WP/21/283

IMF Working Paper

Financing for the Post-pandemic Recovery: Developing Domestic Sovereign Debt Markets in Central America

by Jean Francois Clevy, Guilherme Pedras, and Esther Pérez Ruiz

INTERNATIONAL MONETARY FUND

 WP/21/283

IMF Working Paper

Western Hemisphere Department

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Authorized for distribution by Manuela Goretti

December 2021

Abstract

The pandemic has urged countries around the globe to mobilize financing to support the recovery. This is even more relevant in Central America, where the policy response to cushion the pandemic's economic and social impact has accentuated pre-existing debt vulnerabilities. This paper documents the potential for local currency bond markets to diversify and expand financing for the recovery, lowering bond yields, funding volatility, and exposure to global shocks. The paper further identifies priority actions, both national and regional, to support market development.

JEL Classification Numbers: E44, E62, H63.

Keywords: Bond Markets, Fiscal Deficit, Public Debt, Global Spillovers.

Author's E-Mail Address: jclevyaguilar@imf.org; gpedras@imf.org; eperezruiz@imf.org

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I. INTRODUCTION[1]

Although most Central American[2] countries entered the COVID-19 crisis with moderate debt levels in global comparison, the pandemic is weighing on the region's fiscal balance sheets. Fiscal deficits have widened due to the need for higher healthcare spending and social transfers to respond to the COVID emergency and help protect the most affected, lower tax revenues, and, in some fiscally vulnerable countries, higher financing costs. Gross financing needs have increased markedly as a result, prompting countries in the region to adopt hybrid financing strategies spanning upscaled loans from multilateral financial institutions and bilateral creditors alongside Eurobond placements. While reliance on international capital markets can be a cost-effective way to finance the recovery, further development of the local currency bond markets (LCBM)—a reform ambition that has been on the CADR's agenda over the past two decades (Hemant et al., 2007)—can limit countries' exposure to shifts in investors' sentiment, especially in presence of rising debt ratios.

Domestic sovereign debt markets have been found to provide resilience to shocks in times of financial turbulence and, by expanding financing opportunities and diversifying risk-return preferences, to lift long-term growth (IMF and WB 2021). In CADR, currently underdeveloped LCBM limit the amount and maturity of local funding available to governments, while increasing the financing costs, spreads volatility in the face of global liquidity shocks, and the rollover and currency risks to sovereigns. Furthermore, issuance fragmentation and the absence of a liquid benchmark yield curve prevent long-term funding for borrowers and proper risk management for institutional investors.

To identify key reforms for the efficient functioning of LCBM in CADR, this study first discusses the stage of development of domestic sovereign debt markets primarily based on a novel approach (IMF and WB, 2021). The proposed framework evaluates the legal foundations, market infrastructure, investor base, and the money, primary and secondary markets underlying the LCBM. The resulting assessment indicates that (i) most countries in the region lack a medium-term management strategy (MTDS); (ii) the financial market infrastructure hinders transactions in the money, primary, and secondary markets, which remain fragmented and shallow, preventing the formation of a reference yield curve; and (iii) investor bases remain primarily concentrated on few large banks and/or public institutions with scant participation in secondary markets.

Against this backdrop, this paper documents empirically the potential for LCBM development in the region to lower domestic bonds yields, reduce sensitivity to global shocks, and diversify public sector funding. To this aim, we follow Jaramillo and Weber (2012, 2013) and GFSR (2014) and estimate panel regressions based on a unique monthly dataset over 2007—19 for emerging and CADR countries. The focus is on estimating the nexus between LCBM development indicators and domestic bond yields, controlling for country-specific and common external conditions. Our findings suggest that further financial deepening through a larger and/or more

[1] We are indebted to Aleksandra Babii for her analytical contributions to Section V and to Christian Vera for excellent research assistance.

[2] Throughout the paper, the term Central America refers more broadly to Central America (Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica) and the Dominican Republic (CADR).

diversified investor base, and greater bond liquidity, can materially lower yields and exposure to global shocks both in the whole sample and in the CADR-only sample.

Improving LCBM development in virtually all CADR involve a few critical steps including (i) developing a MTDS; (ii) enhancing the coordination of debt management and monetary policy with regards to primary market issuance; (iii) expanding the use of benchmark securities to foster the creation of a reference yield curve; (iv) promoting a tax framework conducive to the holding and trading of securities; (v) improving the custodian and settlement infrastructure; and (vi) expanding the investor base to long-term institutional investors. We also provide pragmatic advice on policy priorities and sequencing as informed by successful experiences of LCBM development in, e.g., some frontier economies.

The rest of the paper is structured as follows. Section II offers an overview of the current debt challenges facing CADR. Section III provides an overview of the benefits from LCBM development. Section IV discusses the status of LCBM development in the region. Section V investigates the link between LCBM development, domestic bond yields, and countries' resilience to global shocks. Section VI concludes and offers policy recommendations.

II. FINANCING CONDITIONS IN CENTRAL AMERICA DURING THE PANDEMIC

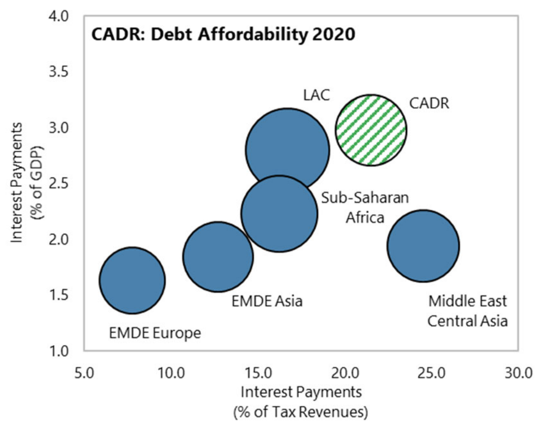
Most CADR countries entered the pandemic crisis with moderate debt burdens but weak debt affordability in global comparison. At about 60 percent of GDP, the region's average debt-to-GDP ratio fared better than in other emerging market (EME) and developing economies. However, government debt burdens were already in an upward trend pre-COVID and government interest payments relative to GDP were among the highest in the world[3]. In some countries, low revenue bases also implied a high debt, and debt service, ratio to revenues. Within the region, Costa Rica, the Dominican Republic and El Salvador exhibited the highest debt and interest burdens.

General Government Debt by regions
(percent of GDP, 2020)

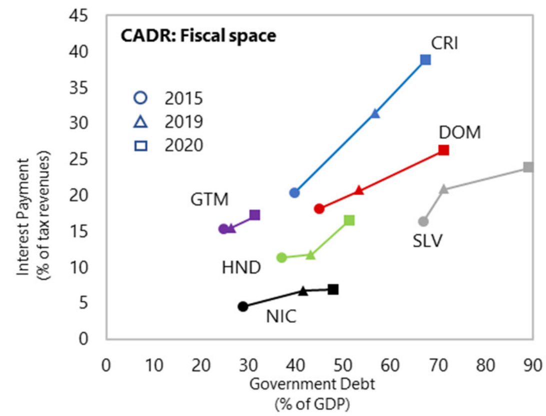
EME Average	64.4
EME Asia	67.6
EME Europe	37.6
EME Latin America	77.7
EME MENAP	56.6
Sub-Saharan Africa	49.1
CADR	59.1

Source: IMF, Fiscal Monitor.

[3] CADR interest payments to GDP are among the highest in the world despite some countries relying heavily on concessional lending.



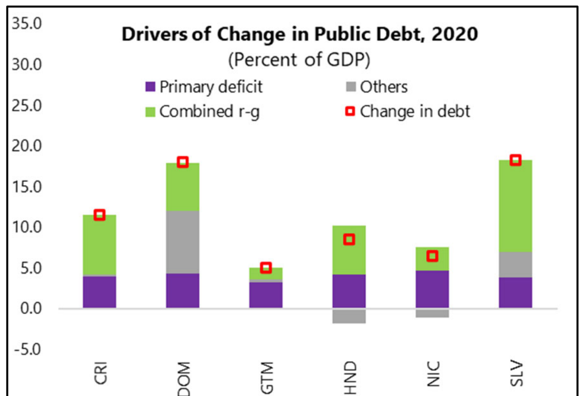
Source: IMF, WEO.
Note: Size of bubble depicts level public debt in 2020.



Source: IMF, WEO.

The shock from the COVID crisis and the necessary responses to save lives and safeguard livelihoods materially increased government deficits and debt burdens.

- *Deficit dynamics*. The region's average deficit-to-GDP ratio increased by 4 percentage points. Fiscal deficits widened across the region due to higher health-related spending and social transfers, and lower tax revenues. Looking ahead, the expected gradual recovery of tax collections, and higher financing costs in fiscally vulnerable countries, is likely to put pressure on deficits.

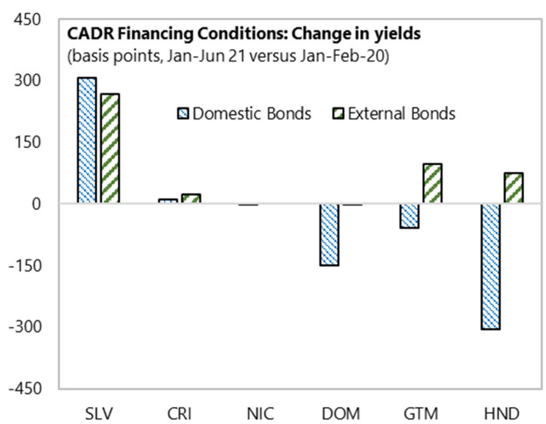


Source: IMF, latest AIV staff reports.

