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Fiscal Determinants of Domestic Sovereign Bond Yields in Emerging Market and Developing Economies

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ABSTRACT: Domestic sovereign bonds have become a growing source of government financing in Emerging Market and Developing Economies (EMDEs). This paper investigates the role of fiscal policies in determining domestic bond yields, and how this relationship varies depending on the debt structure. Specifically, the analysis highlights the interaction of fiscal policy with banking sector leverage and foreign investor holdings for government debt. A 1 percentage point increase in expected primary deficits results in a persistent increase in 10-year domestic bond yield by around 36 basis points over 2.5 years, with larger effects observed during the COVID-19 pandemic. This contrasts with external bond spreads which are more sensitive to external and global risk factors. The greater the reliance on domestic banks for deficit financing, the stronger the impact of loose fiscal policy on domestic bond yields. The shift in domestic debt financing towards domestic banks after the pandemic implies that sovereign yields have been increasingly interlinked with domestic banks' investment behavior implying potential financial sector risks in major EMDEs.

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I. Introduction

Over the past two decades, Emerging Market and Development Economies (EMDEs) have increasingly turned to domestic sources of financing. This trend reflects the significant development of local debt markets, which provide a viable alternative to external financing and mitigate exposure to currency risk. At the same time, there has been a notable shift in the creditor composition of domestic debt, with a concentration of government debt held by domestic banks, thereby intensifying the sovereign-bank nexus. The COVID-19 pandemic further accentuated these trends, as many EMDEs encountered substantial financing needs that were met through a marked increase in domestic debt issuances, offering a breathing space during a period characterized by tight external financing conditions. These issuances were predominantly absorbed by domestic banks and foreign investors. Moving forward, as domestic debt markets continue to expand, it becomes critical to comprehend the determinants of domestic borrowing costs as well as any emerging risks.

Bond yields in EMDEs are becoming increasingly sensitive to fiscal fundamentals (Bolhuis, Koosakul, and Shenai 2024), reflecting increased domestic banks' exposure to public debt as well as gradually strengthened local currency bond markets. This paper aims to shed light on the role of fiscal policy in influencing domestic bond yields, while also investigating the extent to which the impact of fiscal policy is moderated or amplified by the composition of public debt creditors.

Empirical studies examining the determinants of domestic bond yields, particularly in relation to fiscal policy, have been limited, with a predominant focus on advanced economies and large emerging markets. Laubach (2009) uses U.S. time-series data and show that a percentage-point increase in the projected fiscal deficits-to-GDP ratio raises 5-year and 10-year forward rates by 20 to 30 basis points.[1] Laubach's identification approach was applied to examine the effects of fiscal deficits or exchange rate volatility on bond yields in emerging economies (Jaramillo and Weber, 2013; Gadanecs et al., 2018) and to examine how bond yields are influenced by financing sources of government debt and population aging in case of Japan (Ichiue and Shimizu, 2015).

There is an emerging literature that examines the sensitivity of domestic sovereign bond yields to investor demand for sovereign debt. Fang, Hardy, and Lewis (2023) examines the impact of investor composition on the sovereign debt market, finding that demand from institutional and nonresident investors is the most responsive to bond yields. An increase in domestic banks' holdings of domestic sovereign debt (i.e., home bias) after the global financial crisis in advanced and emerging market economies could raise the cost of borrowing depending on the level of debt and market sentiment (Asonuma et al., 2015; Acharya and Steffen, 2015) .In contrast, a higher share of sovereign debt held by foreign investors could reduce the long-term sovereign bond yields but raise the yield volatility (Arslanalp and Poghosyan, 2016; Ebeke and Lu, 2015). Matsuoka (2023) examines nonlinear behavior of long-term bond yields in Advanced Economies (AEs) and major Emerging Markets (EMs) and found high sensitivity of local currency (LC) bond yields to market expectation of higher public debt. The yields are sensitive to public debt for countries where the share of foreign investor's debt holdings exceeds about 20 percent.

Lastly, recent literature highlights the risks coming from complex and highly interdependent relationship between sovereign and domestic financial sector. The literature points spillovers of banks' credit risk to the

[1] Similarly, Laubach (2009) found that 1 percentage-point increase in the projected debt-to-GDP ratio raises 5-year and 10-year forward rates by about 3-4 basis points in the U.S.

sovereign through (a) the direct banks' exposure to the sovereign by holding government debt, (b) the provision of government guarantees to cover banks' losses, and (c) indirect risk transmission through diminished bank lending to households and corporations, undermining growth and raising fiscal and sovereign credit risk (Adrian et al., 2025; Dell'Ariccia et al., 2018). These three channels could work in reverse such that an increase in sovereign credit risk, notably through large fiscal slippages or elevated fiscal risks, could transmit to higher stress in banking sectors. Over the past decade, the holdings of domestic sovereign debt by banks (so called "sovereign-bank nexus") have deepened significantly in EMDEs. This trend appears prominent in countries with high debt and large fiscal deficits, raising sovereign risks through the "doom-loop" channel (Brunnermeier, 2016; Farhi and Tirole, 2018). Coimbra (2018) provides a theoretical framework wherein banking sector leverage matters for determining sovereign bond yields.

