

Developing Local-Currency Government Bond Markets in Emerging Asia

Critical Factors, Challenges and Policy Actions

Kensuke Molnar-Tanaka and Serkan Imisiker

This paper describes the growth of local-currency bond markets in Emerging Asia and the institutional and policy challenges facing the region's economies for their further development. It presents an empirical analysis of the relationship between local-currency government bond (LCGB) market development and the components of financial development, using panel data for selected Emerging Asian economies. The analysis seeks to identify the key determinants for the development of LCGB markets. The results show that the depth of and access to both financial markets and financial institutions have a significantly positive impact on LCGB market development. Critical factors associated with local-currency bond market depth include macroeconomic variables, the exchange-rate regime, capital account openness and creditor rights. Based on these results, the paper offers policy directions for fostering the development of local-currency bond markets in the region.

Keywords: Local-currency government bond, bond market development, financial deepening, financial development, Southeast Asia, Asia

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1. Introduction

Emerging Asia's bond markets have grown substantially over the last two decades. For instance, in the six ASEAN countries for which data are available (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam), issuance of local-currency bonds increased to approximately US\$400 billion in 2021 from around US\$55 billion in early 2003. But while aggregate data show a growth trend, the statistics mask considerable disparity across economies. In countries with more advanced capital markets, such as Malaysia and Singapore, bond markets account for a larger share of gross domestic product (GDP),

Kensuke Molnar-Tanaka is Head of the Asia Desk at the Organisation for Economic Co-operation and Development (OECD), Development Centre, 2 Rue Andre Pascal, 75016 Paris, France; email: kensuke.molnar-tanaka@oecd.org

Serkan Imisiker is Chief Financial Officer at Aktin Cosmetics, Selahaddin Eyyubi Mah. 1538, Sokak No. 43-45/ B4517 Esenyurt, İstanbul, Turkey; email: serkan.imisiker@gmail.com

at approximately 125 per cent and 115 per cent of GDP, respectively, as of 2021. Bond markets are also relatively large in Thailand, at around 90 per cent of GDP. In contrast, bond markets in Indonesia and Vietnam remain small, at less than 40 per cent of GDP as of 2021.

In developing local-currency bond markets, countries in the region face both institutional and policy challenges. Elements that need strengthening include the price discovery process, market infrastructure, access to financial accounts, financial literacy (especially digital financial literacy) and clarity on taxation. Investor participation should be encouraged, and in this and other areas, information campaigns could be useful.

This paper begins by reviewing recent analytical works on critical factors for the development of local-currency bond markets. It then describes an empirical analysis that was conducted to examine the relationship between local-currency government bond market development and the components of financial development. The analysis, carried out using panel data for selected Emerging Asian economies, sought to identify the key determinants for the development of these markets. The results show that both the depth of financial markets and financial institutions and access to them, have a significantly positive relationship with local-currency government bond market development. Moreover, macroeconomic variables such as GDP, inflation, fiscal balance, as well as the exchange-rate regime, capital account openness and creditor rights, are also associated with local-currency bond market depth. Finally, based on our empirical analysis, the study examines recent developments in bond markets in Southeast Asia and proposes policy directions for fostering local-currency bond markets.

2. Literature Review

As local-currency bond markets have blossomed in Emerging Asia over the last two decades, several analyses have been conducted to determine the key factors for their development.

Claessens, Klingebiel, and Schmukler (2007) note that the financial crises of the 1990s led to a surge of interest in the size and structure of government bonds, since possible mismatches of maturity and currency hamper financial stability. This trend naturally resulted in more attention from the literature on the currency composition of outstanding government bonds. One prominent theme of this literature is “original sin”, which refers to the inability of emerging economies to borrow abroad in their local currency due to their failure to issue local-currency bonds in international markets and long-term local currency bonds in domestic markets. Eichengreen, Hausmann, and Panizza (2002) argue that, for the international part of this phenomenon, the only robust factor with a significant relation to the inability of developing countries to issue local-currency bonds is the size of the economy.

Later studies focus on various institutional and macroeconomic factors to identify possible determinants of development in local-currency bond markets. Claessens, Klingebiel, and Schmukler (2007) inspect the depth and currency composition of the domestic bond markets of a set of developed and emerging economies, using the dataset of the Bank for International Settlements (BIS). They find that, after controlling for economic size, the measures for the investor base matter, such that the larger domestic financial systems in terms of bank deposits and stock market capitalization have deeper local currency bond markets.

Burger and Warnock (2006) inspect the size of local-currency bond markets in forty-nine countries and conclude that bond markets are more developed in countries with relatively stable inflation and solid creditor rights. They also note that countries with higher fiscal deficits have larger sovereign bond markets. In a similar study, Burger, Warnock, and Warnock (2012) document a broad-based deepening of local-currency bond markets in tandem with the increasing amount of bonds held by US investors in emerging market economies between 2001 and 2008 and show that less volatile inflation and a stronger legal framework support this development.

The excessive dependence of companies on bank finance and the need to develop bond markets in Asian countries came under the spotlight after the 1997/98 Asian Financial Crisis. Eichengreen and Luengnaruemitchai (2004) illustrate the slow development of bond markets in Asian countries and investigate the dynamics of their underdevelopment using a dataset that covers the period between 1990 and 2001. Their analysis shows that major factors contributing to the development of national bond markets are the size of an economy, strong institutional structure and more stable exchange rates. They found no evidence of a residual “Asia Effect” after controlling for various financial and structural aspects of Asian economies.

In a similar study, Bhattacharyay (2013) studies the determinants of corporate and sovereign bond markets in Asia separately and finds that, while the size of the economy associates positively with bond market deepening in both sectors, the size of the banking sector correlates positively with government bond market capitalization but negatively with corporate-sector bond market depth. The result concerning banking sector size may be due to the fact that banking finance is a more direct substitute for corporate bonds, and that the larger the banking sector, the more government bonds are demanded by the financial sector to manage their liquidity and meet their obligations.

3. Empirical Analysis: Data

Reliable and comprehensive data sources on the size of local-currency sovereign bond markets are limited on the international level. Although it is occasionally possible to find national data sources for individual countries, merging these into a complete dataset is difficult due to possible inconsistencies in compilation methods and the length of observation of each source.

Previous studies in the literature generally use the BIS database to cope with these issues. However, this paper uses Asian Development Bank (ADB) data since it contains more Southeast Asian countries than the BIS database and also covers a long period of time, from 1997 onwards (<https://asianbondsonline.adb.org/>). From this database, we can collect the capitalization data of local-currency government bond (LCGB) markets in China, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

Table 1 presents each variable with its source and descriptive statistics. Our dependent variable is the LCGB market capitalization-to-GDP ratio where the end-of-year values of the nominator are collected from the AsianBondsOnline website and then divided by GDP. Figure 1 shows the LCGB market development for each country between 1997 and 2020 (for Malaysia, the Philippines, Thailand and Vietnam, LCGB market data start from 2000). We observe a steady upward movement of development in China, Thailand and Vietnam. In addition, for all countries in our sample, there was a substantial surge in local-currency government bond capitalization in 2020. Increasing fiscal deficits and government borrowing needs following the COVID-19 pandemic in early 2020 were the key drivers of this boost in the issuance of domestic government bonds.

One possible issue of studies that try to determine the factors affecting local-currency bond market depth is potential endogeneity. For example, while we expect that a country’s exchange-rate regime can affect LCGB market development, the existing currency composition of a country’s debt can alter its exchange-rate policy choice. Previous studies use various methods to address this issue, such as employing slowly changing institutional variables, utilizing constructed indexes for macroeconomic variables and using lagged values or moving averages of variables. Other than the exogenous variable of VIX, and unless stated otherwise, we do not use contemporaneous observations for any other explanatory variable to alleviate the endogeneity problem.