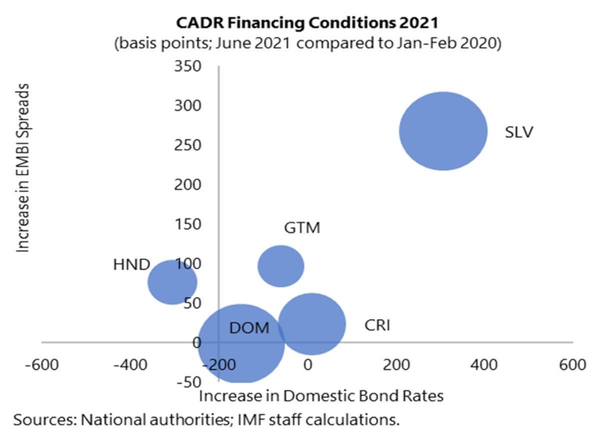
- *Debt dynamics*. The region's average debt-to-GDP ratio increased by 13 percentage points. Higher interest rate-growth differentials (*r-g*) dominated debt dynamics (over higher primary deficits) in most countries, notably Panama, El Salvador, and Costa Rica. Amidst tighter financial conditions, debt ratios are expected to remain elevated even as fiscal deficits stabilize, leaving less fiscal space than before the pandemic.

- *Immediate financing sources*. In response to the sharp increase in gross financing needs, countries in the region adopted hybrid financing strategies. Larger issuances in domestic markets were the first and immediate response. IFIs emergency financing supplemented budgetary liquidity. Additionally, the Dominican Republic, Panama, Guatemala and Honduras tapped into international markets, securing hard currency long-term funding at terms at least as favorable as those pre-COVID. El Salvador was also able to issue Eurobonds albeit at substantially higher yields.

Countries' funding strategies face important challenges ahead. Some countries, such as El Salvador, have faced tighter financial conditions since the start of pandemic, both in international (267 basis points increase in EMBI spreads) and local (307 basis points increase in rates) debt markets[4]. For most sovereigns in the region, reliance on international capital markets can be a cost-effective way to finance for the recovery but can also expose countries to higher spreads volatility and FX risks, especially in presence of rising debt ratios. Against this backdrop, enhancing local currency bond markets could lower borrowing costs and exposure to global shocks.



Source: National authorities, IMF staff calculations.



Source: IMF, WEO, SECMCA.
Note: Bubble size depicts change in public debt in 2020.

III. BENEFITS FROM FURTHER DEVELOPMENT OF LCBM IN CADR

This section draws on IMF and WB (2021) and discusses the benefits arising from the development of local debt markets, with references to the typical six major building blocks of the LCBMs: money market, primary market, secondary market, investor base, financial market infrastructure (FMI), and the legal and regulatory framework.

An efficient money market facilitates the implementation of monetary policy, strengthens monetary policy transmission and provides a foundation for the maturity extension of government financing.[5] Money markets are essential for the short-term financing and inventory management of market makers in government securities, as well as the liquidity management operations of commercial banks. In addition, they help create broader products such as floating rate instruments and hedging tools. Derivatives such as interest rate swaps can in turn facilitate the development of capital markets.

The domestic primary government bond market lays LCBMs' foundations. It allows the debt manager to implement a debt management strategy and to establish a relationship with market

[4] Average from January to June 2021 versus the average from January to February 2020.

[5] Money markets comprise instruments with terms lower than one year, such as certificate of deposit, commercial paper, Treasury bills, and repurchase agreements.

participants. Sound primary market practices involve a transparent formulation and publication of a MTDS, market-based issuance mechanisms and pricing, the publication of auction calendars, and flexible use cash management practices. The primary market also provides a regular opportunity for two-way communications between the issuer and market participants.

A well-functioning secondary market provides a cost-efficient, secure platform for market participants to trade securities in a fair and transparent manner. The market structure should involve enough intermediaries that trade government securities in standard amounts and pricing, and during agreed times. This in turn provides wholesale investors with avenues to buy and sell their securities at short notice and at reasonable cost. Efficient secondary markets provide liquidity for government securities facilitating term transformation, thus allowing investors to hold asset maturities that are longer than for their liabilities. The secondary market also provides a pricing reference to the sovereign for primary issuance. A mature stage of LCBM development typically features sustained secondary market activity across the yield curve during normal times.

A deep and diversified investor base strengthens the resilience of the market in times of market stress by securing demand for government securities. The development of an investor base with diverse maturity and risk-return preferences, as is the case of institutional investors, allows the government to spread risk in its debt portfolio and helps to extend the yield curve. While the size of the financial sector largely defines the absorption capacity of government bonds, the structure of the financial sector can have a significant impact on market liquidity.

An efficient FMI facilitates the smooth flow and settlement of transactions in the money, primary and secondary markets, strengthens investor confidence, and stimulates the pace of market expansion. The state of development and functioning of the custodial and settlement infrastructure is a major direct determinant of systemic risk. Absent a sound securities settlement infrastructure, a market may be exposed to considerable systemic risks as the failure of one party to a large transaction may lead to a series of subsequent defaults.

The legal and regulatory framework affects the structure, functioning, and development of government securities markets. Legislation and other legal instruments, such as a fiscal agency agreement between the government and the central bank, provide for the ability of the sovereign and other government entities to borrow and to act in the markets, as well as the role of the central bank as a government agent. The legal and regulatory framework also shapes the organization of the primary and secondary markets and the roles of market participants.

IV. STATUS OF LCBM DEVELOPMENT IN CADR

To assess the status of market development in CADR countries, we use the LCBM framework (IMF and WB, 2021; Annex I) to analyze sovereign debt markets in terms of their depth, liquidity, diversity and resilience. The framework covers the six building blocks already presented in the previous section and presents key findings and commonalities for the CADR region. Annex II provides detailed information on the status of LCBM development in each of the countries.

Legal and Regulatory Framework

The legal and regulatory framework should pursue fair, efficient, and transparent government securities' markets. While many countries in CADR have reinforced their monetary policy frameworks, their securities' markets and debt management legal foundations can be made more flexible by (i) enabling debt management authorities to define issuances strategies based on market conditions; (ii) preventing differential tax treatments that discourage market development for government securities; and (iii) reducing the mandatory, costly trading through intermediaries or the stock exchanges.

In many CADR countries, the legal framework should provide more flexibility to issue and manage debt. While debt management authorities are clearly defined in the region (*Crédito Público*), their ability to manage debt and undertake liability management operations that promote market development is often constrained by law. For instance, the budget law in Guatemala establishes the exact amount that can be raised domestically or externally during a particular fiscal year, hindering flexibility in adapting issuance to market conditions, prefunding, or building cash buffers. In both Guatemala and Honduras, the government lacks the legal framework to enable liability management operations. El Salvador's Constitution establishes the legal framework for public debt management, mandating Congress' approval of the budget and its financing, and all associated debt operations (rollover, LMOs, external loans, and Eurobond issuances).

The tax framework in many CADR countries has been biased against some investment instruments and entails unnecessary transactions costs or hindrances. In Costa Rica, the tax system has discriminated between types of instruments and investors. In Honduras, double taxation on mutual funds (on the assets held, and on the fund returns) inhibits the diversification of the investor base and the development of this industry. In Nicaragua, treasury bills and bonds were subject to withholding taxes, unlike repos that paid taxes on annual statements. Trading in the secondary market is discouraged by a withholding tax levied on the coupon (with no pro-rata for the period in which the investor effectively held the bond).

Trading continues to be costly in most countries in the region. Mandatory trading through intermediaries or the stock exchanges raises costs and inhibits market participation. In Honduras, investors trading government bonds in the secondary market must pay a transaction fee of 10 basis points. Mandatory trading through the stock exchange in Nicaragua and El Salvador restrains over-the-counter transactions.

Market Infrastructure

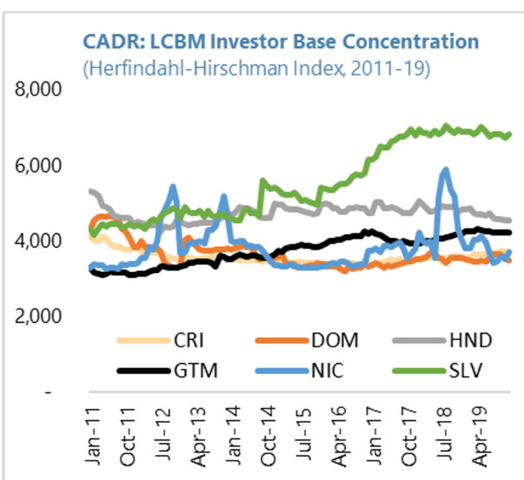
An efficient infrastructure facilitates the smooth flow and settlement of transactions in the money, primary and secondary markets, and strengthens investors' confidence. While the existing market infrastructure is broadly fit for the level of activity currently present in CADR, some elements affect investors' confidence and disincentivize trading in the money, primary and secondary markets. At the country level, progress has been uneven.