Building on previous studies regarding the determinants of domestic sovereign bond yields, this paper extends the analysis to encompass a broader set of countries, including low-income nations, and explores the heterogeneity in the sensitivity of local bond yields to fiscal policy—both in the aftermath of the COVID-19 pandemic and in relation to the creditor base (i.e., the holders of domestic public debt). To our knowledge, this is the first empirical study to examine the interplay between fiscal discipline and debt composition in shaping local bond yields in EMDEs. Additionally, we contribute to the discourse by analyzing the post-COVID dynamics of domestic bond yields in EMDEs.

Using domestic bond yield data from 75 EMDEs, we examine how expectations of future fiscal policy stances affect the sovereign's domestic borrowing costs. The paper constructs a panel dataset of domestic bond yields and external bond spreads at a semi-annual frequency and relates them to 4-year ahead expectations of primary fiscal deficits, which is expected to be more relevant than ex-post outcomes in driving bond yields (Laubach, 2009). We estimate the impulse response of bond yields with different maturities (5-year and 10-year) to the fiscal variable using Local Projection (LP) method, contrasting with the sensitivity of external bond spreads. We minimize the bias due to potential endogeneity by using forecasts, as guided by the literature. A series of robustness checks to the baseline results are carried out by accounting for other confounding channels (e.g., financial repression, sovereign credit risk, commodity price, financial and credit cycles, domestic political risks) and using an alternative forecast horizon. We use the Kitagawa-Blinder-Oaxaca (KBO) decomposition (Kitagawa, 1955; Blinder, 1973; Oaxaca, 1973; Fortin, Lemieux, and Firpo, 2011) to estimate the impulse response heterogeneity of domestic bond yields due to the differences in debt composition across countries over time following Cloyne et al., (2023).

Our results show that fiscal policy significantly affects borrowing costs. In addition to debt levels, domestic bond yields are highly responsive to future fiscal deficits. Our baseline result shows that a 1 percentage point increase in 4-year ahead primary deficits contributes to a persistent increase in 5-year and 10-year domestic bond yields by about 31 basis points (bps) and 26 bps, respectively, over two years. The effect on 10-year bond yields is estimated to peak at around 36 bps after 2.5 years in EMDEs excluding China and India. The sensitivity of bond yields to fiscal expansion has somewhat increased after the COVID-19 recession. The application of LP method to explore the sensitivity of external bond yields illustrates that, in contrast to domestic bonds, external bond spreads are more sensitive to external and global risk factors. Financial repression (e.g., interest rate caps), as expected, dampens this response. We find that the results are robust when controlling for other omitted factors, such as the country's sovereign credit risk (debt-to-GDP), commodity terms-of-trade, global financial stress, and domestic credit conditions, external bond spreads, and institutional quality. Furthermore, we find that the impact of expansionary fiscal policy on domestic bond yields is amplified in countries with a pronounced sovereign-bank nexus. The marginal effect of an increase in the 4-year ahead

primary deficits is estimated to reach about 50 bps over two years in countries where domestic banks have the highest exposure to the sovereign.

Overall, the paper shows that local debt markets are able to discern default risk, and hence, expectations regarding fiscal deficits play a significant role in determining local bond yields. In cases of elevated sovereign-bank nexus, this relationship is amplified. This finding is consistent with earlier policy papers (Andreeva and Vlassopoulos, 2016), highlighting the importance of reducing the home bias in sovereign bond holdings given the potential systemic risk due to a tightening sovereign-bank nexus. Policy implications include the necessity of maintaining robust fiscal positions to positively influence market perceptions and borrowing costs. The amplifying effect of banking sector exposure to sovereign debt elucidates the interconnectedness of fiscal and financial sectors underscoring the necessity for vigilant supervision of the financial sector and the development of robust resolution frameworks (IMF GFSR, 2022) as to avoid "doom-loops." Furthermore, our results regarding the amplifying role of a concentrated investor base on borrowing costs accentuate the importance of fostering a deep and diversified investor base. Such diversification would mitigate the risk of abrupt shifts in risk appetite that could induce volatility in local debt markets.

The paper is structured as follows. Section II describes data and presents stylized facts on domestic debt structure. Section III estimates the baseline LP model and performs robustness checks. Section IV estimates the heterogeneity in the relationship between fiscal policy and domestic bond yields by the composition of creditors. Section V concludes.

II. Data and Background

A. Data

The bond yield data are retrieved from the Bloomberg L.P. and include yields of sovereign bonds issued under domestic law in 75 EMDEs.[2,3] The domestic bonds are grouped into: (i) 5-year bonds (3-to-7-year maturity at issuance; medium-term bonds) and (ii) 10-year bonds (8-to-13-year maturity at issuance; long-term bonds). The bond-level data are aggregated at semi-annual frequencies and merged with the IMF's bi-annual World Economic Outlook (WEO) forecasts in April and October. For each country and semi-annual period, we compute the average yield of sovereign bonds, weighted by the amount of sovereign bonds issued.[4] Inflation-indexed sovereign bonds are excluded. The dataset also contains one-year up to four-year ahead WEO forecast for real GDP growth, annual inflation, primary fiscal deficits (in percent of GDP), and exchange rate depreciation rate, which are updated semi-annually or quarterly by the IMF country desks. The coverage of long-term bond yields is limited for many EMDEs, given that there are no new issuances in some periods. After collapsing the data at semi-annual frequency, the panel dataset is reasonably balanced, covering periods from 2010H1 to 2023H2.

[2] The sample covers a few countries that belong to the regional currency union. As the bonds issued under domestic law are included in our data, we treat the bond issued in the regional market as domestic debt given that the legal framework and jurisdiction governing its debt obligation remains within each member state.