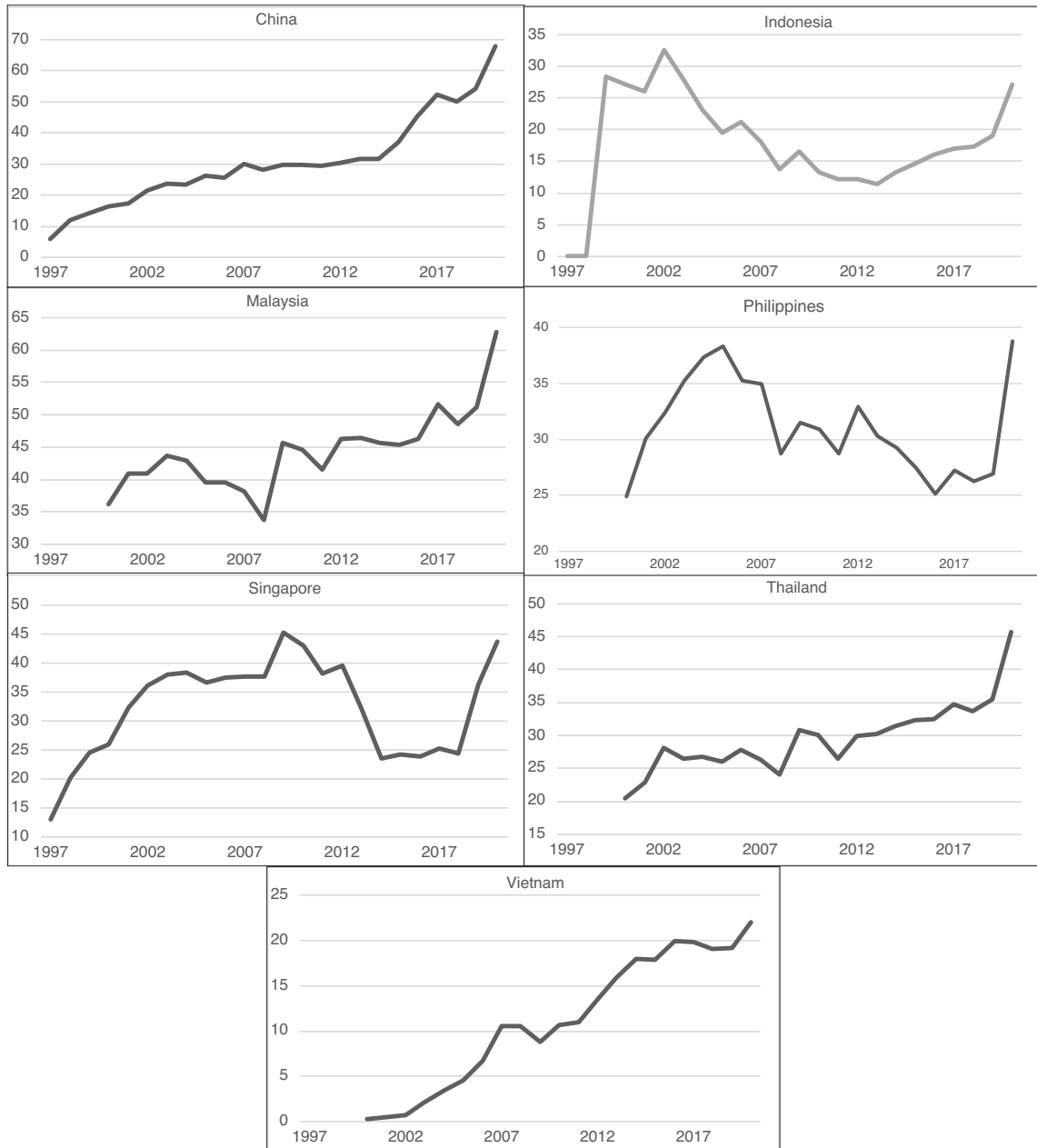
To control the size of an economy, we use the logarithm of GDP in nominal US dollars. To capture major macroeconomic factors, we adopt two other variables: fiscal balance and inflation. Fiscal balance is the net lending/borrowing of the general government to GDP ratio, and we use the three-year moving

TABLE 1
Data Sources and Descriptive Statistics

<i>Variable</i>	<i>Source</i>	<i>No. of obs.</i>	<i>N</i>	<i>Period</i>	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>Overall std.</i>	<i>Between std.</i>	<i>Within std.</i>
Sovereign LCBM capitalization	ADB (https://asianbondsonline.adb.org)	159	7	1997–2020	27.56	0	67.76	13.32	10.74	9.12
Log GDP	World Bank database (World Bank national accounts data, and OECD National Accounts data files)	175	7	1996–2020	26.42	23.93	30.32	1.35	1.24	0.7
Fiscal balance	IMF (Asia and Pacific Economic Outlook)	170	7	1996–2020	-0.86	-7.03	7.09	2.61	2.15	1.67
Log inflation	IMF (Asia and Pacific Economic Outlook)	175	7	1996–2020	0.04	-0.14	0.57	0.05	0.02	0.05
Capital account openness	Chinn-Ito KAOPEN database	168	7	1996–2019	0.45	0.16	1	0.28	0.27	0.12
Exchange rate regime	Ilzetski et al. (2019) (https://www.ilzetski.com/firr-data)	168	7	1996–2019	8.19	2	14	3.07	2.45	2.07
Resolving insolvency (recovery rate)	World Bank (<i>Doing Business</i> report)	99	7	2004–20	46.87	3.8	89.7	28.87	27.21	10.27
Financial Development Index	IMF (Financial Development Index Database)	140	7	2000–19	0.5	0.27	0.79	0.16	0.16	0.06
VIX	Federal Reserve Bank of St. Louis	175	7	1996–2020	20.31	11.09	32.7	6.06	0	6.06

SOURCE: Author's calculations.

FIGURE 1
LCGB Capitalization to GDP (Percentage)



SOURCE: ADB and WB.

average of this measure as a proxy for the past fiscal stance of the economy. We also employ a logarithm of year-end consumer price inflation to control for changes in the prices of goods and services.

The exchange-rate regime is an important driver of uncertainty regarding the value of a currency and can alter the decisions of both investors and the issuers of local-currency bonds. There are basically two categories of measures to gauge the flexibility of an exchange-rate regime. The first set of indicators reports the officially announced, *de jure*, measures as a proxy, and the second group of indicators estimates the actual, *de facto*, state of an exchange-rate regime. For this study, we take the second approach and use an actual exchange-rate regime measure developed by Ilzetski, Reinhart, and Rogoff (2019) that varies between one and fifteen. The higher values of this measure indicate a more flexible exchange-rate environment.

Capital account openness is also expected to be a key factor for determining local-currency bond market deepening since a more open capital account may expand the investor base for local currency debt instruments, but on the other hand, it creates some volatility regarding capital flows. The index developed by Chinn and Ito (2005) is generally accepted as a good measure of the openness of a country's capital account where the higher values of the index represent greater openness.

In this study, we utilize resolving insolvency (recovery rate) as a measure of institutional quality. The recovery rate measures what portion of lending can be recovered by the secured creditors involving domestic legal entities and is a proxy for creditors' rights in a jurisdiction. As supported by Burger and Warnock (2006), creditor-friendly laws are expected to be associated with deeper local bond markets.

Overall financial development in a country may enhance local-currency bond market development by providing a boost via the economies of scale created through improvements in financial infrastructure and the expansion of both the institutional and retail investor base. The International Monetary Fund (IMF) publishes a country-level composite financial development index that is composed of two subindices, namely a financial institutions index and a financial markets index. These subindices are constructed using lower-level subindices that measure the depth, accessibility and efficiency of these sectors. Each index takes values between zero and one, where higher values indicate more financial development in a country.

Finally, the only exogenous factor, VIX, is a proxy for the uncertainty of global financial markets. Figure 2 shows scatter plots for each independent variable and our dependent variable of the LCGB market capitalization-to-GDP ratio. The solid black line in each figure depicts the fitted values for the linear regression of each pair including an intercept. The figure clearly points out some significant relationships without controlling for country-specific fixed effect and external factors, namely between the dependent variable and explanatory variables.

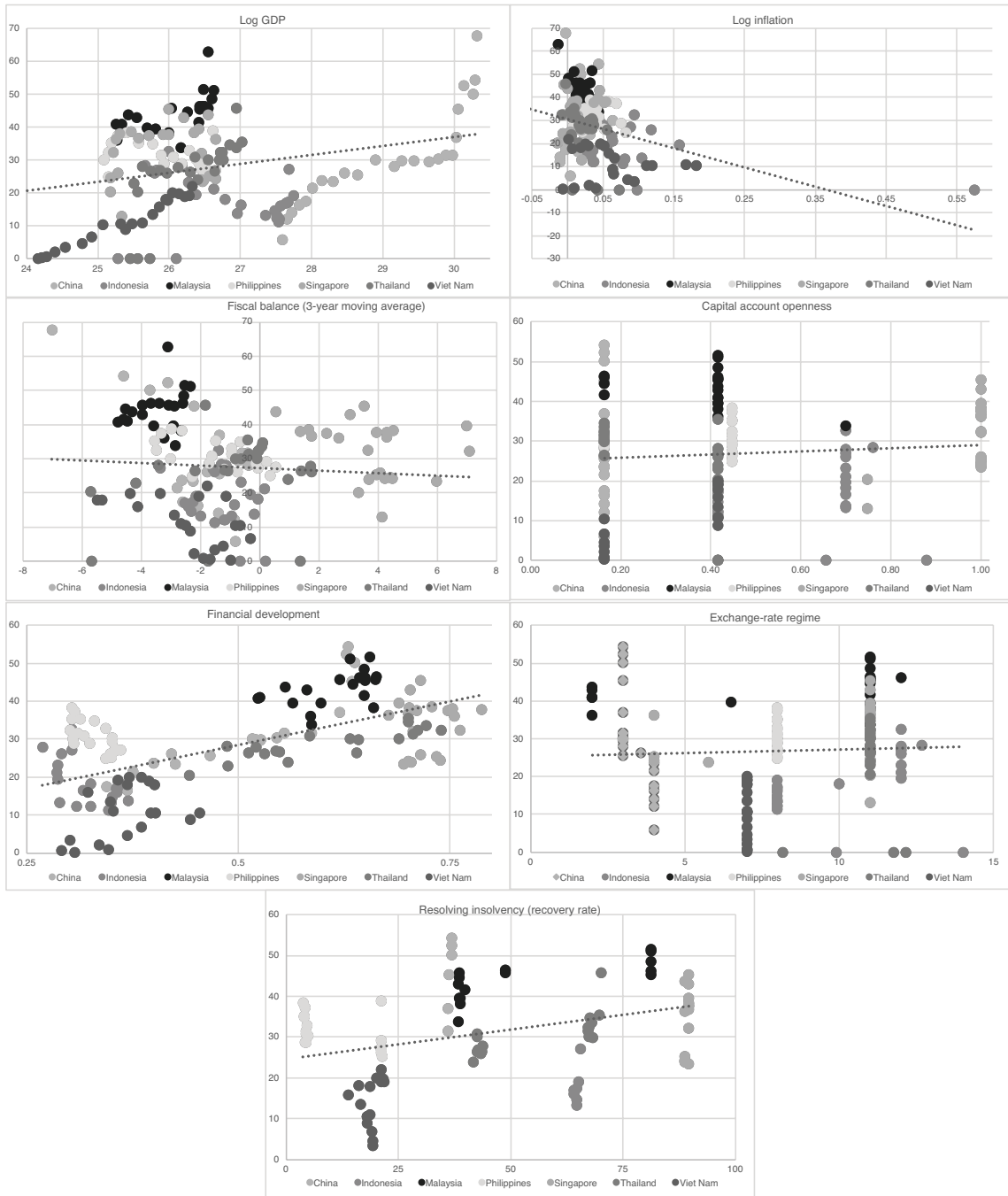
4. Empirical Analysis: Methodology and Key Findings