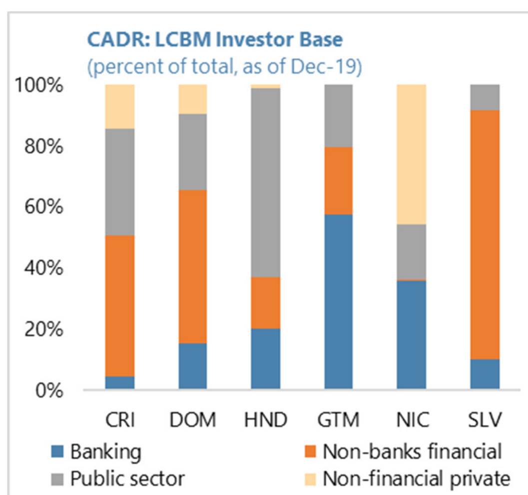
In some CADR countries, the fragmentation of central securities depositories (CSD) hinders market trading. Guatemala has been issuing securities in physical format until recently and the outstanding stock still remains fragmented into dematerialized and physical securities. The central bank keeps custody of dematerialized securities, while the stock exchange (CVN), alongside investors' own vaults, keep custody of physical securities, overall resulting in shallow trading and settlement.

In El Salvador, the custody and settlement are integrated in the Central Securities Depository (CEDEVAL), which provides gross settlement, clearing, and custody of all those listed public and private domestic and international securities. Though still nascent, the stock market of El Salvador (BVES) has recently integrated with the stock market of Panama (BVP) to offer cross border settlement and custody. Despite such integration progress, foreign investors are not allowed to hold domestic securities in international custodians but are expected to use CEDEVAL, which disincentivizes external demand. Similarly, in Costa Rica the presence of foreign investors is hindered by limited and expensive custodian services.

Investor Base

A deep and diversified investor base ensures demand for government securities, strengthening the resilience of the market in times of market stress. The investor base in CADR is still relatively shallow. The banking sector features high concentration levels while public pension funds tend to be the largest, though not particularly active, market players. The lack of diversification is a vulnerability that weakens the stability of budgetary funding, especially in periods of stress. While the participation of private institutional investors (pension funds, insurance companies, and investment funds) remains generally low, some countries have made strides into developing private pension funds, diversifying risk-return preferences, and lengthening debt maturity.

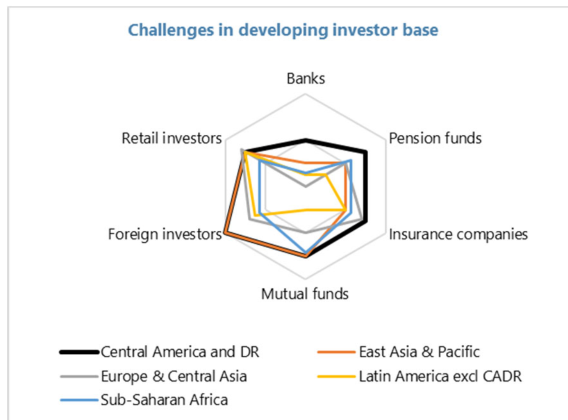




Sources: National authorities and staff's calculations.

Overall, foreign investors participation remains limited although some countries have structured (Costa Rica, Dominican Republic) or are working toward structuring (Honduras) Global Depository Notes (GDN) in an effort to diversify the investor base and stimulate foreign interest in their local currency bond market.

While still shallow, many countries in the region have made progress to diversify their investor base, either by promoting the development private pension funds through the AFPs or by tapping the retail sector. A recent survey conducted in 2019 revealed the authorities' preference for expanding their investor base with foreign and retail investors, with a focus on expanding short-term funding to the government. Over the medium-term, there is scope for balancing the mix of investors given shortcomings associated with biased portfolios. [6]



Sources: IMF and WB staff, based on Survey on Challenges for LCBM Development, 2019.
Note: closer to the edge means greater challenge to development this market segment.

Despite trade integration, geographical proximity, common languages, and the presence of several regional financial groups, the integration of CADR public debt markets remains incomplete, further contributing to the lack of diversification of the investor base. This partly owes to the prevalence of different currencies and exchange rate regimes across the region, as well as substantially different debt burdens and sovereign ratings across countries. Thus, local currency bonds issued by each sovereign remain securities with very different risk characteristics. Another layer of complexity is added by prudential requirements that cannot be easily harmonized given the large differences in sovereign credit ratings. As such, banks face higher capital adequacy requirements on foreign than domestic government securities, which traditionally carry zero risk weighting.

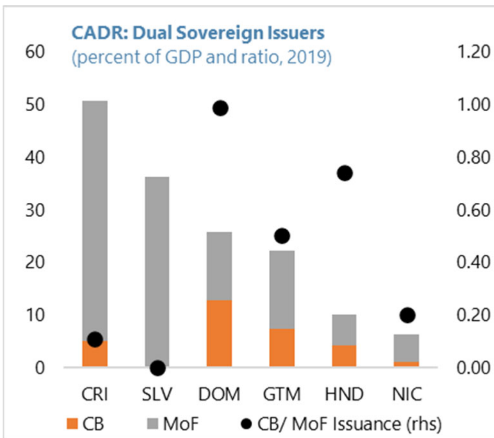
Money Markets

A reliable short-term yield curve and active repo market provides the foundations for the issuance of long-term securities and the development of the secondary market. Despite efforts to modernize monetary policy operations and improve the functioning of short-term securities and repo markets, intermediation in the money market remains a challenge in CADR. Low trading

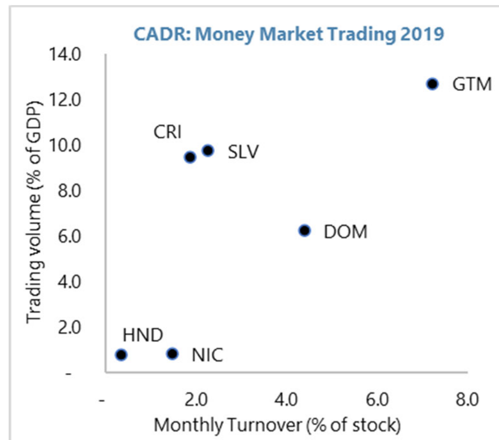
[6] For example, a large share of retail investors may deter secondary market development. Foreign investors, while usually beneficial to increase secondary market liquidity, may also increase volatility in times of stress.

volumes and discontinuous operations prevent liquidity risk management on long-term government securities, thereby lowering investors' demand. This primarily owes to:

- *Structural excess liquidity*. Excess liquidity often places investors on the same side of the market and hampers the growth of interbank trading volumes. This liquidity surplus mainly reflects commercial banks' precautionary behavior, inadequate cost-efficient liquidity provision and, in some cases, persistent remittance inflows.

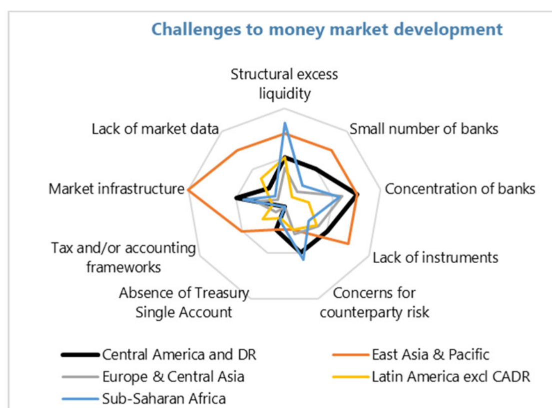


Sources: National authorities and staff's calculations.



- *Dual Sovereign Issuers*. The simultaneous, and often competing, issuance by the sovereign and the central bank, as well as heavy reliance on central bank securities for monetary policy operations (left chart) result into market fragmentation and hinder the formation of a liquid yield curve. This practice is partly due to a legacy of fragilities in their balance sheets and/or a framework preventing central banks from holding sufficient government instruments. The manifold instruments outstanding in the market is detrimental to establishing benchmarks and can potentially reduce the trading of government securities.

In addition to the elements mentioned above, country authorities also identify the *relatively* small size of their financial market and the elevated concentration of the banking sector as key elements deterring the development of money markets. While CADR countries face broadly common challenges, the status of development of each country is quite heterogenous (Annex II).

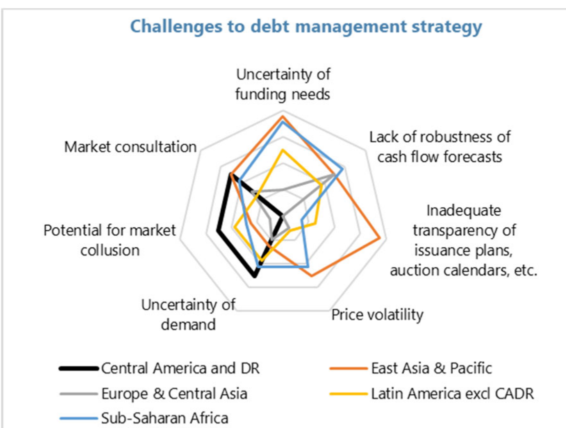


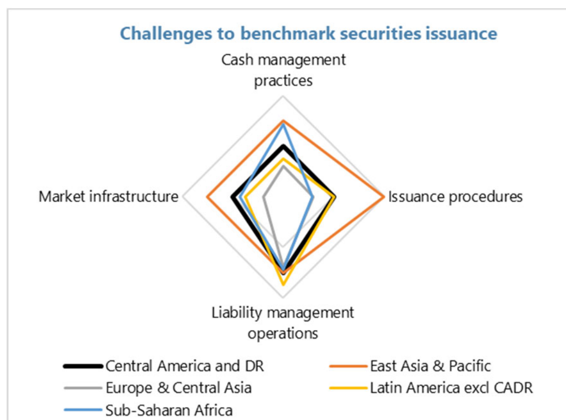
Sources: IMF and WB staff, based on Survey on Challenges for LCBM Development, 2019.
Note: closer to the edge means the factor represents a greater challenge for money market development.