[3] Although we focus on aggregated domestic bond yields in this paper, Annex VI provides the summary statistics of basic bond-level characteristics originally collected from the Bloomberg Finance L.P.

[4] We weight each bond's yield at issuance by volume at a given maturity – 5 years and 10 years. The maturity structure of new bonds issuances is therefore considered in aggregating bond-level to country-level yield data.

Table 1 provides descriptive statistics of the main variables used in our regression analysis. As some variables contain missing observations, the analysis sample for 10-year bond yields (5-year bond yields) only covers 59 (71) countries (Annex I provides the full list of countries included in the analysis of 10-year yields). Domestic bond rates and macro-fiscal variables are winsorized at the top and bottom one percentile to trim outliers.

The descriptive statistics (Table 1, Panel A) show a wide range of bond interest rates across countries, with the 5-year and 10-year bond rates averaging 8.1 percent and 8.4 percent, respectively. External bond spreads are taken from IMF's Sovereign Spread Monitor (SSM) database given its extensive coverage of many EMDEs compared with standard data sources, such as JP Morgan Emerging Market Bond Index (EMBI) and the Global Financial Data. External bonds included in the SSM data are ones issued under foreign governing law (generally UK or New York law), US dollar or euro-denominated (with outstanding amount above 250 million US dollar/Euro), and not covered by external guarantees. The SSM data calculate a country's external bond spreads over U.S. treasury yields (for USD-denominated bonds) or German government yields (for euro-denominated bonds). The sample average of external bond spreads is 4.4 percent (440 basis points), which could reach 11.6 percent (1160 basis points) at the 95th percentile value.

In Panel B, the average primary deficit projected 4-year ahead is modest at 0.1 percent of GDP, while the public debt-to-GDP ratio stands at an average of 56.4 percent. The average of Central Bank's monetary policy rate is 6.7 percent, which is significantly correlated with domestic and external bond yields. We complied each country's sovereign rating histories with the three main rating agencies (Moody's, S&P, and Fitch) and created a dummy that indicates the period when any of the three agencies' credit ratings represent a non-investment grade (countries with a rating below Baa3/BBB-). Table 1 shows that sovereign credit ratings were below Baa3/BBB- in 64 percent of our observations.

Table 1. Descriptive Statistics: Analytical Sample

Country	Source	N	Mean	Std dev	p25	p50	p75
Panel A. Bond yields and spreads							
5 year treasury bond rate (%)	Bloomberg	1,584	8.077	6.126	4.270	6.714	9.972
10 year treasury bond rate (%)	Bloomberg	1,281	8.399	6.086	4.707	7.135	10.464
External bond spreads (%)	IMF SSM	1,618	4.394	5.397	1.737	3.105	4.962
Panel B. Basic control variables							
Primary deficit/GDP (%) (t+4)	WEO	1,584	0.074	2.582	-1.151	0.089	1.499
Public debt-to-GDP (%) (t+4)	WEO	1,562	56.389	25.592	40.049	53.509	70.077
GDP growth (%) (t+4)	WEO	1,584	4.450	1.746	3.191	4.292	5.734
CPI inflation (%) (t+4)	WEO	1,583	4.236	2.662	2.500	3.772	5.000
FX depreciation (%) (t+4)	WEO	1,584	1.720	3.024	0.000	1.000	2.971
Monetary policy rate (%)	Haver	1,431	6.768	6.196	3.000	5.250	8.250
Log GDP Per Capita	WEO	1,584	9.366	0.916	8.716	9.573	9.999
US 10 Year treasury forward rate (%)	CF	1,584	3.963	0.769	3.283	3.737	4.518
Log VIX	Haver	1,533	2.893	0.315	2.660	2.858	2.963
Population growth (%) (t+20)	UN	1,558	0.683	0.983	-0.134	0.606	1.501
Post-tax income share, bottom 50th percentile (%)	WID	1,376	15.472	4.141	12.653	15.029	17.956
Sovereign non-investment grade (0/1)	MSF	1,457	0.641	0.480	0.000	1.000	1.000

Source: WEO: World Economic Outlook, CF: Consensus Forecast, WID: World Inequality Database, MSF: Moodys, S&P, Fitch; IMF SSM: IMF Sovereign Spread Monitor.
Note: The summary statistics of bond yields and spreads are for the analysis sample with non-missing primary deficit data. The summary statistics of basic control variables for our econometric analysis is provided in Panel B for the analysis sample with non-missing 5-year bond yields.

B. Evolving Landscape of Sovereign Debt Holder Composition

We characterize the creditor base of sovereign debt using an internationally comparable estimate of investor holdings of sovereign debt compiled by Arslanalp and Tsuda (2014).[5] In the dataset, the investor base is decomposed along six investor classes – domestic banks, domestic nonbanks, domestic central bank, foreign banks, foreign nonbanks, and foreign official creditors.

