outside Asia:						
Germany	22.0	24.8	30.6	20.4	8.6	-4.3
United Kingdom	23.1	30.5	25.0	26.3	1.9	-4.1
United States	17.6	33.2	19.4	30.1	1.8	-3.1
Average	*20.9*	*29.5*	*25.0*	*25.6*	*4.1*	*-3.8*

Figure 4. Demographic Transition in Asian Region

Dependency Ratio Across Asia and Advanced Countries
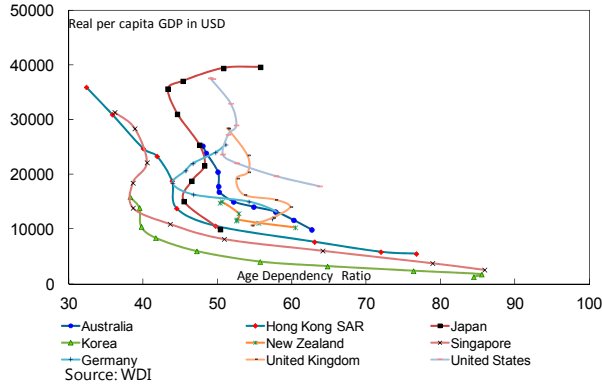(in percent)
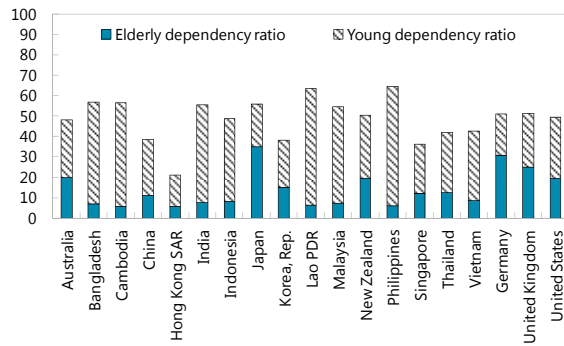
Source: WDI

Working Age Population Ratio in Asia
(in percent)

Source: United Nation

Advanced Countries: Correlation of Real Per-capita GDP and Dependency Ratios

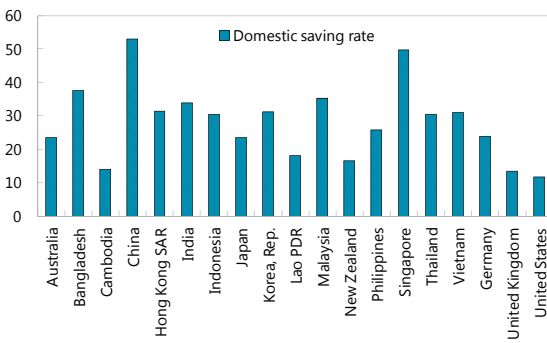
Source: WDI
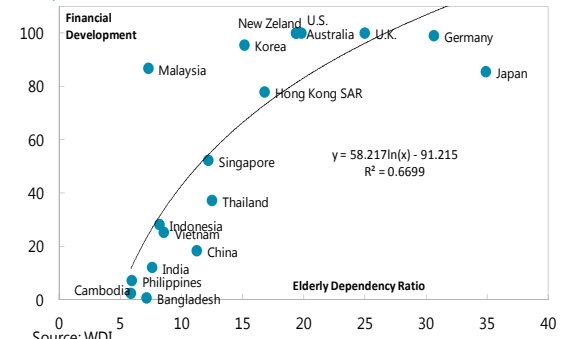
Correlation of Real Per-capita GDP and Dependency Ratios
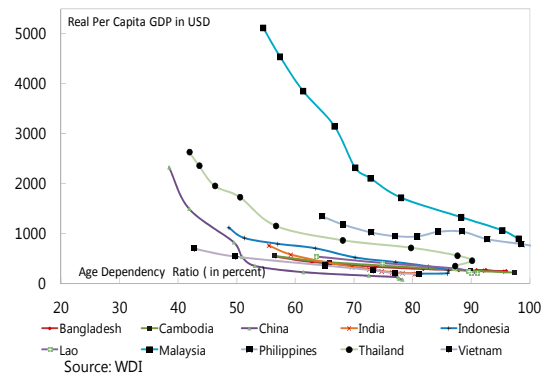
Source: WDI

Average Domestic Saving Rate
(in percent)

Sources: WDI, IFS
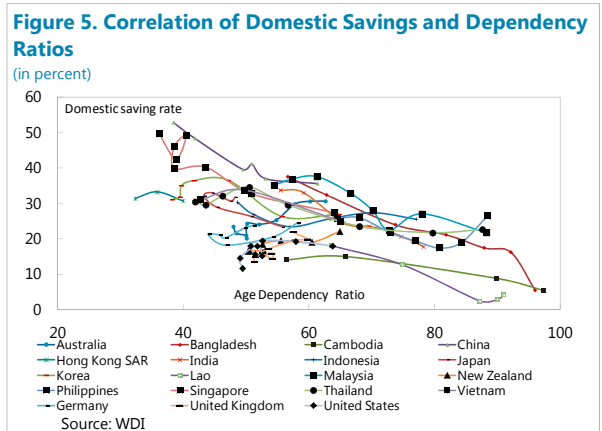
Financial Development and Demography
(in percent)

$$y = 58.217\ln(x) - 91.215$$
$$R^2 = 0.6699$$

Source: WDI
1/ Financial development measured by the penentration ratio of the use of public and private registries in credit market.

9.   Aggregate saving is one of the channels through which demographic change affects capital flows and financial markets. Demographic transition in Asia is often raised as one of factors that contribute to high saving rates. Earlier studies Park and Shin (2009), Horioka and Terada-Hagiwara (2011) have shown a strong relationship between demography and saving rates, in light of the life hypothesis.[4] Domestic saving rates appear to increase as dependency ratios (elderly aged 65 or above and youth aged 14 or below to the total population) decline during the period of 1960-2012 (Figure 5). The negative relationship tends to hold, amid a weaker correlation, for other advanced countries outside Asia. For instance, the dependency ratio has decreased until recently in most emerging Asian economies (the youth growing up while fertility rates declining) while domestic saving rates have increased.