We estimate the relation between the LCGB market capitalization-to-GDP ratio and the group of regressors that are outlined in the previous section by using pooled ordinary least square (POLS) and panel-feasible generalized least square (FGLS) estimations. Our model is represented by equation (1) below,

$$LCGB_{it} = \alpha_1 + \beta_1 X_{i,t-1} + \beta_2 VIX_{i,t} + \gamma_1 \mu_i + \varepsilon_{i,t} \quad (1)$$

where $LCGB_{it}$ is our dependent variable of LCGB market development, $X_{i,t-1}$ is a vector of one-year lagged country-specific explanatory variables and $VIX_{i,t}$ is the contemporaneous measure for global financial uncertainty.

FIGURE 2
Correlation Scatter Plot of Country-Specific Explanatory Variables with
Sovereign LCGB Market Size/GDP



SOURCE: ADB, WB, IMF, Chinn-Ito KAOPEN Database, Ilzetski et al. (2019) and authors' calculations.

4.1 Baseline Results

We present the POLS and FGLS estimation results of equation (1) in Tables 2 and 3, respectively. The POLS model excludes country-specific fixed effects, assuming γ_1 to be zero. In contrast, the FGLS model controls for country-specific fixed effects and also accounts for heteroscedastic error structures and autocorrelation within countries.

The results show that larger economies have deeper local-currency sovereign bond markets, which is consistent with previous studies. Claessens, Klingebiel, and Schmukler (2007) and Eichengreen (2006) note that to have the necessary infrastructure for establishing a local-currency bond market, the size of an economy matters. When foreign institutional investors invest in local-currency bonds, a common objective is the opportunity to diversify their portfolios to reduce the overall expected risk by utilizing the moderate correlation between the returns of these assets and hard-currency bonds. The liquidity of the secondary market is one of the pivotal properties from the viewpoint of foreign institutional investors, and an illiquid market for local-currency bonds may prevent the allocation of funds. Thus, the scale effect can be an important factor through liquidity risk, and a certain threshold size is needed to deliver expansion for the local-currency bond market.¹

TABLE 2
POLS Model Results

	<i>Pooled OLS</i>			
	(1)	(2)	(3)	(4)
Constant	-62.160*** (23.522)	-68.203*** (16.897)	-92.333*** (26.166)	-67.755** (28.306)
Log GDP	3.163*** (0.826)	2.273*** (0.597)	4.034*** (0.885)	3.275*** (1.038)
Log inflation	-46.852** (18.381)	-25.905 (25.167)	-52.052*** (18.201)	-139.317*** (37.968)
Fiscal balance	-1.393*** (0.508)	-2.500*** (0.394)	-1.510*** (0.502)	-1.628*** (0.535)
VIX	-0.019 (0.158)	0.152 (0.112)	0.008 (0.156)	0.438*** (0.160)
Capital account openness	15.836*** (4.945)	12.890*** (3.662)	13.880*** (4.928)	5.561 (5.656)
Financial development		54.298*** (5.742)		
Exchange-rate regime			0.917** (0.371)	
Resolving insolvency (recovery rate)				0.117** (0.052)
R^2	0.153	0.559	0.186	0.444
Adj. R^2	0.125	0.539	0.153	0.405
Num. obs.	157	140	157	92

NOTES: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

SOURCE: Author's calculations.

TABLE 3
FGLS Model Results

	FGLS			
	(1)	(2)	(3)	(4)
Log GDP	9.046*** (0.753)	1.610*** (0.552)	6.687*** (0.228)	0.918 (1.287)
Log inflation	49.770*** (3.292)	27.093*** (5.516)	33.739*** (0.511)	6.175 (10.785)
Fiscal balance	-1.851*** (0.129)	-2.011*** (0.247)	-2.167*** (0.023)	-2.711*** (0.236)
VIX	0.034 (0.043)	0.133*** (0.036)	0.155*** (0.012)	0.352*** (0.015)
Capital account openness	23.117*** (2.984)	22.020*** (3.552)	9.694*** (0.404)	4.225* (2.316)
Financial development		73.629*** (4.639)		
Exchange-rate regime			0.676*** (0.011)	
Resolving insolvency (recovery rate)				0.283*** (0.034)
Num. obs.	157	140	157	92

NOTES: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

SOURCE: Author's calculations.

The results for inflation are complicated, and the coefficients for the POLS and FGLS models differ in sign while being significant in many specifications. Typically, high levels of inflation translate into higher volatility of inflation² and hence, from the investors' point of view, may lead to an increase in exchange-rate risk and the probability of having a drop in the real expected return of the bonds. In Table 2, we observe a negative coefficient for inflation in the POLS model, but it becomes positive when we account for the country-fixed effects in the FGLS model. These findings may point to an outcome such that, on average, countries with higher inflation exhibit shallower LCGB market depth, as expected, but for each country higher inflation levels correlate somewhat positively with LCGB market capitalization over time. Southeast Asian countries exhibit a history of moderate inflation, which contributes to the credibility of the macroeconomic policies of these countries. This within-country positive relation can be explained by the additional demand for government LCBs in periods of relatively high inflation, from both domestic and foreign investors, who expect future inflation to revert to normal levels and hope to benefit from the higher coupon payments due to elevated inflation.

Fiscal balance has one of the most robust results in both POLS and FGLS regressions, and all estimated coefficients are significantly negative in Tables 2 and 3. This result suggests that the supply-side effect of larger government expenditures, which brings more need for the issuance of government bonds, outweighs the possible demand-side effects of a less sustainable debt due to higher borrowing needs and future debt stock.

Our sole institutional measure of recovery rate (resolving insolvency) comes with consistent results in regression findings. A positive and significant estimate in both POLS and FGLS regressions may indicate a better capacity to deal with insolvencies and stronger creditor rights improves overall investor sentiment regarding bond issuances.

The exchange rate (ER) regime seems to be an important factor in the development of LCGB market size over GDP. The estimate for the coefficient of the *de facto* ER policy variable is significant and positive, which can be interpreted as showing that more flexible exchange-rate policies correlate with higher relative market sizes. Investors typically request higher premiums for greater exchange-rate uncertainty. More flexible regimes generate higher volatility in normal times, but larger spikes in volatility occur during turbulent times in relatively fixed ER regimes. A positive correlation may be associated with the fact that investors' fear of higher spikes, which are detrimental to the returns, outweighs their anxiety over the elevated volatility of more flexible ERs in normal times. Another possibility, as stated by Claessens, Klingebiel, and Schmukler (2007), would be that, under more flexible ER regimes, governments choose to issue more local-currency bonds rather than foreign currency bonds in order to avoid a commitment to a foreign exchange rate.

An open capital account widens the investor base by allowing foreign investors to purchase local-currency bonds in the domestic market. However, it also facilitates capital outflows and, as stated by Dafe, Essers, and Volz (2018), this makes it difficult to create a captive investor base. Our results, which have a significant and positive estimate in most specifications, provide some evidence that the positive effect of a more diversified investor base surpasses the effect of these investors being less captive.

The only common external factor in our model is the VIX, a measure of future global financial market uncertainty, which has a positive and significant coefficient in most specifications. A combination of high volatility in global markets and the jump in public debt following the COVID-19 pandemic in 2020 is the key reason why we observe a positive relation between our dependent variable and VIX.

4.2 Results for Financial Development and Its Components

The relation between the overall level of financial development, where we use the IMF's Financial Development Index (FDI) as our explanatory variable, and LCGB market depth appears to be positive, and we see a robust relation in both POLS and FGLS results.