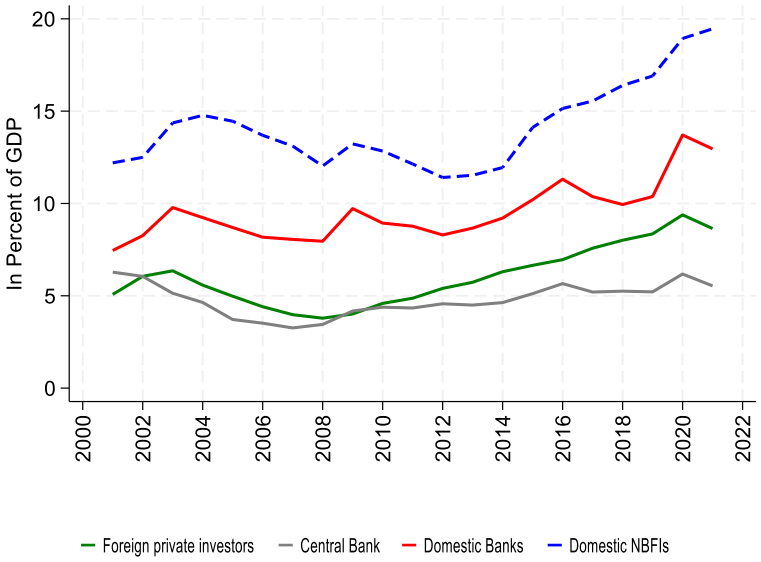
As Figure 1a shows, the level of sovereign debt held by domestic banks and institutional investors has significantly increased in recent years among emerging markets and developing economies. On average, domestic banks have increased their sovereign debt holding from 9 percent of GDP in 2010 to about 14 percent of GDP in 2020. The figure also shows an even sharper increase in sovereign debt holding by Non-Banking Financial Institutions (NBFIs), with its level reaching nearly 20 percent of GDP by 2020. The increasingly diversified financing landscape in developing countries over recent decades reflects (a) strengthened bond issuance policies to diversify the investor base and (b) progress in the implementation of the medium-term debt management strategy (MTDS). The MTDS lays the foundations for domestic sovereign debt market development by improving debt financing risk management and promoting the diversification of debt instruments (e.g., the launch of a primary dealers' program), which encourages domestic and foreign investors' participation (Clevy, Pedras, and Ruiz, 2021; IMF and World Bank, 2021, 2020). It may also reflect the government's proactive measures by establishing hard and soft market infrastructure, strengthening market liquidity, deepening domestic financial sector with enhanced regulatory framework, and implementing structural reforms to attract diverse domestic and foreign investors toward developing countries.

At the same time, developing countries have increasingly relied on foreign private investors to raise sovereign debt financing over the decades through Eurobond issuances or the participation of foreign private investors in local-currency (LC) denominated bond markets. Large EMs have achieved progress in attracting foreign investors to buy their LC denominated bonds (Figure 1b). However, this trend has somewhat reversed after the COVID-19 pandemic (Figure 1b, left). At the individual country level, the change in LC sovereign bonds held by foreign investors (Figure 1b, right) confirms a significant reduction in non-residents' investments in LC sovereign bonds in large EMs after the COVID-19.

In terms of the share of each domestic creditors, domestic banks have been dominant holders of government debt over the past decades in EMDEs. Figure 2 focuses on the part of sovereign debt held by domestic creditors (residency-based definition) and shows the share of each domestic creditor. Domestic banks and nonbanks (NBFIs) provide a dominant source of financing for the government in both EMs and LICs. Notably for LICs, the reliance on domestic banks has increased from 30 percent of total domestic debt to 50 percent.

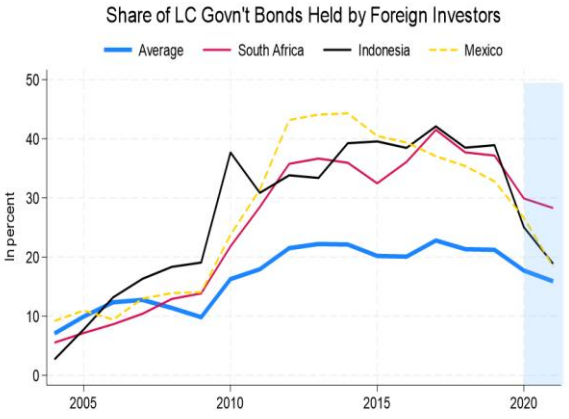
[5] The dataset has been updated regularly every April and October by IMF's Money and Capital Market Department. It uses a definition of general government gross debt including securities and loans.

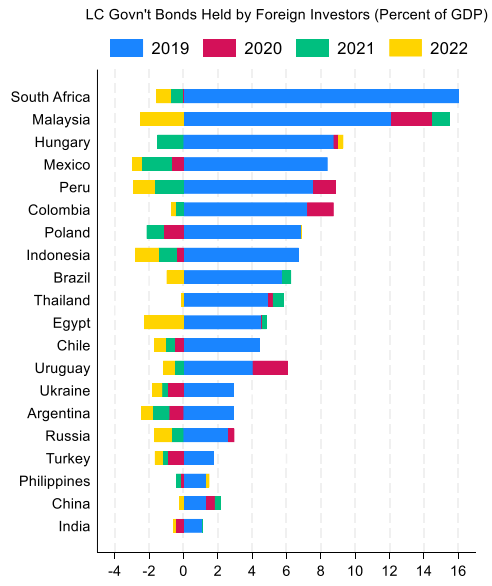
Figure 1a. Level of Debt Held by Domestic and Foreign Private Creditors in EMDEs (in percent of GDP, excluding China)



Source: Arslanalp and Tsuda (2014) and staff estimates.
Note: The charts show GDP-weighted average by income groups.