Primary Markets

Developed primary markets are characterized by a large share of marketable domestic debt and well-defined yield curves. The CADR region has made significant progress in the development of primary markets over the last two decades, especially through the implementation of the *Debt Market Harmonization* program. This region-wide initiative has enabled the adoption of common market conventions, standardized securities for new issuances, and delivered capacity development for debt managers. Nonetheless, there is room to further improve primary debt issuance, especially in enhancing (i) the transparency and accountability of debt management, and (ii) market-based issuances mechanisms and pricing.

The adoption of a MTDS signals a comprehensive and predictable approach to debt management, fostering market participation. Ongoing MTDS' across the region are providing increasing guidance to investors. For example, Honduras' 2020-23 MTDS sets out the general lines of central government domestic and foreign debt and promotes the development of the LCBM through market-based mechanisms. The Dominican Republic couches the government's annual borrowing plan (ABP) into the MTDS. Costa Rica is modernizing its debt management practices, including a revamped MTDS with annual borrowing plans and quarterly issuance calendars embedded into the medium-term strategy. By contrast, Guatemala and El Salvador still lack a published MTDS.





Sources: IMF and WB staff, based on Survey on Challenges for LCBM Development, 2019.
Note: closer to the edge means the factor represents a greater challenge.

There is ample room in CADR to enhance market-based issuance mechanisms and pricing. A recent survey conducted in 2019 points to risks of market collusion in many countries, with issuers pointing to insufficient market competition and costly government debt amidst a shallow investor base and investors' market power. This may explain that auction prices are at times set by the issuer rather than cleared at market prices.

Securities' fragmentation remains elevated, resulting in a large share of individual negotiable and non-negotiable outstanding instruments, and hampering the liquidity in secondary markets. Key obstacles to the issuance of benchmark securities include an inadequate market infrastructure and practical obstacles to execute liability management operations.

Secondary Markets

The secondary market provides liquidity for government securities facilitating term transformation. Despite rising liquidity in recent years, secondary market activity in the CADR region remains shallow. Turnover ratios, defined as the share of secondary market trading in total debt stock, remain low in most countries. Public debt securities account for most of the market trading throughout CADR amidst underdeveloped corporate securities.

This results in relatively illiquid medium- and long-term yield curves, as public securities are predominantly traded on the money market. The associated opacity in the pricing of government bonds deters market trading, which is further affected by high transaction costs—brokerage and exchange fees—charged by local securities exchanges.

From CADR debt managers' perspective, the main bottlenecks for developing secondary markets are the lack of benchmark bonds and the limited number/participation of institutional investors[7]. Both dimensions impede the deepening of yield curves and lessen liquidity in the government securities market.

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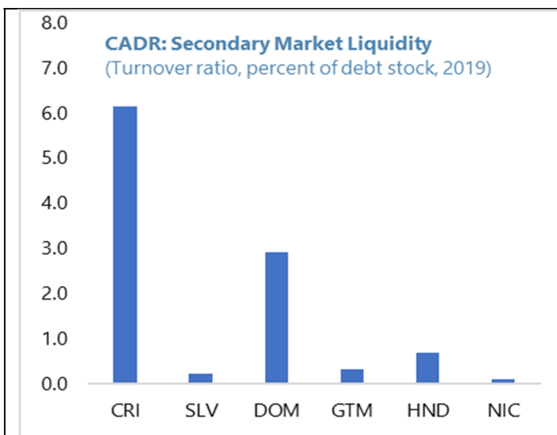
<td>
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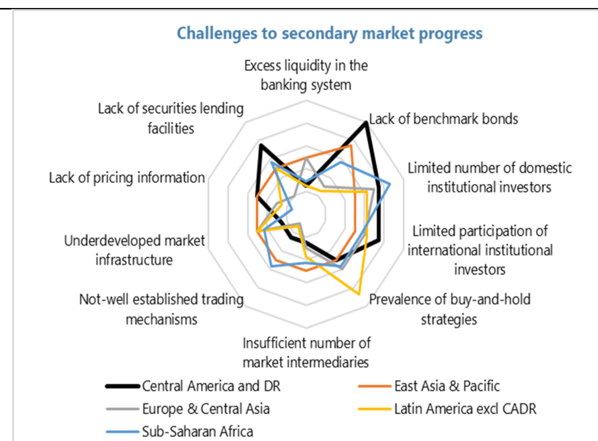
<td>
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<td>Sources: National authorities, authors' calculations.</td>
<td>Sources: IMF and WB staff, based on Survey on Challenges for LCBM Development, 2019.
Note: closer to the edge means the factor represents a greater challenge for secondary market development.</td>
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[7] See footnote 6 on GDN progress by some countries to expand their investor base.

V. DOMESTIC SOVEREIGN BOND YIELDS IN CADR: THE ROLE OF LCBM DEVELOPMENT

This section investigates the macroeconomic benefits associated with the process of developing LCBMs in CADR, arising primarily from a reduction in sovereigns' financing costs. Despite the wealth of studies on sovereign *foreign currency* spreads, there is scarce empirical evidence that focuses on sovereign *domestic currency* bonds, especially for the CADR region.

Jaramillo and Weber (2012, 2013) provide evidence of the link between domestic bond yields in emerging economies and global risk appetite and liquidity. They also find that country-specific fundamentals, notably fiscal soundness, financial sector openness, and the current account balance, are relevant to amplify/diminish exposures to external factors. Mayijima *et al.* (2012) find that the development of a deep and liquid local currency bond market is key to mitigating risks associated with currency and maturity mismatches. In addition, GFSR (2014) finds that a set of indicators of local financial market development affects the sensitivity of domestic bond yields to external factors.

The remaining of this section explores the nexus between further LCBM development, domestic bond yields, and countries' resilience to global financial shocks. To this aim, we estimate a panel regression model relating country-level local currency sovereign bond yields to indicators of financial depth, investor base diversification, and bond market liquidity. In our empirical strategy, we control for global financial conditions and domestic macroeconomic fundamentals.

A. Dataset and Methodological Approach

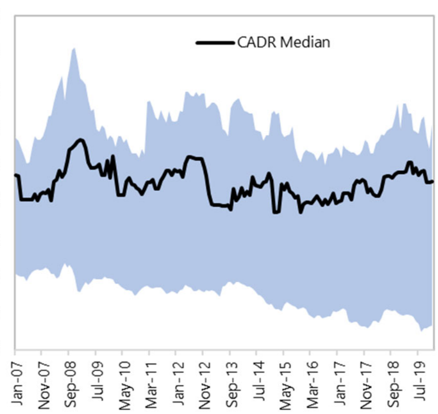
The empirical analysis uses a dataset of monthly observations (January 2007 to December 2019) for the 6 CADR economies and 6 benchmark emerging market economies (Mexico, Peru, Malaysia, Thailand, Hungary, Turkey). The dataset includes long-term (typically 10-year or relevant benchmark) local currency bond yields[8] and one-year ahead market expectations for domestic conditions (annual inflation, real GDP growth, the fiscal balance-to-GDP ratio, and the current account-to-GDP ratio).[9] We also include indicators of short-term domestic rates[10] and of the stock of domestic bonds to control for financing conditions at the short-end of the yield curve and for possible fiscal sustainability risk premia. To capture external conditions, we include the 10-year U.S. Treasury bond interest rate as proxies for global liquidity, and the CBOE volatility index (VIX) as a proxy for global risk appetite.

[8] For the 6 CADR countries, yields on local currency bonds come primarily from the Central American Monetary Council repository. For the 6 benchmark EMEs, data come from J.P. Morgan Global Bond Broad Index redemption yields.

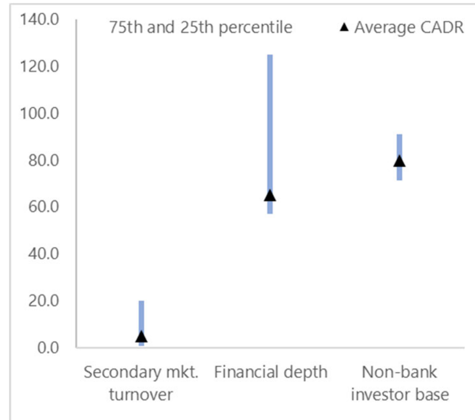
[9] The source for macroeconomic forecasts is the Economist Intelligence Unit, through its monthly country reports. Following Laubach (2009) and Jaramillo and Weber (2013), market expectations/forecasts are used to mitigate possible reverse causality between yields and explanatory variables.

[10] Typically rates of central banks short-term instruments (bills or deposits).

Local Currency Bond Yields EME and CADR [1]
(percent; typically 10-year bonds)



LCBM Development Indicators [2]
(percent)



Sources: JP Morgan Global Bond Index, SECMCA, national authorities and authors' calculations.
1/ Blue shading represents 10th -90th percentile of the distribution of domestic bond yields in the EM sample.
2/ 25th – 75th percentile of the distribution of each LCBM development indicator for the 2007-19 period.