On the other hand, financial development is a broad subject, and the FDI is a composite index derived from six subindices: depth, accessibility and efficiency of financial markets on the one hand and of financial institutions on the other. In this study, we analyse the effect of these components separately on the development of government LCB markets.

Svirydzenka (2016) explains the methodology of the construction of the FDI, where multidimensional data are first normalized and then aggregated to form the main index and the subindices. Table 4 presents the list of variables that are used in the construction of the FDI and its subindices.

The subindex for the depth of financial institutions (FID) measures the size of the banking and insurance sector and mutual funds. Banks and insurance companies commonly constitute a major part of the source of funds for local-currency bonds since they have liabilities in local currency and need to hold LCBs for liquidity purposes. As expected, we see a positive coefficient for FID in Table 5.

The subindex for access to financial institutions' services (FIA) is constructed by using the number of bank branches and automated teller machines (ATMs) per 100,000 adults in each country. An investor needs to have a bank account to purchase bonds from an organized or over-the-counter market, and broad access to financial services can positively affect the development of the local-currency bond market by expanding the retail investor base and the amount of funds for these instruments. Consistent with this explanation, Table 5 provides some evidence regarding this relationship.

TABLE 4
Variables Used in the Construction of the FDI

<i>Financial Institutions</i>	
Depth	Private-sector credit to GDP
	Pension fund assets to GDP
	Mutual fund assets to GDP
	Insurance premiums, life and non-life to GDP
Access	Bank branches per 100,000 adults
	ATMs per 100,000 adults
Efficiency	Net interest margin
	Lending-deposits spread
	Non-interest income to total income
	Overhead costs to total assets
	Return on assets
	Return on equity
<i>Financial Markets</i>	
Depth	Stock market capitalization to GDP
	Stocks traded to GDP
	International debt securities of government to GDP
	Total debt securities of financial corporations to GDP
	Total debt securities of nonfinancial corporations to GDP
Access	Percent of market capitalization outside of the top 10 largest companies
	Total number of issuers of debt (domestic and external, nonfinancial and financial corporations)
Efficiency	Stock market turnover ratio (stocks traded to capitalization)

SOURCE: Svirydzienka (2016).

The subindex for depth of financial markets (FMD) controls for the size of the bond market and the stock market but does not cover the LCGB market, which avoids a possible endogeneity problem. Our results suggest that the size of the other markets complements the LCGB market. This may be a result of the scale effect due to the financial infrastructure they use in common, such as the organized market for securities, the settlement system and the legal framework. We can also explain the positive coefficient for access to financial markets (FMA) by this scale effect since a more diversified access by companies to capital markets can also support the development of financial infrastructure.

However, the result for the subindex on the efficiency of financial institutions (FIE) is insignificant, which indicates that the margins and profitability of financial institutions are not particularly important for the development of the LCGB market. The efficiency of financial markets (FME) is solely measured by the stock-market turnover ratio, and our results show that higher liquidity for the stock market is not related to LCGB market development.

TABLE 5
FGLS Model Results (Financial Development Components)

	FGLS		
	(1)	(2)	(3)
Log GDP	9.743*** (0.642)	0.456 (1.350)	2.921*** (0.250)
Log inflation	44.678*** (2.094)	67.088*** (8.284)	43.027*** (0.824)
Fiscal balance	-2.595*** (0.155)	-1.973*** (0.271)	-2.084*** (0.011)
VIX	-0.018 (0.046)	0.217*** (0.052)	0.158*** (0.007)
Financial inst. depth		22.297*** (5.534)	
Financial inst. access		26.512*** (6.022)	
Financial inst. efficiency		8.871 (6.286)	
Financial markets depth			21.670*** (0.278)
Financial markets access			33.833*** (0.372)
Financial markets efficiency			0.084 (0.279)
Num. obs.	157	140	140

NOTES: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

SOURCE: Author's calculations.

4.3 Recent Developments in Local-Currency Government Bond Markets in Emerging Asia

In the previous section, we find empirical evidence regarding the macroeconomic, financial and institutional determinants of LCGB market development in selected Emerging Asian countries. Here, we focus on the dynamics of this development and its interaction with our explanatory variables for individual countries over time.

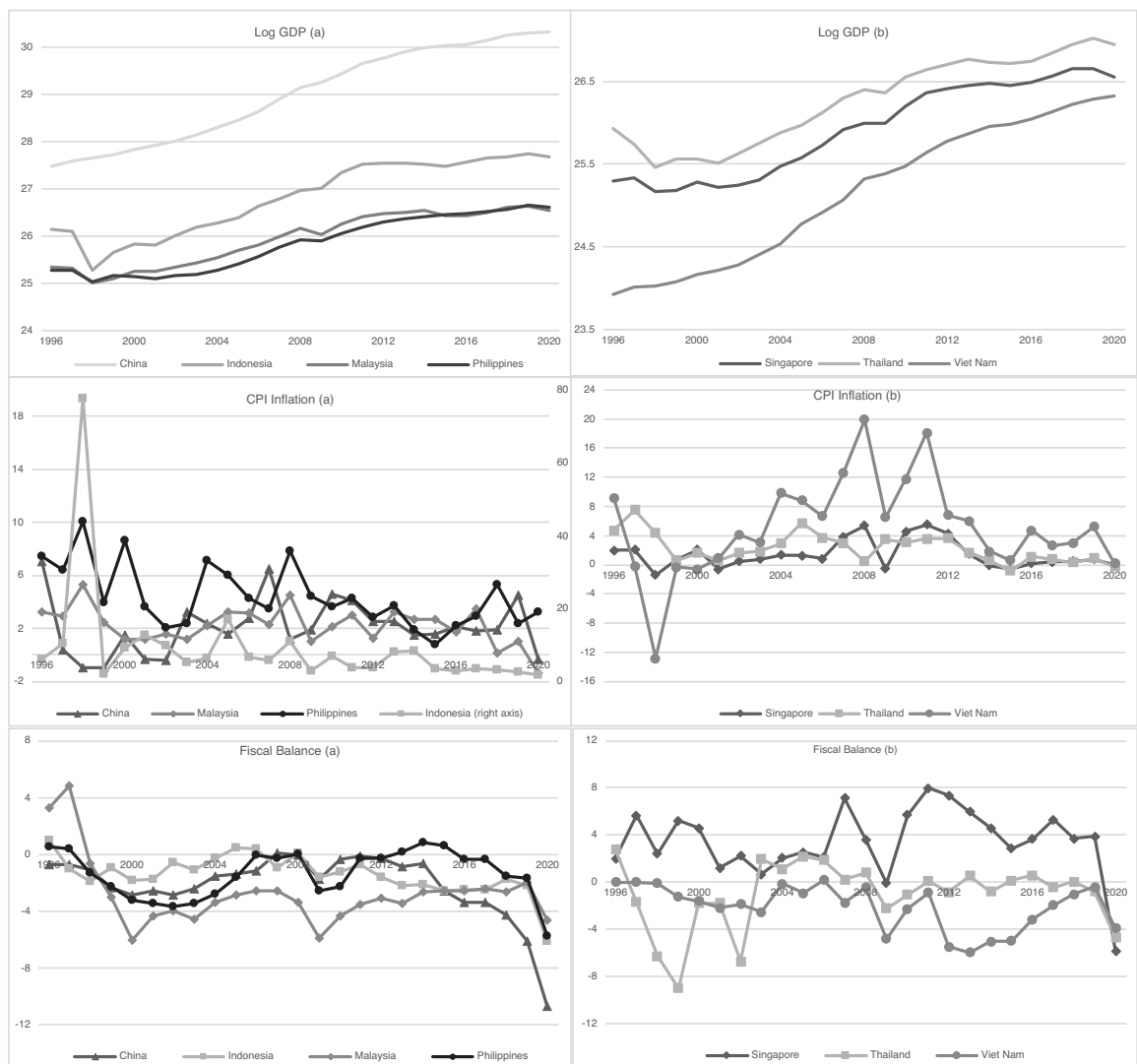
Figure 1 shows the LCGB market capitalization-to-GDP ratio for each country. The first thing to notice is that China, Thailand and Vietnam have an overall positive trend over the sample period without any major setbacks. China experienced substantial development, with the LCGB market capitalization-to-GDP ratio starting at 5.85 per cent in 1997 and reaching 67.8 per cent in 2020. China has the highest level of LCGB market depth among the sample countries, which can mainly be explained by the scale of its economy and also by the high level of financial development. Vietnam's LCGB market, which was almost non-existent prior to 2000, reached 22 per cent of GDP by 2020. Malaysia also shows an apparent positive trend, with a downturn between 2004 and 2008. Malaysia had the second highest LCGB market depth

among the sample countries at the end of 2020, supported by relatively high overall financial development and net borrowing of the government.