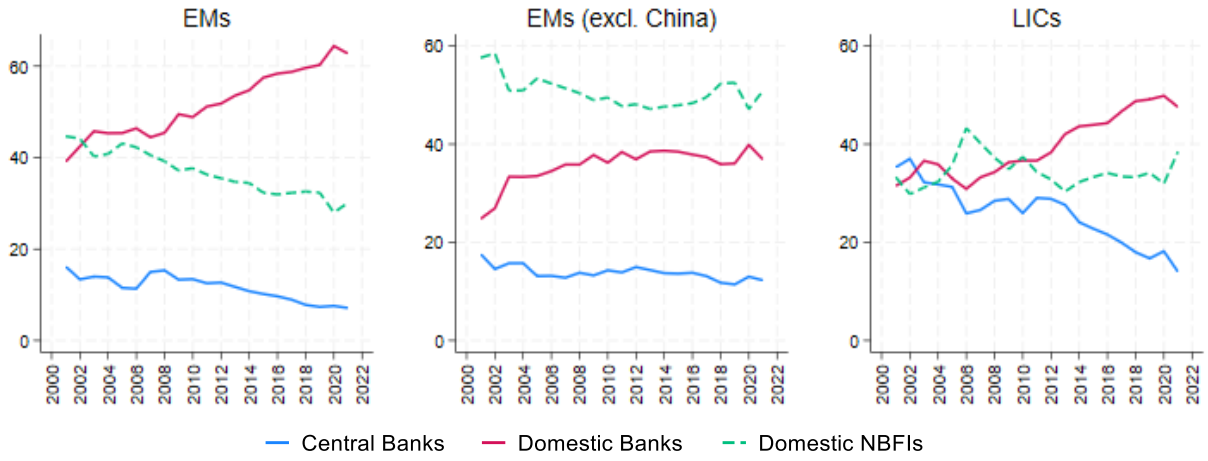
Figure 1b. Local-Currency Denominated Government Bonds Held by Foreign Investors





Source: Arslanalp and Tsuda (2014) and staff estimates.

Figure 2. Share of Sovereign Debt Held by Each Domestic Creditors (In Percent)

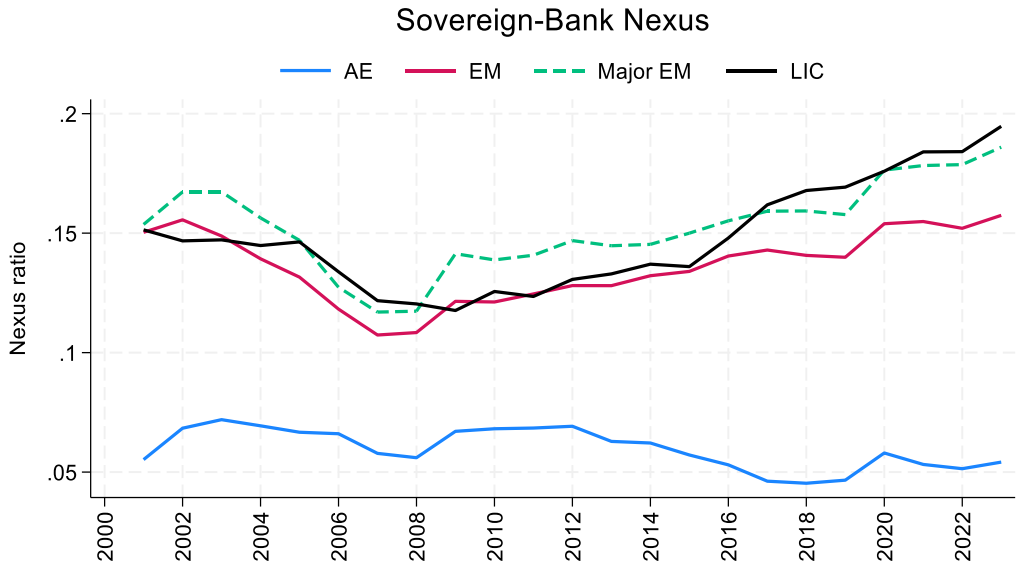


Source: Arslanalp and Tsuda (2014) and staff estimates.
Note: The charts show GDP-weighted average by income groups.

Meanwhile, commercial banks' exposure to their government debt has continued to increase since the global financial crisis and accelerated after the COVID-19, strengthening sovereign-bank nexus (Figure 3). We use IMF's Monetary and Financial Statistics (MFS) database to analyze the exposure of commercial banks, Central Banks, and other financial corporations (OFC) to the public sector (defined as general government and SOEs). The MFS contains aggregate surveys and is available monthly for about 160 countries. Following Salim (2024), we calculate the nexus ratio between the sovereign and each type of financial institution in the form of loans or government security holdings. The nexus ratio is the total exposures as a share of each financial sector's total assets, which measures the strength of the sovereign and financial sectors linkages.

- As Figure 3 shows, given the unexpected expenditure expansion needed for COVID-related measures, domestic banks' holdings of sovereign bonds have continued to rise and reached almost one-fifth of banking sector assets in major EMs and LICs in 2021 (IMF, 2022). Albeit with some variations, this led to a sharp increase in sovereign-bank nexus across most of EMs and LICs from 2020 to 2022 (Annex II).
- With public debt at historically high levels recently, a deeper nexus poses risks of "doom loops" to escalate credit risks between the sovereign and banking sectors.

Figure 3. Evolution of Sovereign-Bank Nexus



Source: IMF Monetary and Financial Statistics, and staff estimates.

Note: The nexus ratio shows banks' exposure to sovereign debt (covering general government and SOEs, in form of loans or government security holdings) as a share of banking sector assets. The chart shows a simple average by income groups.