Figure 5. Correlation of Domestic Savings and Dependency Ratios (in percent)

Source: WDI

10.   In addition, demographic change could also shape financial sector development, which is a key determinant of saving. Population aging in China and industrial Asia economies will reduce aggregate risk appetite as the elderly population tends to be more risk averse in their savings. Households' financial needs in these economies would require stable returns on savings and more customized wealth management products and services. In economies with demographic dividends of higher growth and saving, financial sector development and innovation would help channel those saving for higher returns and diversification. Financial frictions and borrowing constraints in these economies may encourage the needs of precautionary savings such that it would increase domestic saving rates for a given level of income. Financial integration and deepening would reduce such constraints and the precautionary saving motive, while providing more saving options (e.g., bank deposits, wealth management products, real estate through mortgages) with higher expected returns. As a result, financial development may have different impact to the economy depending on specific phase and conditions of the financial markets. Empirical evidence is in general ambiguous (Chinn and Prasad 2003).

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[4] Previous empirical analyses find an important role for demographic variables on saving rates based on the life cycle hypothesis, such as Modigliani (1970), Feldstein (1980), Chinn and Prasad (2003), Park and Shin (2009), and Hung and Qian (2010), and Chinn and Ito (2008). Higher portion of elderly in the population is often associated with lower saving rates given the elderly typically finance the living expenses by drawing down savings. Similarly, higher young dependency in the population will typically consume without earning income, posing a negative impact on the overall domestic saving rates. The elderly also sees less need for precautionary savings as the youth would likely provide more care and finance assistance. This would imply higher elderly and youth dependency in the population would generally be associated with lower saving rate.

11.   The impact of infrastructure on growth has been extensively studied, and most concludes that improvement in a broad range of infrastructure categories tends to lead to faster and more balanced growth. In addition to economic returns, infrastructure investment generates large social returns in the form of stronger economic activity, improved health and education outcomes and diminished inequality. There is also solid evidence, supported by empirical analysis, that better infrastructure improves productivity, growth and equality. Canning and Pedroni (2008) use cross-country data to show that infrastructure positively contributes to long run economic growth despite substantial variations across countries. Using cross-country data during the period of 1980-2010, Seneviratne and Sun (2013) find that better infrastructure, both quantity and quality, could improve income distribution and reduce inequality.

12.   Although the benefits of improving infrastructure are well understood, mobilizing financial resources for infrastructure investment has been challenging in many countries. Historically, given the public goods nature of infrastructure investment, the provision of infrastructure investment has been almost entirely in the public domain in Asia and elsewhere, including in advanced economies. The large sunk costs and long construction periods that were often associated with infrastructure projects also make it less attractive to the private investors, forcing the public sector to bear the main responsibility of financing the investment using both on- and off-balance-sheet instruments. However, the public debt levels in many EM Asian countries like India, Indonesia and the Philippines have not provided the sufficient fiscal space to scale up infrastructure spending in the past. In China, for example, local governments are one of the major drivers behind the infrastructure investment boom in the past decades (Walsh et al 2011). They are actively involved in mobilizing financing for infrastructure projects through public guarantees – implicit and explicit – for bank loans to infrastructure projects, and in some cases direct subsidies for infrastructure SPVs (Special Purpose Vehicles) to boost the entities' profits and credit ratings. In addition, the dominance of commercial banks in most emerging Asian economies also means they are the largest source of infrastructure funding through project finance. However, bank liabilities are generally short-term while infrastructure projects have long payback periods (20-30 years) which tend to exacerbate maturity mismatches and impede long term infrastructure finance.

13.   Government financing and provision of infrastructure alone may not be sufficient to address Asia's infrastructure gap. The ADB 2009 report estimates Asia's total infrastructure investment needs to be $8 trillion over ten years, or about 4 percent of the region's GDP per year. This is almost equivalent to the average of the current total public

Figure 6. Public Investment as % of GDP (2010)

Source: WEO.
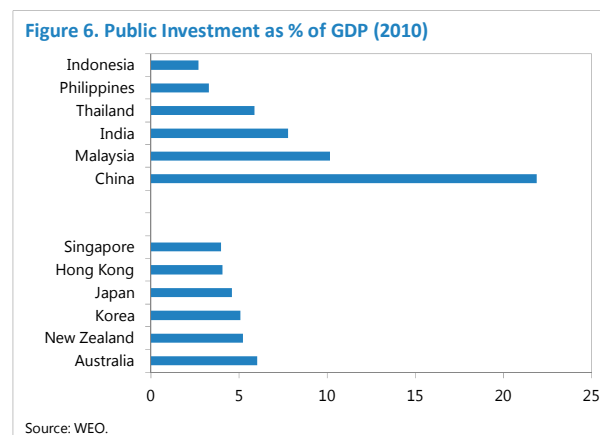
investment level in industrialized Asia, and half of that in emerging Asia (Figure 6). The scope for sustained increases in public investment in a particular country also depends crucially on the prospects for debt sustainability and other short-term financing considerations. In recent years, while several governments across the region have stepped up their allocation to infrastructure as part of the fiscal stimulus package in response to the global financial crisis, their ability to sustain elevated levels of infrastructure investment may be limited by other demands on the budgets and shrinkage fiscal space.

14.   The challenge of infrastructure investment financing in emerging Asia may become more pressing considering their rising population and large infrastructure gap. Whether this can be met by the increase in EM's own savings in the long run is an open question. In the meantime, the changing demographics in Asia may prompt further intra-regional financial integration. As advanced Asia ages further, there will be a growing demand for access to a wider array of financial instruments with superior risk-return characteristics in emerging Asian economies. In particular, infrastructure projects in emerging Asia could provide high yield but steady long-term returns, making them appealing to advanced Asia's investors such as pension funds. As discussed in the next section, further financial integration, combined with domestic financial deepening, may help emerging Asia address their infrastructure investment challenges.

III.   The Macroeconomic Impact of Financial Deepening and Integration

A.   The Impact of Demographic Changes

15.   In this section we first analyze the impact of population aging on domestic saving rates using reduced-form panel estimations. The estimation provides an analysis on the determinants of savings for 12-15 Asian economies. The analysis include Australia, Bangladesh, Brunei, Cambodia, China, Hong Kong SAR, India, Indonesia, Japan, Korea, Laos, Malaysia, Philippines, Singapore, Thailand, Vietnam. These economies are further separated and grouped into different categories in the specification to test for robustness and test for any differences among emerging Asia, advanced Asian countries, and frontier economies. Other advanced countries outside Asia, such as Germany, United Kingdom, and the United States, are included for reference and robustness checks.