The development of relative LCGB market capitalization in Indonesia, the Philippines and Singapore can be divided into three parts. All three countries experienced: (i) a considerable jump in market size; (ii) a prolonged fall; and (iii) recovery in the last couple of years of the sample period. Furthermore, a common pattern of all countries in our study is the sharp hike in LCGB market size in 2020, which was a natural result of the boost in government spending due to the COVID-19 pandemic.

Figures 3 to 7 illustrate the change of our explanatory variables over time on a country basis. In China, the strong upward trend of LCGB market depth over the whole sample period occurs together

FIGURE 3
GDP, Inflation and Fiscal Balance, 1996–2020



SOURCE: WB, IMF.

with similar upward movements of GDP and financial development. China realized an average annual real GDP growth of 8.63 per cent between 1997 and 2020. In terms of financial development, China had good performance in access to financial institutions and depth of financial markets. According to the IMF's database, the number of ATMs per 100,000 adults in China grew from 9.62 in 2006 to 87.88 in 2020. These factors may have contributed to the development of the local-currency bond market in China. Another possible contributor to market deepening could be the country's worsening fiscal balance and the increasing borrowing needs of the government. Net government borrowing started to increase sharply in 2018 in China and reached an unprecedented level of 10.69 per cent of GDP at the end of 2020, following the outbreak of COVID-19. The expansion of public debt generates a positive supply-side effect for the local-currency government bond market. These observations are consistent with our empirical findings in the previous section.

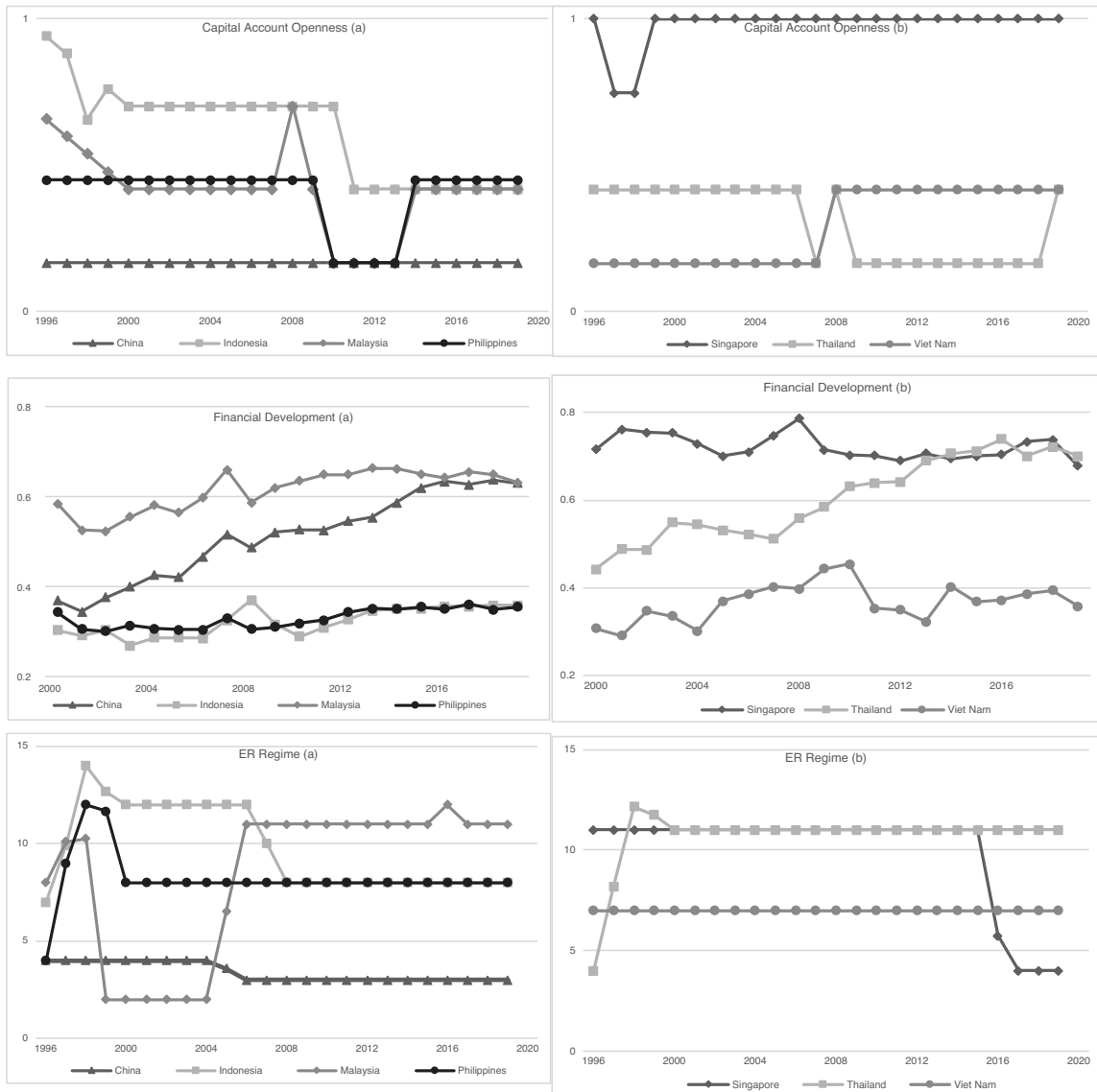
Indonesia, Malaysia, the Philippines and Thailand were severely affected by the Asian Financial Crisis, which initiated a major contraction of GDP in 1998. Capital outflows and currency depreciation were common in these countries in the initial stage of the crisis. Thus, we need to keep an eye on the repercussions of the crisis in these economies while analysing the dynamics of the deepening of LCGB market capitalization.

In Malaysia, after the Asian Crisis, real GDP contracted by 7.4 per cent in 1998. In response, the government introduced various capital controls and switched to a less liberal exchange-rate regime, as can be seen in Figure 4. The country experienced an economic downturn following the Global Financial Crisis in 2009. In both cases, net government borrowing suddenly jumped to around 6 per cent, which can contribute to the bond issuances of the public sector. But in 2009 the exchange-rate regime was kept flexible, in contrast to the policy shift after the Asian Crisis. We can justify the fluctuations rather than having a positive trend in the LCGB market deepening at the beginning of the sample by the combination of capital controls and a less flexible exchange-rate regime after the Asian Crisis. Malaysia's recovery rate, a measure of better capacity to deal with insolvencies and stronger creditor rights, also started to improve from 2011 onward, which might also be a catalyst for deeper LCGB market capitalization.

Thailand had a similar recession and jump in government borrowing at the end of the 1990s due to the Asian Crisis, with net government borrowing reaching 9 per cent of GDP in 1999. However, Thailand's de facto measure for capital account openness did not change much. The measure for the flexibility of the exchange-rate regime also was relatively high and decreased marginally after the crisis. Against this backdrop, Thailand's LCGB market capitalization-to-GDP ratio fluctuates less than among regional peers severely affected by the Asian Crisis. Thailand managed to keep government net borrowing under control after 2003, which could limit the issuance of bonds. Low and stable inflation, and steady financial development after 2008 were potential catalysts for the LCGB market deepening. The depth of both financial institutions and markets soared after 2008. According to World Bank data, the ratios of private credit and the insurance sector's size to GDP climbed, respectively from 87.7 per cent and 10.6 per cent in 2008 to 112.2 per cent and 23.7 per cent in 2018, and this expanded the investor base for local-currency bonds. World Bank data also show that the market capitalization of the stocks trading at the Stock Exchange of Thailand grew from 23.1 per cent of GDP in 2000 to 108.3 per cent of GDP at the end of 2020. Regulatory measures that considerably improved Thailand's recovery rate in 2012, as can be seen in Figure 5, also provide support for increased LCGB market development.

Indonesia's economy can be considered the economy severely affected by the Asian Financial Crisis. The economy began experiencing high inflation in 1998 following the collapse of the exchange-rate peg in late 1997, and Indonesia went through an economic restructuring in the ensuing years. The government signed a stand-by agreement with the IMF under which a long list of regulatory and institutional changes occurred. The government issued a large amount of bonds under its bank restructuring programme.³ For this reason, the jump in the LCGB market size-to-GDP ratio in 1999 can be linked to the policies

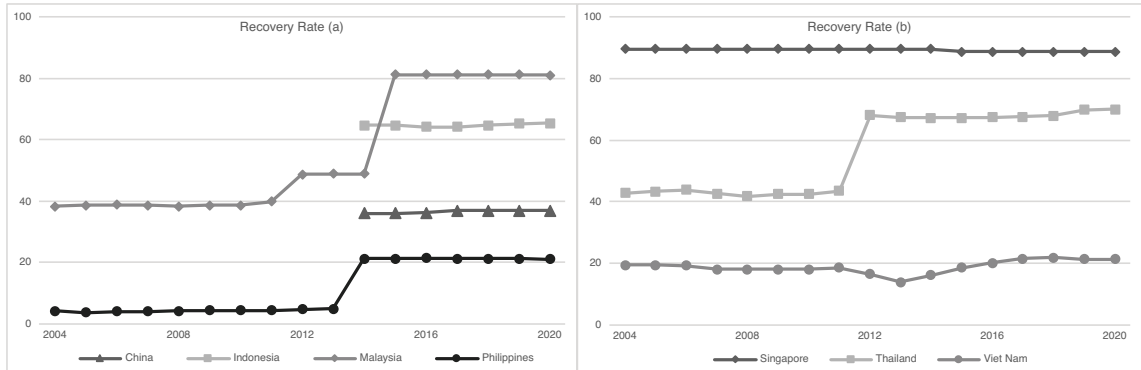
FIGURE 4
Capital Account Openness, Financial Development and Exchange Rate Regime, 1996–2020



SOURCE: Chinn-Ito KAOPEN Database, IMF, Ilzetski et al. (2019).