The novelty of this empirical approach lies in the country-specific indicators of LCBM development, namely the depth of the financial market (financial system assets as share of GDP), the liquidity of the secondary bond market (monthly volume traded as share of the stock of domestic bonds, turnover ratio), and the diversification of the investor base (non-bank investor as share of the total investor base). As this dataset was compiled from each country's central bank, ministry of finance, and/or stock exchange market, as appropriate, the availability and accessibility of monthly information was key in determining the sample of emerging market economies included.

Following previous empirical analyses on domestic bond yields for advanced and emerging economies, we estimate a static fixed-effects panel data model as follows:

$$r_{i,t} = \alpha_i + \sum_{k=1}^{K} \beta_{1,k}\ Global_{k,t} + \sum_{p=1}^{P} \beta_{2,p}\ Macro_{p,i,t} + \sum_{m=1}^{M} \beta_{3,m}\ LCBM_{m,i.t} + \varepsilon_{it}\ ,$$

where $r_{i,t}$ is the nominal yield on the long-term domestic bond for country *i*. The model includes country-level fixed effects α_i to account for time-invariant heterogeneity. The specification controls for *K* number of common external factors $(Global_{k,t})$ and *P* number of macroeconomic variables for each country i $(Macro_{p,i,t})$. The model further controls for *M* number of development indicators for each country's local currency bond market $(LCBM_{m,i,t})$, including through interaction effects.

Finally, panel unit root tests (Im-Pesaran-Shin) were performed to rule out non-stationarity problems (see Annex III). Our estimations rely on Driscoll and Kraay standard errors, which are robust to cross-sectional and temporal dependence[11].

B. Results

Our results (Table 1) show that domestic macroeconomic conditions are important determinants of bond yields. Domestic short-term interest rates are found to have a positive and significant effect on the term structure, at around 57 basis points for each 100 basis points increase in short-term rates. This result is consistent with previous studies, in similar settings, that suggest a response range from 45 to 89 basis points for the impact of short-term rates. An increase in the expected fiscal deficit of 1 percent of GDP raises on average nominal bond yields by about 14 basis points. This is slightly lower than findings of the literature for advanced economies (of about 25 basis points, see Laubach, 2009) and for emerging markets (ranging from 27 to 38 basis points, see Jaramillo and Weber, 2013).

Table 1. Determinants of Long-Term Local Currency Bond Yields

(estimated coefficients)

	[1]	[2]	[3]	[4]
External Factors				
Global liquidity conditions (US Treasury 10-year)	0.08	0.09	0.09	0.08
Global risk appetite (VIX)	0.01 ***	0.04 ***	0.04 ***	0.04 ***
Domestic Factors				
Short-term domestic rate	0.57 ***	0.57 ***	0.57 ***	0.57 ***
Expected real GDP growth (t+12)	-0.14 **	-0.14 **	-0.14 **	-0.15 **
Expected fiscal balance (t+12)	-0.14 ***	-0.14 ***	-0.13 **	-0.14 ***
Expected inflation (t+12)	-0.01	-0.01	-0.01	-0.01
Expected current account balance (t+12)	-0.01	-0.01	-0.01	-0.01
LCBM Development Indicators (Interaction term of the VIX and LCBM indicators)				
Non-bank investor base		-0.0004 ***		
Turnover ratio			-0.0010 ***	
Financial system depth				-0.0003
Number of observations	1,872	1,872	1,872	1,872
Number of countries	12	12	12	12
Within R-squared	0.61	0.61	0.61	0.61

Note: Each equation is estimated using country fixed effects and robust standard errors (Driscoll-Kraay). *, **, and *** mean significance at the 10, 5, and 1 percent level, respectively.

Economic growth proved significant, reducing domestic bond yields by 15 basis point for each 1 percentage point increase in growth rate, in line with findings by Miyajima and others (2012) for a sample of 11 emerging economies. As stronger growth is associated with improved investment perspectives and lower fiscal vulnerabilities, it could be associated with an overall reduction in a

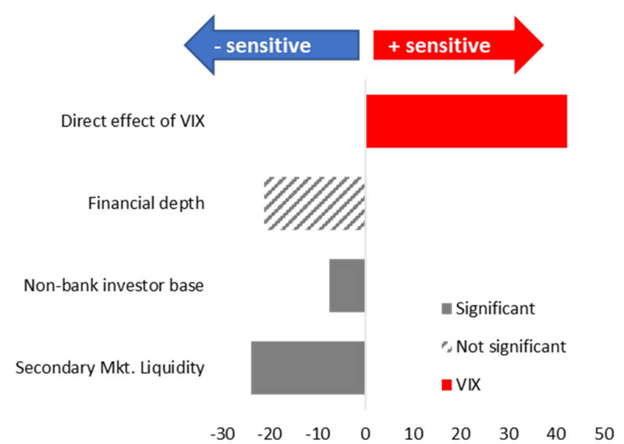
[11] Since our first estimations showed evidence of cross-sectional dependence (De Hoyos and Sarafidis, 2006) and autocorrelation, we shifted to a robust estimation procedure.

country risk premium and a compression of domestic yields[12]. Similarly, we found that an improved current account balance could lower domestic yields, via a stronger external position and lower risk premium, although this result was not statistically significant.

We find that external conditions have positive effects on domestic financing costs, although their contribution to the yields is much lower than for domestic factors. A tightening in global liquidity conditions, captured by a 100 basis points increase in the U.S. Treasury bond yields, translates into higher domestic yields by about 8 basis points. As in Jaramillo and Weber (2012), global liquidity conditions in our sample are not found to be significant. Global risk conditions are found significant, with a 10-point increase in the VIX associated to a 40 basis points increase in domestic yields. The sign and magnitude for the VIX coefficient are consistent with Miyajima and others (2012).

Indicators of development of the domestic bond market proved significant under several specifications, especially when allowed to interact with global risk appetite (Table 1). To illustrate our findings, we compared the responses of domestic bond yields when faced with a deterioration of global risk sentiment, contingent on country-specific levels of LCBM development (text chart below). The effect of a 10-point increase in the VIX on bond yields for those economies with the largest 75th percentile ratio for non-bank investors base is 10 basis points lower than those with the lowest 25th percentile, underscoring the potential benefits of further diversifying investor bases.

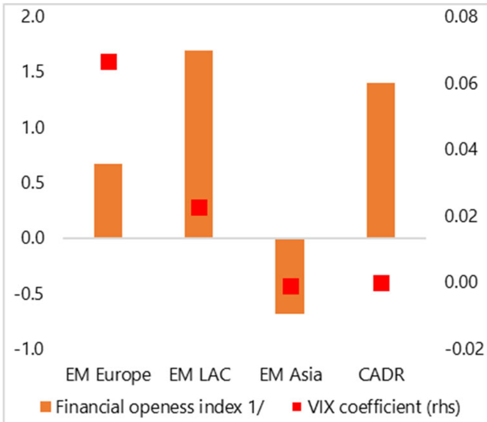
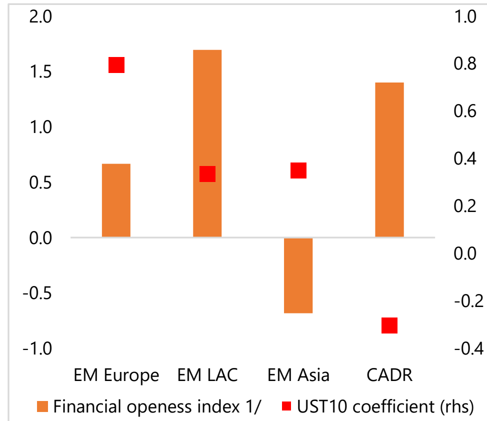
Local Currency Bond Yields
(Interaction effects of the VIX on LCBM; basis points)



Sources: Authors' calculations.
Notes: Estimated coefficients on the interaction terms of the VIX and one LCBM development indicator × best 75th – worst 25th percentile of the LCBM development indicator × 10-point increase in the VIX. Percentile data are taken from the monthly sample from 2007 to 2019.

In an alternative specification, we find that the effect of a 10-point increase in the VIX on bond yields for those economies with the largest 75th percentile ratio for the volume traded in the secondary market (as a share of domestic public debt stock) is 25 basis points smaller than those with the lowest 25th percentile ratio, pointing to the benefits of increasing bond market liquidity.

[12] Baldacci and Kumar (2010) suggest that, ceteris paribus, higher growth could strengthen fiscal positions and may be seen to reduce fiscal vulnerability, leading to lower risk premia.

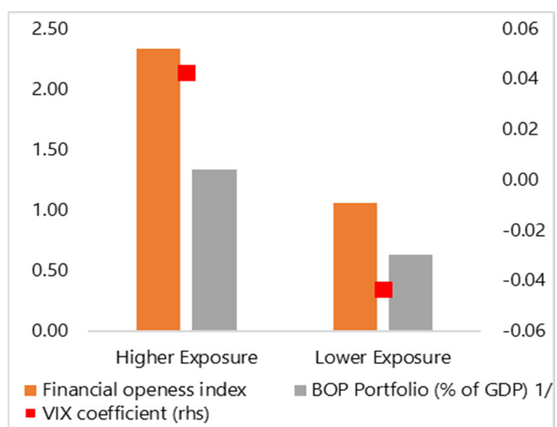
Financial Openness and External Volatility Sensitivity	**Financial Openness and External Liquidity Sensitivity**
	

Sources: Chinn and Ito (2006), World Economic Outlook, and authors' calculations.
1/ Financial openness index as measured by Chinn and Ito for 2018. Larger values indicate greater capital account openness.