- Sample period. As the paper focuses on long-term trend, we use annual data from 1960-2012 where data are available. The paper also includes averages over a 5-year interval (e.g., 1960-65, 1965-1970, 2001-2007, and 2008-2012) to mitigate cyclical effects and accounting for possible structural breaks around the global financial crisis.

- Data. Data are obtained from various sources, including the International Finance Statistics (IFS) by the IMF, World Development Indicators (WDI) by the World Bank, population projections by the United Nations, and Penn World Tables (PWT) version November 2012.

- The specification is listed as follows:

$$SGDP_{i,t} = \beta_{0i} + \beta_1 AGE_{EL\,i,t} + \beta_2 AGE_{YO\,i,t} + \beta_3 ADV * AGE_{EL\,i,t} + \beta_4 ADV * AGE_{YO\,i,t}$$
$$+ \beta_5 GGDP_{i,t} + \beta_6 LNPCGDP_{i,t} + \beta_7 LN(PCGDPSQ_{i,t}) + \beta_8 CREDITGDP_{i,t}$$
$$+ \beta_9 CREDITGDP\_SQ_{i,t} + \beta_{10} FD_{i,t} + \beta_{11} X_{i,t} + \gamma D_t + \varepsilon_{i,t}$$

SGDP is the gross domestic saving rate in country *i* at time *t* in real terms; *AGE_EL and AGE_YO* refer to the dependency ratios of the elderly (aged 65 or above) and youth (aged 14 or below) obtained from the Penn World Tables. *GGDP* refers to the real growth rate in the domestic economy and *LNPCGDP* is the log per-capita GDP in local currency units. CREDITGDP is the credit to private nonfinancial sector as a ratio of nominal GDP. *FD* is an indicator of financial development, proxied by bank access and financing constraints available from the World Development Indicators (WDI). *X* is a vector of control variables (such as real interest rates, inflation etc.), while *D* refers to the time dummy variables for each year or for each 5-year interval. Institutional or legal developments and availability of social security could also be important factors determining saving rates (Ayadi et. al. 2013 and Chamon and Prasad 2007), which would be partly captured in the cross-sectional and annual dummy variables.

16.   The specification also includes an interacting term on aging and additional terms to assess nonlinear impact on savings. Population aging may have different impact on savings for advanced and emerging economies. A dummy variable classified as '1' for advanced countries is interacted with the elderly and youth dependency ratios to see if the aging impact on saving varies across two group of economies. At the same time, since the level of per-capita GDP and credit GDP ratio may have a nonlinear effect on saving rates, the specification also includes quadratic terms (*LN(PCGDPSQ)* and *CREDITGDP_SQ*) with separate coefficients.[5]

17.   The empirical results of the above estimation are presented in Table 2. A summary of the main results is as follows.

- Higher dependency ratio in the population tends to be associated with lower domestic savings across most specification. The impact of elderly and youth dependency on domestic savings tends to be negative and statistically significant. The adverse impact is also notably higher for elderly dependency than for the youth dependency (about 3-4 times) in both advanced and emerging Asia. For instance, a 1-percentage point increase in elderly dependency ratio would reduce domestic savings by 0.3-0.9

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[5] The regression uses lagged terms on the explanatory variables to mitigate the potential endogeneity problems. An alternative will be using the non-overlapping periods for saving rate and the explanatory variables as in Chinn and Ito (2006) and Ayadi et al. (2013).

percentage points, while the same increase in youth dependency ratio would only reduce domestic savings by 0.1-0.2 percentage points.

- Moreover, the negative correlation between youth dependency and domestic savings tends to be higher for advanced economies. The coefficients on interacting terms (specifications 5 and 6) suggest that the negative impact of youth dependency on saving rate appears mainly from advanced countries. This could be related to higher child spending in advanced countries that focus more on education and human capital.

- Per-capita income and demand for private credit tend to have nonlinear impact on domestic savings. The nonlinear effect is similar to the findings in other studies and supported by stylized facts shown in Figure 4. Higher per-capita income is associated with higher savings but domestic savings rate begins to decline as the per-capita income reaches a certain threshold. The nonlinear effect also applies to credit demand. Other factors, such as real GDP growth and higher risk premium affect savings in an expected manner, but inflation rates do not seem to affect significantly on saving rates.

- Financial development, measured by openness in financial markets, tends to play a role in domestic savings, though the magnitude is relatively small. The coefficients are, in most cases, positive and statistically significant.

18. To complement the empirical estimations, we examine the macroeconomic impact of the expected demographic transitions across countries in Asia, especially on savings and capital flows, using a dynamic structural general equilibrium (DSGE) model. The changing demographics in the region calls for strengthening financial integration for better risk sharing and capital allocation, as well as investment in infrastructure to meet the growing demand from the rising population in emerging Asia. In this context, we illustrate that a more balanced growth can be achieved through further financial development in the region. As demographic changes and infrastructure investment would affect all agents in the economy, we present several examples to indicate the benefits of better household financial inclusion, less corporate riskiness, and lower sovereign risk premia.

19. We use the IMF's Global Integrated Monetary and Fiscal model (GIMF) to study the macroeconomic impact of the projected demography changes and infrastructure investment in Asia, and the potential benefits of the financial sector development. The GIMF model is multi-region DSGE model with optimizing behavior by households and firms and full intertemporal stock-flow accounting. [6] Frictions in the form of sticky prices and wages, real adjustment costs, liquidity constrained households, along with finite planning horizons of

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[6] For the theoretical structure of the GIMF model see Kumhof and others (2010).

households, mean that there is an important role for monetary and fiscal policy in economic stabilization. In our exercise the model is calibrated to contain four regions: China (CH), Other Emerging Asia (EA), Industrialized Asia (IA), and the rest of the world (RW). Because the model allows for dynamic interaction across sectors and regions, we can design scenarios to incorporate the different demographic changes and investment needs across the region.