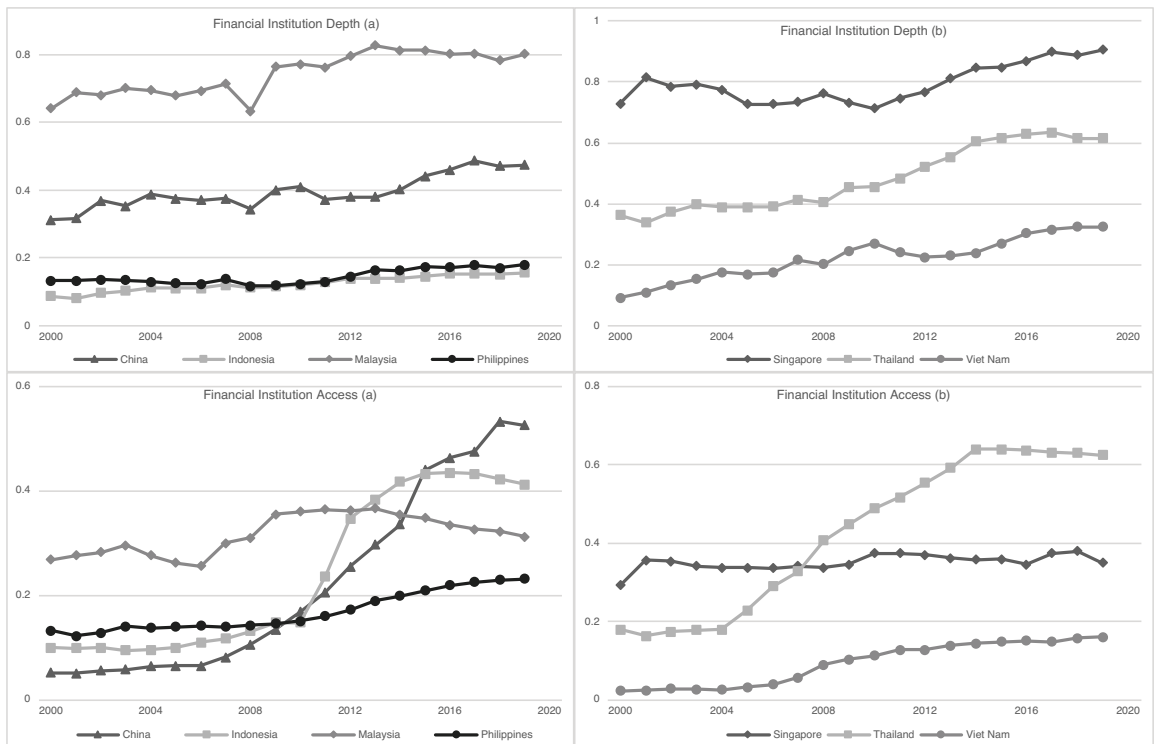
implemented after the crisis. After peaking in 2002 at 32.6 per cent, the LCGB market capitalization-to-GDP ratio declined to 11.4 per cent in 2013. Among our regressors in the previous section, deterioration in capital account openness and exchange-rate flexibility could be among the factors that contributed to this downturn. Figure 6 shows that access to the services of financial institutions rose sharply in Indonesia after 2011, with the number of bank branches and number of ATMs per 100,000 adults jumping, respectively,

FIGURE 5
Recovery Rate (Resolving Insolvency), 2004–20



SOURCE: WB.

FIGURE 6
Indices for Access to and Depth of Financial Institutions, 2000–19



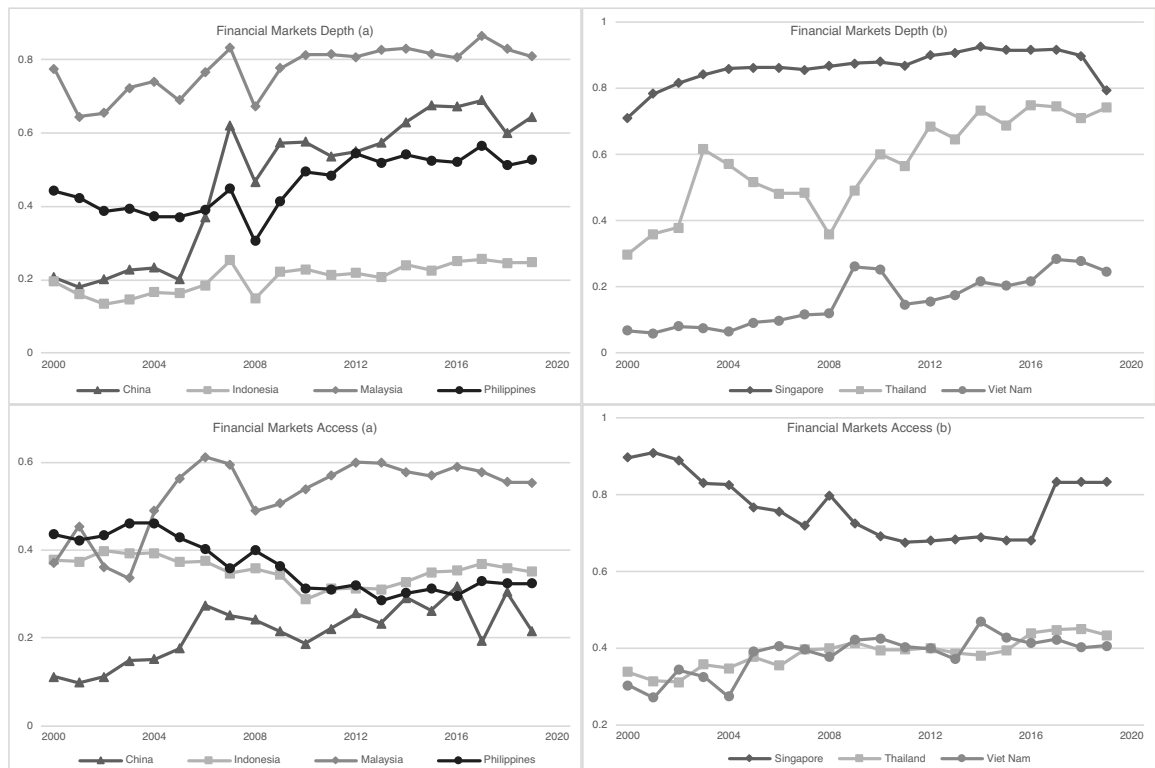
SOURCE: IMF.

from 8.11 and 13.04 in 2010 to 15.22 and 51.66 in 2020, and these factors could enhance the investor base for the bond market. This improvement in financial development provides an explanation for the LCGB market development in the last part of our sample period.

The economy of the Philippines was affected by the Asian Crisis, and government local-currency bond market capitalization rose from 24.9 per cent of GDP in 2000 to 38.3 per cent in 2005. But it then entered the longest downtrend in our sample, with the ratio gradually driven down to 26.9 per cent by 2019. Our empirical findings from the previous section indicate that possible sources of this decline could be lower net government borrowing, with the Philippines essentially a net lender between 2013 and 2015, and low levels of capital account openness, with the Chinn-Ito index declining to 0.16 between 2010 and 2012. These figures led to a sharp decline in the relative size of the country’s government local-currency bond market. During this period, the Philippines exhibited positive development on the institutional side of the economy, with improvement in not just the recovery rate but also in regulatory quality and rule of law, as measured by the World Bank’s World Governance Index. However, the low levels of government borrowing and the shallower investor base due to lessened capital account openness might dominate these structural improvements in the institutional part of the economy.