III. Econometric Analysis

A. Panel Local Projection (LP) Estimation

The baseline model estimates the sensitivity of domestic bond yields to an increase in 4-year ahead expected primary deficits over time using the LP method.

$$r_{i,t+h} - r_{i,t-1} = \beta^h E_t(g_{i,t+4}) + \theta_1^h E_t(m_{i,t+4}) + \theta_2^h X_{i,t} + \lambda_i + \tau_t + \epsilon_{i,t+h} \qquad (1)$$

where the left-hand side of the equation is the cumulative change in sovereign bond yields (in percentage) for country i over eight semesters (h =0,…8) relative to pre-shock period $t-1$.[6] $E_t(g_{i,t+4})$ is the IMF desk economists' 4-year ahead forecast of expected level of primary fiscal deficits (in percent of GDP). λ_i and τ_t are country, year, and semester fixed effects.

[6] Similar to Jaramillo and Weber (2013), we are unable to obtain long-horizon forward rates of domestic bond yields in semi-annual frequency for many EMDEs. However, as found in Laubach (2009), the absence of long-horizon forward bond yields could possibly create downward bias to the effect of expected primary deficits reflecting endogeneity due to cyclical responses of fiscal variables and interest rate. Therefore, our results could be considered as conservative estimates.

As fiscal conditions are not the only determinant of long-term interest rates, we include an extensive set of control variables $X_{i,t}$. We use forecasts as independent variables to the utmost extent as long-horizon forecasts are presumably little affected by the current state of the business cycle:

- **Macro cyclical conditions**: Bond yields typically increase as expectations of future growth and inflation rise because investors demand higher returns on investments. In EMDEs that rely more on foreign investment, expected currency depreciation also affects bond yields. A domestic bond yields will also be influenced by unforeseen macroeconomic shocks (Jaramillo and Weber, 2013). We include 4-year ahead macroeconomic forecasts of real GDP growth, CPI inflation, and exchange rate (FX) depreciation $(E_t(m_{i,t+4}))$ to control for the effects.
- **Short-term interest rate**: The change in monetary policy rate is added to isolate monetary policy effect and to control for long-term trend in interest rates.
- **Sovereign risk**: We control for the level of sovereign risk at time of fiscal loosening by adding a dummy of sovereign credit ratings (investment-grade or non-investment grade).
- **Global financial spillovers**: We account for potential financial spillovers from the global economy to EMDEs (Miranda-Agrippino and Rey, 2020) by adding the U.S. 10-year treasury forward rates and global financial conditions, proxied by the Chicago Board Options Exchange's Volatility Index (VIX).
- **Demography, Inequality, Income level**: Population aging can put downward pressure on interest rates, or possibly has an upward effect through expectations for fiscal deterioration due to declining tax revenues and increasing social security spending (Ichiue and Shimizu, 2015). Similarly, high level of inequality in developing economies may put upward pressure on interest rates due to expectations for fiscal deterioration due to large social spending. For these reasons, we add the UN's long-term population growth projection and income share of the bottom 50th percentile from the World Inequality Database to control for demographic and inequality trends. We also control the correlation between bond yields and income level (GDP per capita, at purchasing power parity (PPP) in international US$).

Different papers have used different expectation horizon starting from same-year and year-ahead (Cimadomo, Claeys, and Poplawski-Ribeiro, 2016). However, using long-horizon *expectations* of fiscal variables serves two purposes. First, it helps avoid potential reverse causality (bond yields might affect primary fiscal balances) which would create a downward bias in coefficients. This is driven by the fact that both fiscal balances and bond yields may be affected by a common factor such as the business cycle. Fiscal policy would be more expansionary during recessions (thus higher deficits), while economic slowdown may be associated with lower interest rates (through monetary policy easing) to stimulate the economy. Using long-term expectations of fiscal variables helps disentangle the effect of fiscal policy from business cycles, an approach widely used in the reduced-form empirical literature. Second, the 4-year ahead expectation of fiscal deficit captures the anticipated long-term fiscal stance, and hence market expectations and forward-looking behavior of investors.

B. Panel LP Results

The impulse responses from the LP regression indicate high and increasing sensitivity of domestic bond yields to expected fiscal loosening with the effects peaked in 2-3 years (Figure 4, Annex III). In response to a 1 pp of GDP increase in 4-year ahead primary deficits, the instantaneous yield response at time t is about 7-12 basis points (bps) for 5-year bonds (column 1 in Table AIII.1) and 6-10 bps for 10-year bonds (column 2).[7] The information on fiscal policy that investors receive remains relevant with high persistence in the following years. After 1 year (i.e., 2 semesters), the point estimates almost double in magnitude, which suggests that market participants price in the risk of expected fiscal loosening with some lag. After 2 years (i.e., 4 semesters), 1 pp of GDP increase in primary deficits leads to a persistent increase in 5-year and 10-year bond yields by about 31 bps and 26 bps respectively in a full sample. When the sample excludes China and India or only covers major (frequent) bond issuers in EMDEs, the point estimates get even larger in magnitude. The peak of the fiscal policy effect on 10-year bond yields is around 36 bps after 2.5 years in EMDEs excluding China and India. However, the result suggests that the effect of expansionary fiscal policy on domestic bond yields starts to decline after around 3 years, suggesting that the information that investors initially observed on fiscal policy gets obsolete due to significant revisions to the fiscal policy stance.