Table 2. Panel Regression Estimation Results						
Dependent variable Domestic saving in percent of GDP						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-213.4	-2.9	-8.1	38.7	33.9	55.3
	(772.5)	(29.5)	(31.6)	(31.7)	(27.7)	(29.2)
Elderly dependency ratio	**-0.71**	**-0.31**	**-0.54**	**-0.64**	**-0.76**	**-0.90**
	(0.4)	(0.4)	(0.2)	(0.2)	(0.4)	(0.5)
Youth dependency ratio	0.39	**-0.21**	**-0.15**	**-0.16**	**-0.19**	**-0.22**
	(0.4)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)
Elderly dependency ratio*ADV	-	-	-	-	0.12	0.59
					-(0.2)	(0.5)
Youth dependency ratio*ADV	-	-	-	-	**-0.17**	**-0.22**
					(0.1)	(0.1)
Ln(real per capita GDP)	32.35	**14.52**	**11.90**	0.93	2.53	-1.03
	(157.4)	(6.4)	(7.1)	(7.3)	(6.7)	(7.2)
Ln(real per capita GDP square)	-0.83	**-1.02**	**-0.75**	-0.06	-0.15	0.03
	(8.1)	(0.4)	(0.4)	(0.5)	(0.4)	(0.5)
Ln(private sector credit to GDP)	**0.19**	**0.01**	0.00	**0.06**	**0.01**	**0.02**
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Ln(private sector credit to GDP square)	**-0.02**	**-0.05**	-0.03	-0.05	**-0.01**	**-0.01**
	(0.1)	(0.0)	-(0.4)	-(0.4)	(0.0)	(0.0)
Real growth	0.21	**0.20**	**0.12**	**0.15**	**0.19**	**0.22**
	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Real interest rate	-0.59	**-0.58**	-0.20	**-0.41**	**-0.37**	**-0.54**
	(0.4)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)
Inflation rate	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.1)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Openness in financial development	0.02	**-0.04**	**0.04**	**0.03**	**0.02**	**0.01**
	(0.0)	(0.0)	(0.0)	(0.0)	(0.1)	(0.0)
Control variables						
Cross-section dummy	Y	Y	Y	Y	Y	Y
Country groups	Advanced Asia	EM Asia	All	All Asia	All	All Asia
No. of groups	5	9	15	14	15	14
Adjusted R-squared	0.89	0.87	0.65	0.72	0.77	0.80
1/ Numbers in parentheses denote standard errors of estimated coefficients.						
2/ Numbers in bold denote 10 percent significance level.						
3/ Interactive term refers to the dummy variable for advanced countries multiplied by the respective age dependency ratios.						

20.   The projected demographic changes in Asia would have different macroeconomic impact across the region, especially on savings and investment. According to the 2010 United Nation's World Population Prospect, the working age population in emerging Asia is projected to rise by about 25 percent by 2030, continuing its upward trend albeit at a slower

rate (Table 3).[7] [8] For Asia's industrialize economies, their working age population is projected to decrease by 9 percent in the next two decades. China's working age population is projected to peak around 2020.[9] In the GIMF model we introduce the changing working age population in different regions as labor supply shocks. Moreover, as the empirical analysis in the previous section shows, the elderly and youth dependency ratios tend to have a negative impact on domestic saving rates in Asia, after controlling for other factors. As the GIMF does not allow for an explicit incorporation of the age of agents or their retirement decisions, we impose the impact of demographics on saving as estimated above in the GIMF in addition to the labor supply shocks.[10] The combination of labor supply shocks and shocks to household savings rates allow us to capture the impact of the changing demographics on both labor supply and households saving behavior.

Table 3. Asia Demographic Changes (cumulative growth in percentage points)											
	2000-2010			**2010-2020**				**2020-2030**			
	Population	Working age population	Working age population ratio	Population	Working age population	Working age population ratio	Implied savings rate change	Population	Working age population	Working age population ratio	Implied savings rate change
China	5.7	14.7	8.5	3.5	4.7	1.2	0.4	0.4	-2.6	-3.0	-0.9
Other Emerging Asia 1/	15.4	24.4	7.8	12.5	18.3	5.2	1.6	9.2	12.0	2.6	0.8
Industrialized Asia 2/	3.9	2.0	-1.9	2.1	-3.1	-5.2	-2.6	0.0	-6.0	-6.0	-3.0

Source: United Nations; Staff estimates.
1/ Other Emerging Asia: India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.
2/ Industrialized Asia: Australia, Japan, Korea, Hong Kong, New Zealand, and Singapore

21.   GIMF model simulations suggest that demographic factors in EA are likely to be supportive of growth in the coming decades. The model simulations show that the increasing working-age population growth in EA could add 1.5 percentage points to its long run annual real output and 0.7 percentage percents to its gross savings as a share of GDP (Figure 7) by year 2020. The interplay between saving and investment would also have significant impact in the dynamics of current accounts and thereby, both inter- and intraregional capital flows. In EA, the increase in savings tends to outweigh the increase in investment, leading to a rise in annual current account surplus. While in IA, the decline in savings tends to outweigh the decline in investment, which would lead to an increase in real interest rate and capital inflows. However, in practice this is likely to be offset by the higher growth rate and thereby, real interest rate, in the emerging markets.

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[7] In this exercise the working-age population is defined as age 20-64.

[8] Data can be downloaded from http://esa.un.org/wpp/

[9] Although the elderly dependency ratios in China are projected to more than double by 2030, its youth dependency ratios are expected to decline sharply. As a result, its working-age population ratios will only decline from 65% in 2010 to 63% in 2030.

[10] We assume a 1 percent increase in working age population ratio will increase savings rate by 0.3 percent in emerging Asia and 0.5 percent in industrialized Asia.

22.   Although gross saving in EA would increase due to the rising working age population, it is unlikely to be sufficient to finance the region's immediate infrastructure investment needs given the estimated size of the infrastructure gap in the region. The decrease in the interest rate spread between EA and IA due to the demographic changes is unlikely to have material impact on intraregional financial flows. More needs to be done to enhance regional financial integration to facilitate a more efficient allocation of resources across countries.