According to Asian Development Bank data, Vietnam’s government local-currency bond market started from scratch in 2000 and expanded to 22 per cent of GDP by the end of 2020. The country’s

FIGURE 7
Indices for Access to and Depth of Financial Markets, 2000–19



SOURCE: IMF.

market capitalization grew steadily and without any major setbacks except during the 2008/9 Global Financial Crisis. During our sample period, Vietnam experienced one of the fastest average GDP growth rates in the region, which can contribute to LCGB market development. In the previous section, we infer a positive association between financial development and LCGB market depth. Four subindices—the depth of and access to both financial institutions and markets—contributed significantly to the improvement of the Financial Development Index for Vietnam between 2000 and 2020. We also identify the subindices for financial institutions as positively related to LCGB market development, as shown in Table 5. According to the IMF's Financial Access Survey dataset, the number of ATMs per 100,000 adults in Vietnam increased sharply from 1.4 in 2004 to 26.3 in 2020. The credit-to-GDP ratio, a major determinant of the subindex for depth of financial institutions, also rose, from 35.3 per cent in 2000 to 147.7 per cent in 2020. Furthermore, securities trading on the Hanoi Stock Exchange began in 2000 and the market capitalization of the listed companies had reached 68.6 per cent of GDP as of 2020, according to World Bank data. These figures demonstrate the magnitude of financial deepening in the country during the sample period. Such deepening can lead to a significant increase in demand for local-currency government bonds from banks and the expansion of the investor base due to financial inclusion, which can also translate into a surge in interest for local-currency bonds. The country's recovery rate also improved between 2000 and 2020, but the level of this indicator is low relative to the other countries in our sample. It increased slightly, from 19.4 in 2004 to 21.3 in 2020, while the rate is estimated at 70.1 for Thailand and 65.5 for Indonesia. According to the ER policy classification of Ilzetski, Reinhart, and Rogoff (2019), there was no change in the flexibility of Vietnam's actual exchange-rate regime throughout our sample period. A one-time change made capital account openness more liberal after 2008 than before. Other macroeconomic indicators exhibit a volatile course over the period. Vietnam's fiscal balance jumped into net lender territory in 2006, while over the rest of the period, it fluctuated between 0 and –6 per cent, with many ups and downs. Consumer price inflation was also quite volatile and moved in a very wide range, with a maximum of 19.9 per cent in 2008 and deflation of 0.6 per cent in 2000. Considering all these changes in institutional, macroeconomic and financial variables, and also the empirical results described above, it is reasonable to argue that the steady development of the local-currency government bond market in Vietnam from 2000 to 2020 was supported by the strong and sound improvements in financial development and by economic growth.

Finally, Singapore has the highest ratings of our dataset in terms of financial development, capital account openness and creditor rights, and exhibits stable low levels of inflation throughout the sample period. However, it also has a solid record of net lending on the government side. The government was in a net borrower position in only one observation other than 2020, when most countries around the world increased public borrowing considerably to support households during the pandemic. This factor will be crucial in explaining the relatively flat pattern of LCGB market development in Singapore.

5. Policies to Foster Local-Currency Bond Markets in Emerging Asia

Based on the empirical analysis above and recent market trends, this section offers potential policy directions for fostering local-currency bond markets. Of course, bond market challenges faced in Emerging Asia vary by country. In countries where the markets are less developed, such as Cambodia, Lao PDR or Myanmar, the basic infrastructure and legal frameworks of bond markets are still being established. However, the challenges share several characteristics, and in particular: issues in the price discovery process and benchmarking; investor participation; market infrastructure; financial access; and financial literacy (OECD 2022).

5.1 Strengthening the Price Discovery Process and Benchmarking

Strengthening benchmarking and improving price discovery are essential to developing bond markets. Sovereign bonds typically act as “benchmark” securities, setting price standards for other fixed-income securities. Benchmark securities reduce adverse selection costs that arise from asymmetric information between buyers and sellers. They also facilitate liquidity, as they can be used as hedging instruments. This renders effective benchmarking a top priority for policymakers in countries with emerging bond markets. Reliable benchmarks will boost investor confidence and allow growth in emerging economies, which is rapid by global standards, to stimulate the development of bond markets (Nagano 2018; Mizen and Tsoukas 2013).

With these goals in mind, Indonesia, Thailand and China have undertaken policy measures to support price discovery in their respective bond markets. Bank Indonesia introduced an overnight index swap and interest rate swaps in 2018 to support liquidity and risk management. The overnight index swap is considered nearly risk-free, allowing for the construction of a benchmark yield curve. Thailand has sought to develop price discovery and yield curves by offering a variety of maturities on government securities and releasing them at regular intervals under advance notice. Bidding by fourteen specific primary dealers is used to construct a government bond yield curve; the primary dealers also act as market makers for secondary market trading. Yields for bonds issued by state-owned enterprises, and some other instruments, are also made available daily, allowing for the development of more specific yield curves by asset. A Thai Bond Market Index has been developed as another benchmarking tool (Damayanti et al. 2020; ThaiBMA n.d.). China began issuing government bonds denominated in US dollars in June 2017 to develop benchmarks for US dollar-denominated corporate issues (Zhang and Desai 2017).

In contrast, government bond issuance is limited in Cambodia, Lao PDR and Myanmar. Cambodia issued its first government bonds on 9 September 2022 after the Law on Government Securities was adopted in December 2020. The bonds were placed on the Cambodia Securities Exchange (CSX n.d.).

5.2 Encouraging Investor Participation

Most Emerging Asian countries have a strong institutional investor base, though this is not necessarily the case in some countries where potential institutional investors prefer holding cash. Highly dollarized economies can also present a challenge for bond market development, as most if any demand for bonds is for those denominated in US dollars, rather than in the local currency.

Expanding the investor base to include more retail investors could deepen the demand for bonds and diversify the characteristics of bonds demanded. Bonds contribute to a more diversified investment approach for retail investors and are a key component of portfolios with better-optimized risk-return profiles. Instruments such as regulated bond funds could help retail investors overcome cost and financial literacy barriers to holding a diversified portfolio of bonds. Pairing these types of instruments with FinTech solutions could further help mobilize domestic savings, as blockchain-based or digital crowdfunding platforms may reduce financial barriers to market entry by facilitating the purchase of small quantities of bonds or bond funds, even fractional units. In this way, people who would typically lack the means or expertise to participate in the bond market could do so from the convenience of their mobile phone (ADB 2021). Some large firms have already begun to capitalize on such technologies. The European Investment Bank issued its first digital bond using blockchain technology in April 2021. The bond issue raised EUR100 million via the Ethereum platform (Knight 2021).

5.3 Improving Market Infrastructure

Properly functioning capital markets depend on efficient substructures, such as clearing and settlement systems, each supported by robust legal and regulatory systems. A real-time and high-value gross settlement system is especially important for bond markets, in which typical transactions are very large. The need to develop these systems is particularly urgent in countries like Cambodia, where no such system existed as of 2018 and where large payments are still often conducted by cheque (ADB 2018), and Lao PDR, where the gross payment system only became real-time in 2019 and where cheques are still cleared manually at provincial-level weekly meetings (UNESCAP 2021). Conversely, Malaysia, the Philippines and Thailand established sound market infrastructures as far back as the late 1990s or early 2000s.

Understanding the vital importance of developing these infrastructures, the ASEAN+3 economies—the ten ASEAN member states plus China, Japan and Korea—have been working on developing a regional cross-border settlement infrastructure “to ensure the safety of settlement-connecting financial market infrastructures” as part of their collaboration through the Cross-Border Settlement Infrastructure Forum (ADB 2020).

This forum is only one aspect of regional cooperation that has been essential to developing bond markets in Emerging Asia. In 2001, ASEAN+3 helped domestic credit rating agencies to form the Association of Credit Rating Agencies in Asia. The association in turn assisted its members in adopting best practices and common standards for the region (ADB 2017). Meanwhile, the Executives’ Meeting of East Asia-Pacific Central Banks (EMEAP) established the Asian Bond Funds 1 and 2 in 2003 and 2004, respectively. These funds were used to support regional bond market development, including by promoting private-sector participation in local-currency bond markets. This objective was pursued by enhancing reporting standards and placing the EMEAP Working Group on Financial Markets in charge of monitoring. Launching a low-cost, passively managed index bond fund was another objective to attract retail investors, as discussed above (ADB 2017).

The Asian Bond Market Initiative (ABMI) was launched by ASEAN+3 in late 2002. ABMI sought to develop local-currency bond markets and enhance regional financial stability, cooperation and integration. The scope of the initiative has expanded several times. It issued a roadmap in 2008 that called for promoting the issuance and supply of local-currency bonds, fostering demand for these bonds and bolstering the bond market’s regulatory framework and infrastructure (ADB 2017). In 2012, it launched a new expanded roadmap with the same priorities to reflect rapid development in regional bond markets. A Credit Guarantee and Investment Facility was launched, along with several infrastructure-financing schemes. The roadmap also called for: a common programme of bond issuance to standardize regulation; the establishment of a regional settlement intermediary to reduce cross-border transaction and settlement costs; and the development of a foundation for an eventual regional credit rating system (ADB 2017). Further multiyear roadmaps were launched for 2016–18 and 2019–22 (ASEAN+3 2019). The ABMI has also established the ASEAN+3 Multicurrency Bond Issuance Framework (AMBIF) to support intraregional transactions through common standards, procedures and documentation (ADB 2015).

5.4 Enhancing Infrastructure for Financial Access

Robust and widespread infrastructure is essential for consumers to have access to financial systems. The IMF Financial Access Survey identifies two metrics for measuring the state of this infrastructure, consistent with the United Nations Sustainable Development Goals: commercial bank branches per 100,000 adults and ATMs per 100,000 adults. In Emerging Asia, Brunei Darussalam and Indonesia are

the leaders in the number of bank branches per 100,000 adults, while Lao PDR, Vietnam and Myanmar are in a distinct lowest tier. As regards ATMs, Emerging Asia averages 48 per 100,000 adults, yet the spread across countries is large. Thailand is in a tier of its own with more than 120 ATMs per 100,000 adults, while Myanmar has fewer than 10. In 2018, China became the second Emerging Asian country to surpass 80 ATMs per 100,000 adults.