The effect is sizable and broadly comparable to Jaramillo and Weber (2013)'s finding for emerging economies (where the estimated impact of 1 pp of GDP increase in the overall deficit-to-GDP ratio raises yields by 30 bps) and in the midrange of estimates found in the literature for advanced economies.

We find that the sensitivity of bond yields to the expected widening of primary deficits has somewhat increased in magnitude after the COVID-19**.** We estimate eq. (1) for the full sample (blue line) and only for the pre-COVID period (red line) (Figure 5). We find consistent evidence that the average sensitivity of 10-year bond yields in response to 1 p.p. increase in 4-year ahead primary deficits has somewhat risen after the COVID-19. In two years after the fiscal shock, the impact on bond yields is estimated to be larger when eq. (1) estimated for a whole period compared with their pre-COVID estimate by about 10 bps for all EMDEs (excluding China and India) (left chart) and by 9 bps for major EMDEs.

[7] The point estimates in Figures 4-5 and Annex III show the impact in percentage. The impact in basis point is derived by multiplying estimates by 100.

Figure 4. Cumulative Response of 5-Year and 10-Year Bond Yields to Higher Expected Primary Deficits: All EMDEs (excl. China/India) vs. Major bond issuers in EMDEs (in percentage)

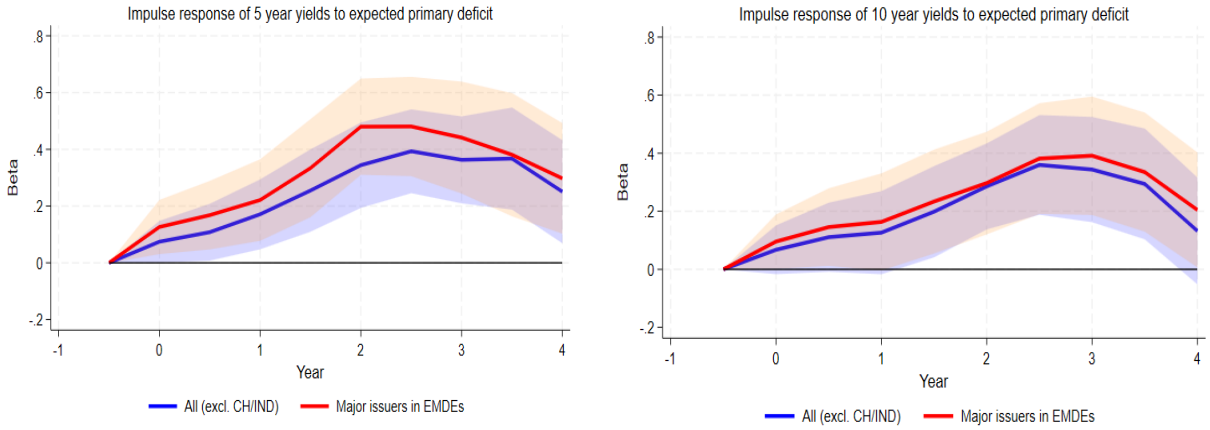
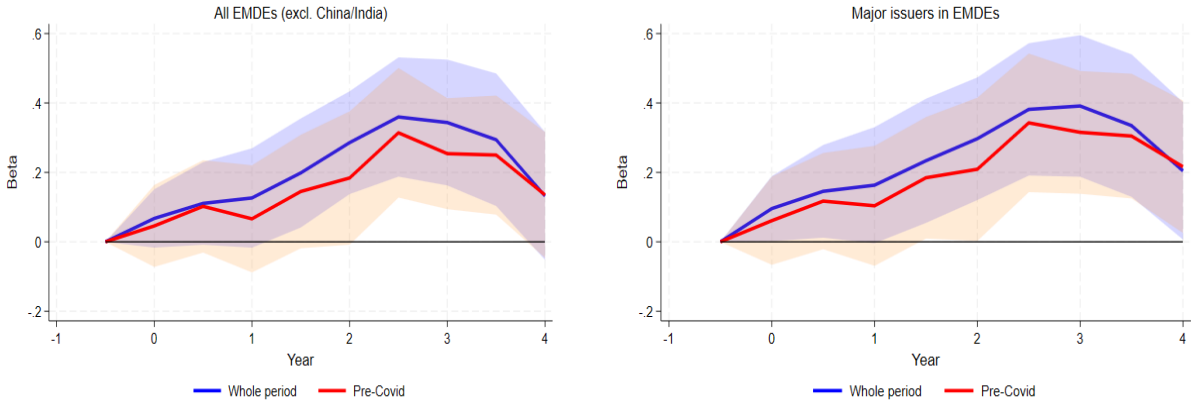


Figure 5. Cumulative Response of 10-Year Bond Yields to Higher Expected Primary Deficits: Whole Period vs. Pre-Covid Period (in percentage)



Source: Bloomberg, IMF, Haver, and staff estimates.

Note: 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in shaded areas. The regression uses the amount of new long-term sovereign bond issuances as weight. "Major issuers in EMDEs" include 36 countries with frequent bond issuances in the analysis data.[8]

[8] 36 major bond issuers in EMDEs include Botswana, Brazil, Bulgaria, Chile, Colombia, Costa Rica, Dominican Republic, Egypt, Georgia, Ghana, Indonesia, Jamaica, Kenya, Malaysia, Mauritius, Mexico, Morocco, Namibia, Nigeria, Pakistan, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Sri Lanka, Thailand, Trinidad and Tobago, Turkey, Uganda, Ukraine, Uruguay, Vietnam, and Zambia.