When allowing for cross-section specific coefficients in our panel, we find that estimated responses across country groups are quite heterogeneous, with European EMs being more sensitive to external volatility than EMs in LAC and Asia, as found in Jaramillo and Weber (2013). In our sample we also find a similar result for country groups sensitivity to external liquidity, with larger and significant impacts for European EMs. These results seem closely correlated with the degree of financial openness (as per the commonly used Chinn-Ito index) of each country group, except for CADR.

A closer look into CADR's characteristics reveals substantial heterogeneity across countries that gets masked when aggregating. As a robustness check, CADR financial openness is also measured by the size of BOP portfolio investment flows as share of GDP. In assessing CADR exposure to external volatility, two groups clearly emerge: (i) *higher-exposure countries* featuring relatively high financial openness, comprising Costa Rica, the Dominican Republic and Guatemala; and (ii) *lower-exposure countries* featuring relatively low financial openness and larger concessional financing, comprising Nicaragua, Honduras, and El Salvador. As expected, bond yields in CADR countries with higher exposure to global risk conditions proved more sensitive to VIX fluctuations.

CADR: Financial Openness and Volatility Exposure

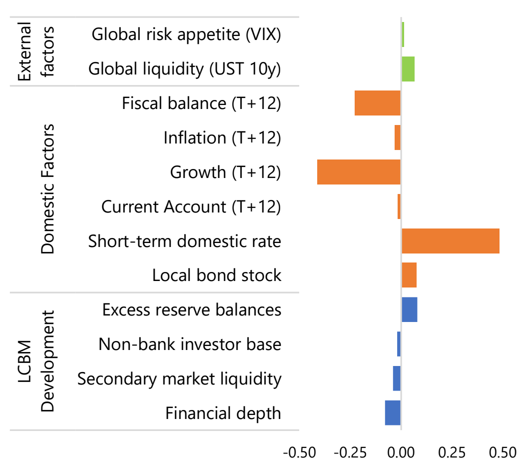


Sources: Chinn and Ito (2006), World Economic Outlook, and authors' calculations.
1/ BOP portfolio, an alternative measure of financial openness, is calculated as the sum of assets acquisition and liabilities incurrence in portfolio investments.

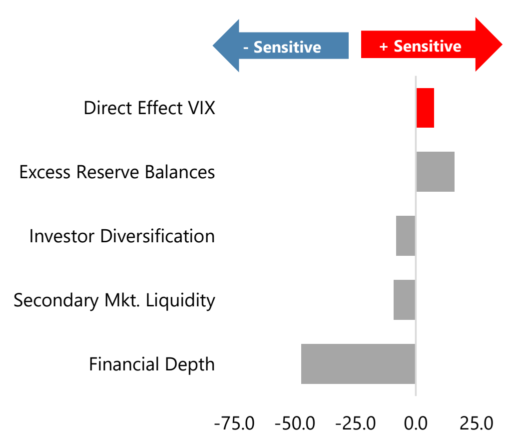
In view of these findings, we next confined our sample to CADR and replicated the empirical approach. Considering some CADR intrinsic characteristics we performed a few minor adjustments to our dataset, specifically we included the stock of local currency bond to capture possible fiscal sustainability risk premia and we considered excess reserve balances as one of the LCBM development indicators. Holding balances above the required reserve levels has been a common practice in some CADR countries, mainly reflecting the lack of proper interbank market development. Maintaining large non–interest bearing balances at the central bank could be expected to increase, *ceteris paribus*, the average interest rate charged by banks on remaining assets.

Our findings highlight that local macroeconomic conditions are key determinants of CADR domestic bond yields. Short-term interest rates, used as a proxy of the monetary policy stance, proved to be the main determinant, implying a 48-basis points response in yields, on average, when increased in 100 basis points. The fact that in most CADR countries central banks securities represent an alternative investment for buyers, renders CB rates as benchmarks. A widening of the expected fiscal deficit in 1 percent of GDP raises on average nominal bond yields by about 23 basis points, while economic growth proved significant, reducing domestic bond yields by 40 basis points for each 1 percentage point increase in the growth rate. In addition, the level of domestic debt also proved to be a significant factor for CADR, increasing bond yields in 8 basis points for each percentage point increase in the domestic debt to GDP ratio. Our estimates for the impacts of fiscal deficits and debt ratios are consistent with the findings of Jaramillo and Weber (2013) and Baldacci and Kumar (2010). Expectations on the current account balance and inflation were not found statistically significant for the region.

CADR: Local Currency Bond Yield Determinants
(estimated coefficients)



CADR: Local Currency Bond Yields
(Interaction effects of the VIX on LCBM; basis points)



Sources: Authors' calculations.
Notes: Estimated coefficients on the interaction terms of the VIX and one LCBM development indicator × best 75th – worst 25th percentile of the LCBM development indicator × 10-point increase in the VIX. Percentile data are taken from the CADR monthly sample from 2007 to 2019.

Although external conditions have positive effects on CADR domestic financing costs, their impact is lower than in the full sample considering benchmark EMs. While global risk conditions were found to be statistically significant, global liquidity conditions were not.

Our results for the CADR region confirm that financial deepening and the proper functioning of local debt markets (bond liquidity) are associated with lower yields and sensitivity to global shocks. In addition, compared to the results for the whole sample, the indicator of financial system depth gained statistical significance in CADR[13]. On average, an increase in (i) financial depth of 10 percent of GDP reduces bond yields by 80 basis points; (ii) the volume traded in the secondary market of 10 percent of the stock of domestic public debt reduces bond yields by 40 basis points; and (iii) the non-bank participation of 10 percent of the total investor base reduces bond yields by 20 basis points. On the contrary, an increase in banks' excess reserve balances of 1 percent of total deposits raises the financing cost by 8 basis points. We also find that further LCBM development can mitigate the impact of an episode of global volatility. Greater financial market deepening and secondary market liquidity could respectively save up to 47 and 10 basis points in domestic bond yields in the event of a 10-point increase in the VIX. Finally, greater excess reserve balances heighten sensitivity to shifts in external risk conditions, increasing bond yields by 16 basis points[14].

VI. POLICY IMPLICATIONS

A. Overall Policy Recommendations for CADR

This section puts forward key recommendations meant to address those challenges faced by most CADR countries (for detailed country-specific recommendations, see Annex IV). Core recommendations include:

1. *Maintain a sound macroeconomic environment*. Our study highlights that local currency bond yields are very sensitive to fiscal fundamentals. Anchoring investors' expectations in moderate fiscal deficits and sustainable debt levels is key to reducing domestic financing costs and alleviating interest payment burdens. Increasing potential growth plays an important role in strengthening tax revenues, improving debt dynamics, and reducing overall debt vulnerabilities and country risk premia.

2. *Modernize the legal and regulatory framework for debt markets.* The revised framework should allow for greater debt management flexibility and promote the trading and holding of securities. This particularly involves: (i) taxes should not be levied solely on the holders of the coupon; and

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[13] To address potential endogeneity between sovereign bond yields and LCBM indicators we re-estimated equation (1) using lagged values for the latter. The coefficients and significance remained broadly unchanged relative to the base specification with contemporaneous values for the LCBM indicators.

[14] Interaction effects are calculated using estimated coefficients and the difference between the best 75th and worst 25th percentile for each LCBM development indicator, in the event of a 10-point increase in the VIX.

(ii) eliminating mandatory trading through brokerage houses to reduce transaction costs and increase secondary market activity.

3. *Improve market infrastructure to minimize costs and risks for participants.* Promote a sound custodian and settlement infrastructure, market makers, and primary dealers to reduce the costs and risks of holding securities and settling transactions.

4. *Diversify the investor base to promote a more stable funding and allow for a more flexible debt management.* The experiences of the Dominican Republic, Costa Rica, and Honduras in expanding their bases beyond banks and public entities to private pension funds are encouraging. This can be facilitated by, for instance, introducing a regulatory environment that allows for the formation of fully funded pension systems on individual capital accounts, while making sure the tax system does not penalize this type of investment. Also, stimulating the participation of foreign investors through transparent and market-friendly debt management practices, efficient market infrastructure, and fair taxation could be envisaged. However, stimulating the presence of these players requires caution, as a large share of them could bring volatility to the market (GFSR 2020)[15].

5. *Improve the coordination between debt management and monetary policy*. To avoid market fragmentation, the Ministry of Finance should be the sole issuer of securities. Central banks could gradually implement monetary policy relying on government securities. In many countries this involves strengthening the central bank's balance sheet and operational autonomy. This may need: (i) instituting regular transfers of profits/losses from/to the central bank and, where warranted, recapitalizing the latter with marketable securities; and (ii) mechanisms for the timely provision of government securities for the central bank to execute monetary policy.

6. *Improve primary market debt management practices.* There is room to (i) expand the issuance of benchmark securities at various maturities that results in a well-defined yield curve and enhanced monetary transmission; (ii) lay out and widely diffuse more strategic MTDS that also define funding actions for at least one year head; and (iii) make auction practices more regular, transparent, and predictable, including by publishing an auction calendar for each of the instruments with predefined auction dates, preferably at regular intervals, regardless of the specific funding needs at each moment. Auctions should be gradually cleared at market prices.

B. Developing LCBM in CADR: Sequencing and Lessons from International Experience

While there are exceptions for particular countries in specific building blocks, the analysis presented in this paper suggests that the CADR region as a whole is in early stages of market development for each of the six building blocks.