Approximately 290 million people in Southeast Asia do not have a bank account, a figure corresponding to 43 per cent of the region's population (Fitch Ratings 2020). Domestic bond markets will have little potential in countries with larger unbanked populations, and firms or sovereigns may prefer offshore bond issues in the short term. Policymakers must strive to bolster financial inclusion and reduce the proportion of unbanked persons for reasons of both financial market development and human development.

Fewer than 50 per cent of adults (aged fifteen years and older) in most Emerging Asian countries hold a transaction account at a financial institution. According to the World Bank's 2017 Findex survey, common reasons cited include both the expense of financial accounts and lack of trust in financial institutions. Respondents without financial accounts in the Philippines (nearly 40 per cent), Cambodia, Indonesia and Lao PDR were most likely to cite the cost of these accounts as their primary reason for not having one. To bolster financial inclusion, policymakers could pursue the reduction of account opening fees, account maintenance fees or minimum balance requirements. Information campaigns on the benefits of having a financial account may also be beneficial. While distrust of financial institutions is generally low in Emerging Asia, it was nonetheless cited as the main reason for not having an account by 16 per cent of respondents in Cambodia and 15 per cent in the Philippines. Fewer than 5 per cent of respondents from all other Emerging Asian countries surveyed cited distrust as their primary reason for not having a financial account.

5.5 Development of Financial Literacy

Broadening investor bases in Southeast Asia will require significant efforts to raise levels of financial literacy through information campaigns and other activities. Financial literacy refers to awareness of the financial products available and their corresponding risks. In addition to facilitating financial inclusion, increased levels of financial literacy can promote consumer protection and make prudential risks more manageable. In contrast, financial illiteracy has been shown to be costly to consumers, both indirectly in terms of missed opportunities and directly due to financial blunders made in ignorance. Lusardi and Tufano (2015) find that consumers who do not understand compound interest spend more on transaction fees, carry more debt and face higher interest rates on loans. Stango and Zinman (2009) find that these people borrow more, save less and are less likely to diversify their financial risks. Nguyen and Nguyen (2020) find that having only a basic level of financial literacy can decrease the likelihood of participation in financial markets, but that the likelihood increases as financial literacy improves. The study also shows positive peer effects, suggesting that people discuss financial matters and take the opinions of others into account in their own decision-making. This would further support the importance of population-level financial literacy training, through education, the workplace and public messaging. Yeh (2020) finds that financial literacy has a positive and significant effect on a person's awareness of his or her post-retirement financial needs and enables him or her to compare financial products more effectively, leading to better choices. As many Emerging Asian economies have ageing populations, boosting the financial literacy of those in the workforce (especially those closer to retirement) is crucial.

Data gaps represent a major obstacle to assessing financial literacy in Southeast Asia. Available data are often several years old and not comparable across countries. The OECD's International Network on Financial Education survey attempts to provide a picture of financial literacy in Emerging Asia that permits such comparisons. The work of the OECD (2016), supplemented by Morgan and Long (2019),

indicates that financial literacy is below the OECD average in Cambodia, India, Indonesia, Lao PDR, Malaysia, Thailand and Vietnam—all of the Emerging Asian countries for which data were available except China. The Standard & Poor's Ratings Services Global Financial Literacy Survey, conducted in 2014, showed largely similar results based on interviews with more than 150,000 adults from over 140 countries (Klapper, Lusardi, and van Oudheusden 2015). The survey also showed that financial literacy correlates positively with the likelihood of a person holding a financial account. Among Southeast Asian countries, China and Thailand are exceptions—rates of financial market participation are above the median level despite relatively low rates of financial literacy.

Examining changes in financial literacy rates within individual economies is also very challenging due to the scarcity of data that are comparable over time. However, where such statistics do exist, the findings are generally positive. Using data from Indonesia's Financial Services Authority, Hidayatinnisa et al. (2021) note that the proportion of Indonesia's financially literate adults rose from 21.84 per cent in 2013 to 29.66 per cent in 2016 and to 38.03 per cent in 2019. Similarly, 2021 data from the People's Bank of China show that the financial literacy index for Chinese consumers rose by 2.04 points (or 3.15 per cent), from 64.77 in 2019 to 66.81 in 2021 (People's Bank of China 2021).

A further challenge for policymakers is that several studies suggest that people with lower cognitive abilities are more likely to display lower financial literacy, meaning that policy measures may not work as hoped for those who may need them the most. Fostering trust in financial advice is therefore crucial, as people with lower cognitive abilities may be more likely to seek professional help with their finances. Policymakers must ensure that financial advisors act in the best interests of their clients and with integrity. Lourenco, Dellaert, and Donkers (2020), using a large sample of households in the Netherlands, find that consumers' perceptions of trust and the expertise of the firm providing the financial advice are important drivers of their accepting this advice.

Digital financial literacy in particular is now critical for the development of financial markets, financial inclusion and risk mitigation. While technology can enhance financial inclusion by providing better access to services, it may increase the level of understanding needed by a market participant. When cyber and financial risks are also considered, it is vital for flexible legislation to be in place alongside robust oversight mechanisms for both the financial and digital aspects. In the absence of these safeguards, or if one has a significant failure, trust in the digital infrastructure of financial markets may be lost.

Notable divides in digital literacy exist in Emerging Asia between men and women, urban and rural residents, and small and large firms (Morgan 2020). These divides are largely due to disparities in access to digital tools and the ability of people to use them. Quimba, Rosellen, and Calizo (2020) examine the digital divide in three main categories: motivational aspects, material considerations and skills. Authorities are aware of these challenges and are pursuing improvements in financial literacy while incorporating digital literacy aspects into their frameworks. However, the development of financial literacy frameworks varies significantly by country. Malaysia and Singapore have had strategies in place since the early 2000s, while China, Philippines and Thailand were designing their strategies as of 2019 and Brunei Darussalam was still in the planning phase (OECD 2019).

Despite the complexity of integrating digital financial literacy into existing frameworks, doing so will have significant benefits. A joint analysis conducted by the Alliance for Financial Inclusion (AFI) and ASEAN (2021) argues that doing so can “guide the systematic and harmonized implementation of digital financial literacy with centralized oversight of implementation, stakeholder collaboration and resource allocation” in countries with existing strategies for financial inclusion, and that it can “guarantee the participation of relevant stakeholders at the pre-formulation and formulation phases” in countries where such strategies remain in development.

National authorities must systematically collect data on policy interventions to identify gaps and make them more inclusive. A national co-ordinating council can be helpful with this (Morgan, Long and

Huang 2020; OECD 2019), not only in the wide array of stakeholders it can offer, but also in its ability to devise a roadmap to achieve determined objectives and provide guidance on programme implementation.

Recent regional cooperation efforts have prioritized financial literacy. ASEAN education ministers recently agreed in principle to pursue better digital literacy education for young people, and digital literacy will be integrated into ASEAN's education work plan for 2021–25 (UNICEF East Asia and Pacific Regional Office 2021). Furthermore, ASEAN's Business Advisory Council hosted a roundtable on FinTech and financial literacy in August 2021 (ASEAN BAC-Secretariat 2021).

Finally, it is important to note that the stability of the overall economy and financial markets is critical for the sustainable development of bond markets and the use of any other market-based instruments. Indeed, the global financial crisis of 2008/9 and its aftermath led to a new emphasis on macroprudential policy as a means of addressing systemic risk (OECD 2021). It became clear after that crisis that microprudential policy alone could not cope with system-wide financial distress. Several macroprudential policy instruments are currently embedded in various pieces.

6. Conclusion

This paper has examined the significant growth of local-currency bond markets in Emerging Asia over the last two decades and proposed actions that policymakers could take to boost the development of these markets. An empirical analysis was conducted to examine the relationship between local-currency bond markets and the components of financial development. The analysis showed that elements affecting local-currency bond market depth include macroeconomic factors such as GDP, inflation and fiscal balance, the exchange-rate regime, capital account openness and creditor rights. It found that both the depth of financial markets and financial institutions, and access to them, have a significantly positive relationship with local-currency bond market development.

While local-currency bond markets display considerable disparity across the region, Emerging Asian economies seeking to develop these markets face a number of common challenges. Identifying and addressing the prevailing institutional and policy constraints is of great importance. Top priorities for policy makers include: establishing reliable benchmarks and strengthening the price discovery process; encouraging investor participation; improving market infrastructure; enhancing access to financial accounts and; developing financial literacy, especially digital literacy. Information campaigns can also help to boost confidence in local-currency bond markets across the region.

NOTES

1. McCauley and Remolona (2000) suggest that a certain size of government bond market issuance may be required to sustain a liquid market.
2. See Ball (1992) for an explanation and Fountas and Karanasos (2007) for empirical evidence.
3. See Enoch et al. (2001) for detailed analysis of the banking crisis in Indonesia after the Asian Crisis.

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