Figure 7. The Impact of Demographic Changes
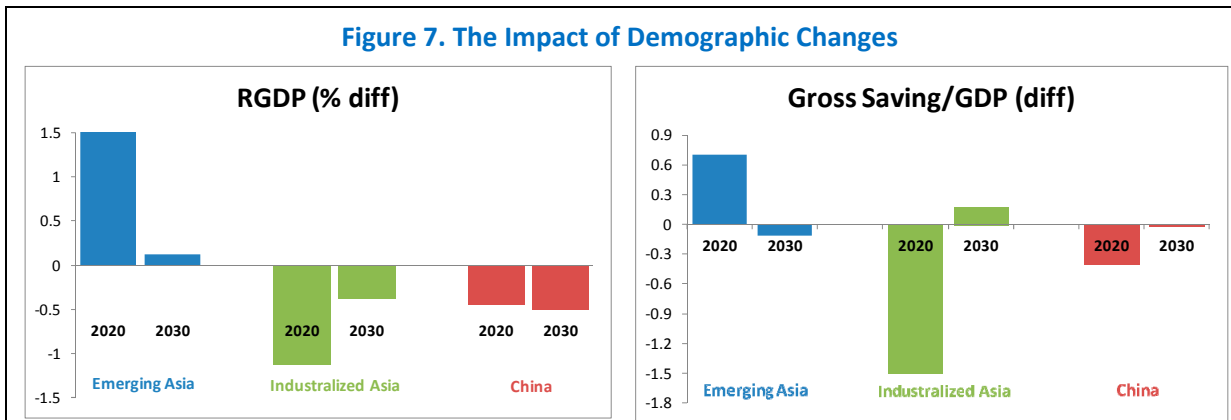
B. The Benefits of Financial Deepening and Integration

23.   The baseline scenario considers the expected demographic changes in Asia with rising investment over the next decade. The simulation assumes an increase of investment by 2 percent of GDP per year for the next ten years in EA, with public and private investment each contributing half.[11] Different policy instruments are available to increase public infrastructure investment, with the domestic options including reallocating public expenditure, implementing tax policy measures, and relaxing fiscal targets, financed by domestic debt or the sale of state assets, and the external options mostly in the form of external borrowing. In the GIMF model, as the fiscal policy is governed by specific rules to respond flexibly to the business cycles while ensuring a non-explosive government-debt-to-GDP ratio, the financing of the augmented public investment spending would be a combination of revenue measures and domestic and external borrowings.

24.   Long-term output would increase under the baseline scenario but at a cost of crowding out private demand and widening trade deficits. Model simulation suggests that it would increase EA's long run annual output by 3-4 percentage points, but private demand

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[11] The scenario of a 2 percent increase in investment as a share of GDP is for illustrative purposes. Although it is widely recognized that there is a need to increase infrastructure investment in emerging Asia, partly through public investment, there is no consensus on the optimal level of infrastructure investment, the financing scheme or the efficiency of the investment.

would be replaced by public demand while the region's trade deficit widens. The persistent positive output gaps and inflationary pressure would also lead to tighter monetary policy.[12] In this regard how to mobilize domestic and external financing resources to ease the impact of the expansionary shock is a key policy challenge.

25.   We use the GIMF model to illustrate that enhancing financial deepening and integration in emerging Asia could help mobilize savings in the region and potentially lower infrastructure financing cost. In particular, we illustrate the benefits of financial development in three scenarios representing the three important agents in the economy—households, corporate, and the sovereign. The three scenarios are: (i) household financial inclusion, i.e., improving household access to financial markets in emerging Asia; (ii) lowering the sensitivity of the external finance premium to corporate leverage (or net worth); and (iii) reducing emerging Asia's external borrowing premium possibly through financial integration.

- *Household financial inclusion scenario*. The scenario assumes the share of liquidity-constrained households in emerging Asia declines from 50% in the baseline scenario to 25%, the level that is applied to industrialized Asia. More households having access to financial instruments and the ability to smooth consumption intertemporally implies a higher degree of private sector offsetting to the expansionary fiscal shock and less crowding out. A larger domestic saving pool would also improve the economies' ability to mobilize savings to finance the large investment needs and lessen the pressure on public finance. Model simulations suggest that with improved financial inclusion, a more sustained and balanced growth path can be achieved—the positive output gap due to the increase in labor supply and public investment is slightly less than in the baseline scenario, but there is much less inflationary pressure and monetary tightening required is less. The region also imports less compared to the baseline scenario.

- *Corporate riskiness scenario*. It shows the effects of a persistent decrease in the riskiness of emerging Asia's corporate borrowers that reduces the corporate financing premium by 1 percentage point. The decrease in the corporate finance premium originates from the lower sensitivity of "external" spreads to corporate leverage which effectively lowers the borrowing cost faced by firms. Thus, there is an immediate decrease in the cost of capital and therefore business investment (e.g., private infrastructure investment) increases. A lower cost of capital also raises profitability, leading to higher dividends and an increase in household wealth. This is particularly important when there is private sector involvement in infrastructure

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[12] In the GIMF model the central bank uses an inflation-forecast-based interest rate rule. The central bank varies the gap between the actual policy rate and the long-term equilibrium rate to achieve a stable target rate of inflation over time. Under this framework, monetary policy stance tends to tighten when there is a positive output gap or inflation gap and vise versa.

investment. Lower costs also lead firms to increase production and demand more labor, pushing up wages.

- *Sovereign risk premium scenario.* It assumes a 100 basis points decrease in emerging Asia's sovereign risk premium. A sustained fiscal expansion (as assumed in the baseline scenario) tends to increase the cost of capital and crowd out private investment. If financial integration could lower external borrowing premia for the region (discussed below), public investment would rely more on foreign funding, thereby reducing the pressure on domestic economy. Similar to the financial deepening scenario, inflation and real interest rate would not increase as much as in the baseline scenario and there is less monetary tightening.