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[15] For instance, April 2020 GFSR Chapter 3 found that financial market depth increases volatility when foreign participation rises beyond a 40 percent threshold.

In thinking about the appropriate sequence in market development, actions to improve the primary market should take precedence, prioritizing (i) the publication of updated MTDS; (ii) increasing auctions transparency, regularity and predictability; and (iv) enhancing the legal framework and market infrastructure to promote an enabling environment for the primary and money markets. As the primary and money markets become more effective, policies should be geared towards enlarging the investor base, deepening the secondary market, and enhancing the formation of the yield curve. At this stage, adjustments to the regulatory framework should focus in facilitating the creation of collective investment schemes (e.g. private pension funds and mutual funds) and allow for more flexible debt management operations.

While market development needs to be tailored and carefully sequenced to country-specific circumstances, successful experiences of LCBM advancement in peer groups can provide some guidance to CADR. By domain:

- *Debt management and monetary policy coordination*. Mexico provides a pragmatic example on how to reduce public debt segmentation by providing the central bank with sufficient treasury bills to implement its monetary operations. By organic law, Banco de Mexico is allowed to purchase federal government securities for the purpose of monetary regulation. A government's cash deposit is created at the central bank of the same size, terms, and yield as the securities sold.
- *Debt management flexibility*. Brazil's debt management legal framework allows the Ministry of Finance for a flexible and agile decision-making process. The Head of the debt management office is empowered to issue debt and conduct liability management operations at prices below, above, or at par. High levels of transparency and accountability ensure that management decisions are driven by technical considerations.
- *Investor relations.* The Dominican Republic has established a transparent relationship with market participants. Approved by the Parliament and published in 2016, the 2016–20 MTDS establishes strategic objectives for the debt portfolio (average maturity, currency risk exposure) and an issuance policy for benchmark instruments to support market development. Annual borrowing plans are couched within the MTDS, with specific target ranges for debt and components, and pre-announced auction calendars.
- *Efficiency in the tax framework*. Georgia has implemented a competitive tax framework across key classes of investors, both resident and non-resident, in their primary and secondary bond markets. Reforms focused initially on the "supply side" of government securities and allowed for a uniform tax treatment across the primary and secondary markets. To encourage investment and liquidity in government securities, the authorities also addressed "demand side" considerations, and effectively aligned the tax treatment given to different classes of institutional investors, such as mutual and investment funds.

At the regional level, some initiatives spearheaded by the Central American Bank of Economic Integration (CABEI) have the potential to catalyze LCBM development in CADR, most notably:

- *The creation of a Regional Trading Platform*. Such platform would offer clearing, settlements and custody services. This initiative could enhance market infrastructure, facilitate cross-border operations, diversify investor base, and increase bond market liquidity.

- *The creation of a Regional Investment Fund*. This fund would allow CABEI and other extra-regional partners to invest in CADR domestic debt.
- *Upgrading of sovereigns' credit ratings*. CADR sovereigns would benefit from CABEI's partial credit guarantee to enhance their credit rating and access on favorable terms the Mexican market.

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Annex I. The LCBM Framework

The Framework uses a set of indicators which represent the key functionalities of each building block. For any particular country, each indicator is assessed from stage 1 to stage 4, demonstrating the level of functionality or stage of development in the particular building block. The indicators are ordered in a sequential manner, starting with more foundational measures and progressing in sophistication. A composite stage at the building block level can also be calculated, which can help focus the proper sequencing of policy efforts across the six building blocks. The aim of benchmarking at the indicator and building block level is to identify peer countries who have overcome similar challenges, and to draw lessons from them to formulate an LCBM reform plan.

The first step is to determine the stage of development at the indicator level. There are two types of indicators: outcome indicators, which typically show the condition of the building block; and policy indicators, which demonstrate the current practices as employed by the authorities. For most indicators, several binary (yes or no) questions are used to assess the extent to which sound policies and practices are implemented. Countries are rated as 1 (yes) or 0 (no) for each question, and the sum of the ratings determines the stage of the indicator. For several indicators (mostly those in the primary market), a specific question is asked, and the answer determines the stage of the indicator.

The second step is to determine the composite stage at the building block level. Four building blocks (the money market, primary market, secondary market and the investor base) have outcome indicators and policy indicators. A composite stage can be calculated with an equal weighing for both the simple average of the assigned stages of outcome indicators and policy indicators. Two building blocks (market infrastructure and legal and regulatory framework) have only policy indicators. A composite stage can be calculated with a simple average of the assigned stages of policy indicators.

The four stages of LCBM development are determined through a threshold methodology:

- Stage 1, or nascent stage, where the relevant indicator exhibits no functionality.
- Stage 2, or developing stage, where the relevant indicator exhibits some functionality, but severe shortcomings exist.
- Stage 3, or emerging stage, where basic elements of the indicator's functionality are established; and
- Stage 4, or mature stage, where the indicator exhibits a considerable degree of functionality. This stage broadly corresponds to the levels/functionality in LCBMs of advanced economies.[16]

[16] For the investor base building block, stage 4 represents the state of functionalities observed in emerging market economies that are at a more advanced stage of market development.

Annex II. Status of LCBM Development in CADR

Table II.1. Status of LCBM Development in CADR Countries

	Costa Rica
Investor Base	With a participation of around 45 percent, non-bank financial institutions (mainly private pension funds, insurance companies, and investment funds) continue to be the main holders of debt issued by the central government. State-owned banks, the social security fund, and other public institutions have been historically large market players, holding about 8, 17 and 10 percent of the total, respectively, while private banks' participation remains low.
Money Market	Both the BCCR and the government have for long placed in the domestic market a large share of their debt. As of end-2019, BCCR liabilities and government debt amounted to 5 percent of GDP and 45.7 percent of GDP, respectively[17]. Given its relatively large liabilities, BCCR acts more as a debt than as a liquidity manager. Strong financing pressures in the past inhibited attempts to coordinate issuances[18], overall resulting into market fragmentation, and undermining market liquidity and proper price signaling along the yield curve. The money market turnover has therefore remained low, at 1.9 percent of the total stock of securities.
Primary Market	Price formation in the primary market has remained weak as the need to raise significant funding within short periods of time has impaired in the past the use of competitive processes. As a result, direct placements (*Tesoro Directo*) and non-marketable issuances accounted for the majority of financing. Ongoing efforts to improve the functioning of the primary market and price discovery processes focus on the gradual phasing out of the open bond windows and bilateral bond sales, as well as reforming the bond auction mechanisms for the Treasury to become a price-taker.
Secondary Market	The secondary market is relatively illiquid and trades mostly public debt instruments, with market participants (mainly securities brokers, banks and pension funds) trading parsimoniously and benchmark prices being difficult to identify. Trading has actually been decreasing in recent years despite increased issuance in the primary market, leading to a lower monthly turnover ratio (6 percent as of 2019). Secondary market trading is handled by the BNV's securities brokers through a multilateral BNV trading system that is mandatory for all fixed-income securities transactions.

[17] BCCR extensive issuance reflects partly its negative net worth of about 6½ percent of GDP (as of December 2019).

[18] There has been plans for BCCR to issue securities with maturities up to 3 years, leaving the longer segment to the government. In practice, the government has also issued shorter-term instruments to meet cash and debt management needs.

	Dominican Republic
Investor Base	Unlike in other countries in the region, the investor base has become more diversified over the past few years with increasing private pension funds, foreign investors and, to a lesser extent, the retail sector. As of end-2019, government debt was primarily owned by pension funds' associations (AFPs), representing over a third of the investor base, followed by banks and foreign investors, respectively holding about 15 and 10 percent. The public sector accounts for about 25 percent of the total holding, most of which are central bank recapitalization bonds.
Money Market	The stock of securities issued by the central bank (BCDR) was almost equivalent (ratio of 0.99) to the outstanding amount of domestic debt issued by the central government. As of 2019, BCDR liabilities and government debt amounted to 13 percent of GDP, respectively[19]. Amid increasing fiscal pressures, the BCRD's recapitalization process and financial position have weakened, leading to an upward trend in its net issuances. The absence of a predictable auction calendar prevents further deepening of the domestic debt market.
Primary Market	While public debt management operates within a clear and transparent framework, greater coordination between the Ministry of Finance and the BCRD would enhance the predictability of primary market issuances. Price formation has been hindered by market fragmentation and competing issuers. Uncertainty about the amounts distributed over competitive and non-competitive auction processes has generated yield volatility.
Secondary Market	Although trading in the secondary market remains relatively low, volumes have steadily grown during the last decade—one key benefit of the market-makers program launched in 2012. The market-maker program has brought about larger trading volumes and greater transparency, thereby reducing the bid-ask spreads. Unlike other countries of the region, most of transactions are operated bilaterally or over the counter (OTC).

[19] The relatively large share of central bank securities originates from the quasi-fiscal operations of 2003-2004, where BCDR issued instruments to deal with a banking crisis.

	El Salvador
Investor Base	The domestic investor base largely comprises pension funds and commercial banks, while the share of assets held by cooperatives, insurance companies, and investment funds remains relatively small. Pension funds represent the largest institutional investors and the largest holders of government bonds (with about 80 percent of total), mainly in the form of Certificates of Pension Investments—pension liabilities of the government. While commercial banks dominate the financial sector, their participation in the local investor base is low at around 10 percent, investing mostly in short-dated maturities.
Money Market	The Ministry of Finance is the main securities issuer in the domestic market, while the central bank (BCR) only intervenes through small and irregular auctions. El Salvador's money market currently features a small number of instruments, with the repo market being more liquid than the interbank market. Overall, the money market turnover has remained low, at around 2 percent of the outstanding stock of securities, amidst structural excess liquidity.
Primary Market	Primary issuance of government securities in the domestic market has concentrated on Treasury Bills (LETES) and, occasionally, on Treasury Certificates (CETES). As LETES are cash management instruments, the domestic yield curve does not extend beyond one year (in contrast with the well-defined yield curve for Eurobonds). Issuance calendars and indicative amounts are published, although auctions tend to significantly deviate from plans, affecting investors' liquidity and investment strategies. The current funding strategy exposes the government to refinancing risks.
Secondary Market	The secondary market is very small, with a monthly turnover ratio of just 0.2 percent in 2019. As OTC trading is not permitted under the Securities Market Law, all transactions must be executed on the stock exchange through a brokerage house, increasing trading costs. The annualized cost of a total round trip for an outright transaction is of the order of 40-50 basis points of the market price of bonds.

	Guatemala
Investor Base	The investor base mostly comprises commercial banks and the Guatemalan Social Security Institute (IGSS), respectively holding about 65 and 20 percent of the stock of government domestic debt. AFPs, foreign investors, mutual funds, and insurance companies play a minor role in the domestic market. As a result, the market remains highly concentrated, especially for secondary market trading where the IGSS acts as a buy-and-hold investor.
Money Market	Both the central bank of Guatemala (Banguat) and the Ministry of Finance issue their own securities and have longer-term instruments. Amid strong remittance inflows since 2015, Banguat ramped up its FX sterilized interventions, with its stock of securities now accounting for almost 50 percent of the outstanding treasury bond amount. Guatemala's money market is one of the most active in the region (right chart), featuring a relatively deep and liquid cash yield curve, particularly in the short maturity segment.
Primary Market	Auction practices in recent years may have constrained the development of a yield curve, particularly in the absence of a secondary market and investors' ability to plan their investments. Although the government communicates how much will be issued each year, the amounts offered on each weekly auction are usually not disclosed and is eventually determined by the bids received. As a result, the issuance policy lacks predictability and targets are often attained before year end. While bringing short-term benefits for the government, this practice can harm transparency and the price clearing process, leading to extra costs in the medium term.
Secondary Market	Secondary market liquidity remains scarce. The volumes traded are low, with a turnover ratio around 0.3 percent in 2019, and there is no reference yield curve. Structural excess liquidity in the banking sector and an investor base concentrated in a few institutions have hampered the development of the secondary market.

	Honduras
Investor Base	The investor base for domestic government debt is concentrated on public sector pension funds, commercial banks, and AFPs, with market shares of 40, 20 and 9 percent respectively. The AFP's market share has been steadily growing in recent years, from 5.4 percent at end-2015, which given AFPs active participation in the secondary markets, offers potential for greater market development. Considering central bank recapitalization bonds, the public sector holds about 60 percent of securities issued.
Money Market	The central bank of Honduras (BCH) holds few government bonds in its portfolio and issues its own securities to implement monetary policy and to absorb excess liquidity. As of 2019, BCH's outstanding securities accounted for almost 75 percent of the debt issued by the central government. For coordination purposes, the yield curve is segmented such that the BCH and the government respectively issue instruments with maturities up to 2 and 15 years. Honduras persistent excess liquidity, along with a limited interbank lending tradition, have hindered money market development. As a first step towards forming a yield curve in lempiras, BCH has launched a platform for money market operations, allowing for electronic trading and improved liquidity and transparency in the repo market.
Primary Market	The government has undertaken several measures to eliminate distortions in the primary market, foster liquidity and demand, notably through the standardization of debt instruments[20]. Despite the recent increase in average maturity, the demand for longer-term tenors is weak, hindering the management of rollover risks. Investors have argued that long-term bond yields inadequately reflect term premia. The ample variety of tenors offered at each auction has reduced bond liquidity and incentives for secondary trading. Incomplete adherence to announced issuance amounts has also affected market predictability.
Secondary Market	Secondary government bond markets are shallow, with transactions volume pointing to a monthly turnover ratio of 0.7 percent during 2019. As a result, the treasury bond yield curve mainly reflects the primary market borrowing costs. Financial institutions lack incentives to participate in the secondary market, given the high frequency of government and central bank auctions. In addition, transaction costs (e.g. tasa de seguridad) and the requirement to use a broker reduces yields and further disincentivizes market participants.

[20] The creation of benchmark bonds is somewhat hindered by recurrent changes in the international securities identification number (ISIN), which occurs at least once a year for each instrument.

	Nicaragua
Investor Base	The banking system is a strong market player, holding around 40 percent of the instruments issued by the central government. Historically, the social security used to be a very large player in the market, but its participation has been reduced considerably, owing to its increasing cash flow deficit.
Money Market	The central bank of Nicaragua (BCN) is also a large player in the market, with BCN securities representing around 20 percent in total outstanding debt in 2019. Although those securities tend to be concentrated on the shorter end of the curve, market fragmentation is still present. Banks' excess reserves lodged at the BCN has reduced interbank trading and hampered the money market's development.
Primary Market	The Ministry of Finance's auctions of domestic debt are held on a weekly basis, issuing Treasury Bonds (BRN) with maturities ranging from 1 to 6 years. However, auctions are often void either due to lack of demand or the government's rejection of investors' bids. Given the high frequency of auctions and the variety of tenors offered, the domestic debt is highly fragmented, reducing bonds liquidity.
Secondary Market	Secondary market operations accounted for 2½ percent of the BDVN trading in 2019, while the average monthly turnover ratio just reached 0.1 percent of the outstanding stock of public securities. According to the capital markets law, all secondary market trading goes through the Nicaraguan Stock Exchange (BDVN). This, alongside market fragmentation of government securities, affects the secondary market's liquidity.

Annex III. Panel Unit Root Tests

Variables	Description	Statistics	P-value
yield	Local currency bond yield	-2.417	0.0078
vix	CBOE volatility index	-6.8617	0.0000
ust10	10-year US Treasury bond yield	-3.2598	0.0006
fiscal	1-year ahead fiscal balance expectation	-4.1643	0.0000
bop	1-year ahead current account expectation	-1.6532	0.0491
gdp	1-year ahead GDP growth expectation	-3.5984	0.0002
inflation	1-year ahead inflation expectation	-4.2648	0.0000
nbib	Non-bank investor base	-3.9332	0.0000
depth	Financial system depth	-1.5768	0.0574
turn	Secondary market turnover ratio	-17.5638	0.0000
tpm	Domestic short-term interest rate	-1.6168	0.0530

Note: Im-Pesaran-Shin unit root test performed. Null hypothesis being the variable contains unit roots.

Annex IV. Main Policy Recommendations for LCBM Development

Local Currency Bond Market Development: Key Recommendations

	Costa Rica	Honduras	Nicaragua	El Salvador	Guatemala	Dominican Rep.
Legal and Regulatory Framework	Harmonize withholding tax system for the different debt instruments and investors. Reallocate responsibility for debt issuance policy and planning from the Treasury to the DCP.	Allow for liability management operations.	Ensure equal tax treatment between repos and bonds. Introduce buyback operations to provide liquidity.	Consider streamlining debt roll-over approval process.	Adopt a comprehensive Public Debt Law. Promulgate a new Securities Market Law. Allow for liability management operations.	Harmonize accounting treatment and price valuation methodologies across the financial system.
Financial Market Infrastructure		Continue (BCH and banks) promoting the development of the repo interbank market.	Turn the settlement of securities in the primary market into a DVP system.	Consider eliminating the requirement for foreign investors to hold their bonds in the local CSD.		
Investor Base	Explore easing regulatory barriers and harmonizing tax regime for foreign investors. Introduce longer-term performance metrics and liability benchmarks for pension funds.	Ensure that the new Securities Market Law allows for regional integration. Consider developing GDN and identify and lower barriers that might hamper its structuring.		Continue developing regional integration programs with links to regional exchanges and settlement systems. Promote greater price availability for investors.		Broaden investor base expanding the GDN and LC global bonds program.
Money Market		Promote development of the repo market.		Standardize LETES to foster construction of benchmark securities and the short end of yield curve		
Primary Market	Publish and adhere to ABP and issuance calendars, consistent with the MTDS. Offer quantities and accept market price. Phase out open bond windows and bilateral bond sales.	Increase issuance in the short end of the curve to capture more bank liquidity. Consider replacing structural BCH bills auctions with government securities auctions.	Enhance predictability in auctions (calendar, amounts). Fulfill the short part of the curve to allow for the formation of a reference yield.	Approve and publish MTDS and ABP to gradually lengthen maturity of domestic debt.	Formulate and publish an ABP and MTDS. Preannounce volume of each instrument to be offered in auctions. Issue only dematerialized securities.	Revise periodically the institutional division on issuance along the yield curve maturities.
Secondary Market	Establish a pilot market-maker program. Develop technical capacity to supervise price vendor methodologies.	Reduce secondary market transaction cost by allowing OTC operations. Encourage the use of electronic trading platforms.	Study measures to give incentives for banks to act as market makers.	Consider allowing OTC transactions to reduce trading costs.	Issue securities in the shorter part of the curve to establish a pricing reference. Concentrate enough volume in specific points of the curve to stimulate liquidity.	Consider allowing pension funds to trade directly with banks.

Sources: IMF Staff