26.   The simulation results suggest that better access to finance and lower financing cost would allow emerging Asia to scale up infrastructure investment with lower macroeconomic and fiscal risks. As shown in Figure 8, interest rate and inflation increases (indicators of aggregate demand pressures) would be less than in the baseline scenario while long run growth benefits remain largely unaffected. Moreover, a deeper domestic investor base and lower financing costs

Figure 8. Simulation Impact of Financial Sector Development in Emerging Asia 1/ (in percent)

Source: Staff estimates.
1/ Results show the peak level impact on real interest rate and inflation and average impact on real output over the decade. The Households scenario assumes the share of liquidity-constrained households in EA declines from 50% to 25%; the Corporate scenario assumes corporate borrowing premium reduces by 1 percentage point; the Sovereign scenario assumes sovereign risk premium declines by 100 basis points.

also create fiscal space and enhance fiscal sustainability. In the next section we will discuss the possible ways to materialize these benefits and the policy implications.
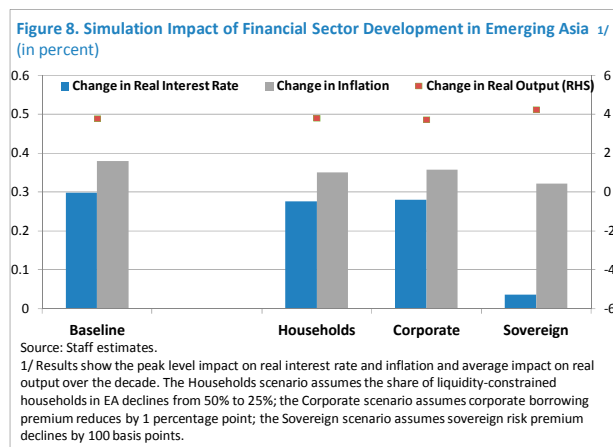
IV. How to Enhance Financial Deepening and Integration in Asia

27.   Financial sector development can play an important role in addressing the challenges of demographic change and infrastructure investment needs in Asia. Financial sector development broadly consists of financial integration and financial deepening, in which economies across Asia have closer financial linkages and firms and households have greater inclusion and better access in financial markets.

28.   Relative to its trade integration, Asia's degree of financial integration, both with the world and within the region, is relatively low. There is scope for Asia's financial integration to be more effective, in particular intraregional integration: for the same level of contagion risks. Asian economies currently benefit less from risk sharing compared with advanced economies. Controlling for a broad set of structural and cyclical factors including trade integration, relative GDP growth, interest and exchange rate movements and exchange rate volatility, the degree of financial integration of many Asian economies is below the level predicted by the model for all economies (with the exception for the financial centers of

Hong Kong and Singapore), and in several cases falls behind the norm for Latin America and Emerging Europe (IMF 2011). Risk sharing captures the degree to which countries succeed in insuring each other against shocks—a perfect risk sharing implies no further potential gain from redistributing risk.[13] Greater risk sharing in the region could help reduce its susceptibility to external shocks and reduce sovereign risk premia.

29.   One way to enhance risk-sharing is to strengthen the quality of financial integration by further developing financial markets, harmonization and coordination.[14] Indeed, policies can help enhance the benefits from risk sharing at a minimal risk of financial contagion and excessive volatility by developing harmonized market standards and rules, by building common trading rules and platforms, as well as harmonizing accounting standards and securities regulations, which in turn will help engender deeper regional markets and enhance the participation of more sustained institutional investors, and encourage Asia-wide portfolio investments. The recent capital market reforms and Asian Bond Market Initiative, for example, has already led to a notable diversification of sources of financing and an expansion of the investor base (Goswami and others, 2014). Combining these initiatives with ongoing efforts to promote convergence in macroeconomic policy objectives, such as through regional surveillance, peer review, policy discussions, and, ultimately, greater regional policy coordination and safety nets, can help ensure that the benefits of financial integration are maximized for Asia.

30.   Improving domestic financial inclusion is also an important aspect for emerging Asian economies to deepen their financial markets. Financial inclusion could help harness the increased saving from population growth in the region, which in turn can improve access to credit and be used to finance the region's infrastructure investment. Financial inclusion in terms of access to finance by households and SMEs in Asia has a lot of room for improvement and could be facilitated by diverse savings products, credit bureaus, and better collateral and contract enforcement (Table 4). The impediments to developing the corporate bond markets and institutional investor base highlighted in Goswami and others, 2014and the previous section will be critical to channel financial savings from greater inclusion and the region to infrastructure.

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[13] Typically, a risk-sharing compares how growth in marginal utility of consumption differs across countries, which is indicative of how much risk is shared.

[14] Meanwhile, risk sharing should not be expected to contain the most extreme of shocks.

Table 4. Selected Indicators of Financial Inclusion			
	Households with access to banks (percent)	Adult population not using formal financial services (millions/percent)	SMEs lacking access to loan from financial institution (millions/percent)
East Asia and Pacific	42	876 / 51-75	140-170 / >59
South Asia	22	612 / 51-75	60-70 / >59
Middle East and North Africa	42	136 / 26-50	12-15 / >59
Sub-Saharan Africa	12	326 / 75-100	26-30 / >59
Latin America and Caribbean	40	250 / 51-75	11-12/ 40-59
Central Asia and Eastern Europe	50	193 / 26-50	5-7 / 20-39
High income countries	92	60 / 0-25	10-12 / <20
Source: Financial Access 2010 and Access to Finance 2010.			

31. Financial integration and deepening could potentially reduce the external borrowing premium and its sensitivity to domestic balance sheet considerations. The degree of financial integration within Asia is low, in part reflecting capital account restrictions in a number of countries in the region (Pongsaparn and Unteroberdoerster 2011). On the other hand, Asia as a whole is a net capital exporter. A lot of Asia's capital outflows go to the government debt market in the US and Europe, and in turn, Asia receives FDI and portfolio inflows which typically has higher rate of return than that of the sovereign bonds. Foreign portfolio inflows tends to significantly reduce sovereign bond yields as shown in Goswami and others(2014), thus greater regional portfolio flows (or integration) would be expected to reduce sovereign risk premiums particularly in emerging Asia. However, deepening debt market by encouraging greater participation of regional investors might increase asset price sensitivity to global and regional financial conditions. At the same time, a broader domestic investor base can prevent asset prices from overshooting or undershooting in response to sales or purchases by foreigners that are driven by external factors (IMF 2014b). Therefore, the size of direct participation of foreign investors in local-currency bond markets warrants close monitoring and needs to be balanced with broad financial system development policies. Mizen and Serafeim (2012) also find that the external finance premium measured by corporate bond spreads of Asian firms were more sensitive to leverage and risk of bankruptcy measures during the Asian crisis of 1997 than the GFC, suggesting that bond market deepening in the region partly in response to the Asian crisis highlighted in Goswami and others (2014) may have played a role. Lower sovereign and corporate spreads would be an important channel through which financial integration and deepening would help finance infrastructure in EM Asia including from aging Asia where the returns would still be greater than investing domestically or in other advanced economies.

32. Financial product structures will also need to adapt to demographic change and infrastructure financing. Aging societies will demand financial products that allow inflation protection and drawdown of savings, such as annuities. Markets in such products remain underdeveloped in Asia, in part owing to limited diversification of systemic risks. Government policy can help develop these markets by addressing the duration risks and

inflation risks. Building on the deepening of sovereign bond markets in Emerging Asia as outlined in Goswami and others (2014) including the introduction of Treasury Inflation Protected Securities (TIPS) and Separate Trading of Interests and Principals (STRIP)s could facilitate public infrastructure investment but also help develop a benchmark to price financial innovations in the provision of private infrastructure finance.

33.   Public-private partnerships (PPPs) offer an alternative provision mechanism to public investment, provided they are properly structured. PPPs are increasingly viewed as a popular vehicle for providing infrastructure, as sound infrastructure projects that address clear bottlenecks are likely to have relatively high economic rate of return, and the private sector can be made responsible not only for constructing the infrastructure, but also for providing the principal services related to it, and tailoring asset design specifically to this purpose. To the extent that these services are supplied directly to final users, charging is both feasible and, from an efficiency standpoint, desirable. However, experiences suggest that effective implementation of the PPP projects, and more generally increasing private sector involvement in the provision of infrastructure, requires coordinated action on many fronts including strong legal and institutional frameworks and well-informed decision making process.

34.   PPPs have specific requirements such as long duration, varied risk-return characteristics and complex structures that make capital markets better able to finance infrastructure—especially the corporate bond market. In terms of project financing through banks in Asia, new Basel III capital requirements mandate banks to hold more capital against long term finance typical in PPPs. Moreover, the large size of investments would run up against single borrower limits of banks even with syndication given the infancy of takeout financing and securitization.[15]. While raising adequate equity finance tends to be one of the most challenging aspects of infrastructure project financing and PPPs, the regions relatively deep stock markets makes[16] as well as growing private equity firms make it less of a binding constraint (ADB 2013). On the other hand, once the construction phase over and the infrastructure project is generating a steady stream of revenue over a long horizon, that might be suitable to be packaged as long term bonds and sold to investors.[17] In some Asian markets, bonds issued by infrastructure-related companies already represent a substantial share of total

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[15] Long-term syndicated bank lending to Asia from outside the region has also been affected by the global financial crisis and continued deleveraging of European banks, although a number of Asian banks have stepped up cross border lending, particularly Australian, Singaporean and Japanese banks.

[16] Probably unknown to many, the share of stock market capitalization as a percentage of GDP in most Asian countries is comparable to their total banking sector assets, with debt securities markets coming a distant third. It contrasts with developments in many advanced countries, where the banking sector continues to dominate financial intermediation

[17] The revenue stream from infrastructure tends to be less sensitive to the economic cycle and generally inflation-protected too.

bond outstanding. For example, in Malaysia, 40% of bonds outstanding are issued by infrastructure-related firms. Developing the infrastructure bond market in the region can help draw non-traditional investors into financing infrastructure projects.

35.   To encourage investors to purchase infrastructure bonds, several obstacles must be overcome.

- While there is a substantial pool of funds in the region ready to be invested in infrastructure projects, there is a shortage of a regional infrastructure asset class that meets the requirements of investors, particularly in industrial Asia. Assisting emerging Asian economies in structuring bond financing for the Brownfield phase in infrastructure projects can create additional supply.

- Another hurdle is that infrastructure projects tend to be given a credit rating that is too low to be of interest to institutional investors particularly the pension funds in aging industrial Asia. Traditionally, guarantees have been provided by governments to ameliorate the situation, but that carries a fiscal risk. Another way to improve the credit rating of infrastructure bonds is to make subordinated debt tranches available to raise the credit rating of the senior tranches of the debt to investment grade. The securitization of infrastructure assets can allow banks to offload some of their long-term risk in infrastructure loans and help promote the development of a bond market. This would also allow banks to conserve their capital under the new Basel III rules. However, securitization would require a well-developed bond and derivative market that usually go hand in hand as outlined in Goswami and others (2014) to provide liquidity and minimize risk. It would also involve having a regulatory framework that allows for the securitization of revenue streams while ensuring some "skin in the game" and functioning markets for distressed assets including well structured bankruptcy laws and resolution frameworks (IMF 2012).

36.   Promoting a long-term investor base would help build up a stable source of finance for infrastructure projects. The role of long-term institutional investors (e.g., pension funds and life insurance) has increased (Table 5 and IMF 2014b), offering a natural financier for infrastructure projects. Also, infrastructure assets offer pension funds some measure of protection against inflation while pension funds offer financing in domestic currencies. On the other hand, the main drawback of pension funds as a source of infrastructure project financing is that they tend not to have the expertise needed to evaluate and invest in infrastructure assets that are complex to evaluate and heterogeneous in nature. A more common way for institutional investors to gain exposure is through participating directly in an unlisted fund. Unlisted funds are set up by management companies on behalf of institutional investors to provide them with exposure to infrastructure projects without having to develop in-house expertise. Data from ADB (2013) shows that there are 88 unlisted infrastructure funds that invest in Asia with a growing total of US$22 billion of funds committed. Institutional investors can also buy debt linked to infrastructure projects through

bond funds that invest in infrastructure projects mostly through mezzanine debt. Another option is to purchase debt that is issued by project operators and securitized by the revenue stream from infrastructure projects.

Table 5. Amount of Sovereign Pension Fund Assets (US$, million)		
Country	2005	2012
China 1/	8,102	49,026
Hong Kong, China	110	211
Indonesia	4,000	14,399
Malaysia	69,659	183,761
Philippines 2/3/	4,452	7,443
Singapore	74,906	186,243
Korea	160,319	326,209
Thailand	6,986	18,253
1/ Latest data as of end-2010.		
2/ Earliest data as of end-2006.		
3/ Latest data as of end-2011.		
Sources: OECD Pension Funds Data and Sovereign Pension Funds Annual Report.		

V. Conclusion

37.   This paper concludes with the findings that further financial integration and market deepening in Asia would allow the region to mobilize financial resources for greater benefits. As discussed in Obstfeld (2009), financial opening could benefit the emerging countries that pursue it through better risk sharing with the rest of the world and the alleviation of capital scarcity. As the share of working age population appears to be at a stark transition point in many countries in the region, there is a greater need to enhance financial integration and deepening to cope with the demographic changes as the higher dependency ratio will reduce domestic savings and growth. Well executed and structured infrastructure projects particularly PPPs in emerging Asia could provide the pensioners in industrialized Asia with high yielding long-term returns. In addition, the demographic transitions are likely to intensify the incentives for capital flows to emerging Asia where labor resources remain abundant. Financial innovation and integration could provide individuals and pension funds to get access to a broader array of financial products tailored to the needs of an aging society. This in turn could reduce the cost of capital in Emerging Asia alongside greater financial inclusion and financial market deepening and thus help spread the benefits of financial integration across the region. Our simulations suggests that raising the infrastructure investment to GDP ratio by 1 percentage point in emerging Asia will raise annual output by 2-3 percentage points over the long term.

38.   At the moment, the degree of financial integration in Asia, both with the world and within the region, is relatively low, especially when compared with Asia's high degree of

trade integration. Several barriers could have limited the financial integration and channeling of savings to the most productive investment opportunities across the region. For instance, financial inclusion is relatively low in EM Asia, capital account and investment restrictions remain in many countries, and the development of debt capital markets that can be an ideal vehicle for private infrastructure finance has been uneven (Goswami and others, 2014). However, deepening debt markets by encouraging greater regional flows might increase asset price sensitivity to global and regional financial conditions (IMF 2014b). That said, a broader long term domestic investor base can reduce the susceptibility to external factors and finance infrastructure at lower costs if supported by appropriate financial instruments, macroprudential policies and regional cooperation.

39.   Asia's financial sector has an important role to play in the transformation in the region's real economy by helping address the key challenges of demographic change and infrastructure needs. As its population becomes increasingly urban and middle-class, Asia needs to shift from its current manufacturing and export-driven growth model to a group of more vibrant and diverse markets. A healthy and dynamic financial sector can serve the social and economic needs for this transformation and support a successful and sustainable new growth model.

References

Asian Development Bank (ADB), 2009, "Infrastructure for a Seamless Asia," Manila: ADB.

Asian Development Bank (ADB), 2013, "Asia Bond Monitor," November 2013, Manila: ADB.

Ayadi, R., A. Emrah, N. Sami, W. de Groen, 2013, "Determinants of Financial Development Across the Mediterranean", MEDPRO Technical Report No. 29/February 2013.

Buffie, E., Berg, A., Pattillo, C., Portillo, R. and L. Zanna, "Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces", IMF Working Paper WP/12/144.

Canning, D. and P. Pedroni, 2008, "Infrastructure, Long Run Economic Growth and Causality Tests for Cointegrated Panels," The Manchester School, 76, 504-527.

Chamon, M., and E. Prasad, 2007, "Why are Saving Rates of Urban Households in China Rising?", IZA DP Working Paper No. 3191, November 2007.

Chinn, M. and H. Ito (2008), "A New Measure of Financial Openness", *Journal of Comparative Policy Analysis,* Volume 10, Issue 3, pp. 309-322 (September).

Chinn, M. and E. Prasad (2003), "Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration", Journal of International Economics 59 (2003) 47–76.

Feldstein, M., and C. Horioka (1980), "Domestic Saving and International Capital Flows" The Economic Journal, Vol. 90, No. 358 (Jun., 1980), pp. 314-329.

Goswami, M., Jobst, A., Peiris, S. and D. Seneviratne, 2014, "Bond Markets: Are the Recent Reforms Proving To Be Effective?" IMF Working Paper, forthcoming.

Horioka, C. and A. Terada-Hagiwara, (2011) "The Determinants and Long-term Projections of Saving Rates in Developing Asia', NBER Working Paper No. 17581 http://www.nber.org/papers/w17581.

Hung, J. and R. Qian, (2010) "Why Is China's Saving Rate So High? A Comparative Study of Cross-Country Panel Data" Congressional Budget Office Working Paper 2010-07.

International Monetary Fund, 2010, *Regional Economic Outlook: Asia and Pacific*, October, (Washington).

International Monetary Fund, 2011, *Regional Economic Outlook: Asia and Pacific*, October, (Washington).

International Monetary Fund, 2014a, *Regional Economic Outlook: Asia and Pacific*, April, (Washington).

International Monetary Fund, 2014b, "How Do changes in the Investor Base and Financial Deepening Affect Emerging Market Economies?" in *Global Financial Stability Report* (April 2014).

Kumhof, M., D. Laxton, D. Muir, and S. Mursula, 2010, "The Global Integrated Monetary and Fiscal Model (GIMF) – Theoretical Structure," IMF Working Paper 10/34.

Mizen, P. and S. Tsoukas, 2012, "The Response of the External Finance Premium in Asian Corporate Bond Markets to Financial Characteristics, Financial Constraints and Two Financial Crises," *Journal of Banking & Finance*, vol. 36(11), pages 3048-3059.

Modigliani F. (1970), "The Life Cycle Hypothesis of Saving and Intercountry Differences in the Saving Ratio", Induction, Growth, and Trade, (eds) W.A. Eltis, M.F.G. Scott, and J.N. Wolfe. Oxford: Clarendon Press.

Obstfeld, M., 2009, "International Finance and Growth in Developing Countries: What Have We Learned?" IMF Staff Papers, Vol. 56, No.1.

Park, D., and K Shin (2009), "Saving, Investment, and Current Account Surplus in Developing Asia," ADB Economics Working Paper Series no. 158, Asian Development Bank, Manila, Philippines (April).

Pongsaparn, R. and O. Unteroberdoerster, 2011, "Financial Integration and Rebalancing in Asia", IMF Working Paper 11/243.

Seneviratne, D. and Y. Sun, 2013, "Infrastructure and Income Distribution in ASEAN-5: What are the Links?", IMF Working Paper 13/41.

Tahilyani, N., Tamhane, T. and J. Tan, 2011, "Asia's $1 Trillion Infrastructure Opportunity," McKinsey&Company, March 2011.

Walsh, J., Park, C. and J. Yu, 2011, "Financing Infrastructure in India: Macroeconomic Lessons and Emerging Market Case Studies," IMF Working Paper 11/181.