C. Robustness Checks

Financial repression. The impulse response of 10-year bond yields to expected primary deficits gets stronger with sharper short-term impact when periods of financial repression are excluded (Table 2). Following the surge in public debt after the Global Financial Crisis, some jurisdictions introduced administrative ceilings on interest rates. Drawing on the database by Jafarov et al. (2020) and Calice et al. (2020), we identify the periods with interest rate repression (legal restrictions on interest rates, credit allocation, capital movements, and other financial operations) for each country.[9] While noting that interest cap is an incomplete proxy of financial repression, we check the robustness of our baseline result in Figure 4 by estimating eq. (1) for the sub-sample without any restrictions on interest rates. In both the full sample (excluding China and India) and major EMDEs, we found stronger short-term impulse responses in 10-year bond yields by 28 bps and 31 bps in response to 1 p.p increase in 4-year ahead primary deficits respectively with the effect peaked in one year (columns 2 and 4).

Table 2. Robustness Check to Financial Repression

	(1)	(2)	(3)	(4)
	10 Year Yield			
	ALL (excl CHN/IND)		Major EMDE	
	Total	No FR	Total	No FR
Dependent variable: Δr_t				
$E_t(g_{t+4})$	0.067	0.139	0.096**	0.195**
	(0.043)	(0.085)	(0.048)	(0.089)
Observations	804	365	664	323
Adj. R2	0.119	0.125	0.162	0.143
Number of countries	54	32	36	27
Country-Year-Semester FE	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+2}				
$E_t(g_{t+4})$	0.126*	0.276**	0.163*	0.309**
	(0.073)	(0.121)	(0.085)	(0.130)
Observations	796	363	665	323
Adj. R2	0.363	0.441	0.388	0.454
Number of countries	52	32	35	27
Country-Year-Semester FE	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+4}				
$E_t(g_{t+4})$	0.286***	0.291*	0.297***	0.304
	(0.076)	(0.173)	(0.090)	(0.189)
Observations	722	342	611	309
Adj. R2	0.453	0.485	0.471	0.494
Number of countries	51	32	36	28
Country-Year-Semester FE	Yes	Yes	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Source: Staff estimates.

Note: Heteroskedasticity-robust standard errors in parentheses. Δr_t in the first row indicates the instantaneous impact at time t. Δr_{t+2} in the second row and Δr_{t+4} in the third row indicate the impact after one year and two years, respectively.

[9] Interest rate cap is one aspect of financial repression which misses other types of non-market operations in government security issuances (e.g., private placement). World Bank's domestic debt securities heat map provides some information on such non-market-based practices, but with limited country-year coverage.

Controls for other channels. To examine the robustness of our baseline result to omitted variable bias, we further extend control variables related to (a) sovereign credit risk, (b) commodity price cycles, (c) financial stress and credit conditions, and (d) external bond spreads in an alternative specification only with country fixed effects (Table 3).

- **Expected public debt** (columns 2 and 9): Fiscal vulnerabilities also depend on market expectations on future government debt level through which drives the impact on long-term interest rates (Reinhart, Rogoff, and Savastano, 2003). When 4-year ahead public debt-to-GDP ratio is added to eq. (1), the point estimate of primary deficits slightly decreases but remains significantly positive with large magnitude.
- **Commodity prices** (columns 3 and 10): For commodity exporters in EMDEs, an exogenous shift in international commodity prices is an important driver of business cycles and tax and non-tax revenues ("Commodity Roller Coaster"; Fernandez, Gonzales, and Rodrigues, 2018). Higher terms-of-trade could improve a country's growth and fiscal position, potentially leading to lower bond yields. In columns 3 and 9, we find that the effect of commodity net export price index (Gruss and Kebham, 2019) on 10-year bond yields is insignificant on average, while slightly increasing the point estimate of primary deficits.
- **Financial stress and credit conditions** (columns 4, 5, 11, and 12): The risk of tighter global financial markets (including interest rates, liquidity, investor risk perceptions) could drive up sovereign bond spreads (Gilchrist et al., 2022). In times of financial stress, fiscal discipline tends to weaken with increased borrowing costs. In columns 4 and 10, we additionally control for the Financial Stress Index (FSI) (Ahir et al., 2023), a country-specific composite indicator of financial stress related to stock market volatility, credit spreads and liquidity situation. With FSI included, the effect of expected primary deficits remains strong and significant. Alternatively, columns 5 and 11 account for the possibility that domestic credit cycles may play a role in driving sovereign spreads. We control for credit gaps (Hodrick-Prescott (HP) filtered private credit-to-GDP ratio) using quarterly series available from the International Financial Statistics. A positive credit gap (faster credit growth than each country's long-term trend) tends to be associated with higher bond yields, especially in semi-elasticity specification, but the coefficient of expected primary deficits remain robust.
- **External bond spread** (columns 6 and 13): We add the growth of external bond spreads over the same period. A widening of spreads signals increasing risk perceptions on the sovereign's creditworthiness, thus inducing higher yields on domestic bonds. The government may lose market access or face high cost of issuing external bonds, which shifts the financing source from foreign to domestic bonds putting pressure on domestic bond yields. We use IMF's Sovereign Spread Monitor database which has wider coverage in EMDEs than other data sources (e.g., J.P. Morgan Emerging Market Bond Index). Results in columns 6 and 12 show a strong correlation between domestic yields and external spreads as they both reflect the sovereign's credit risk. Even with this effect controlled, the impact of 4-year ahead primary deficits on 10-year bond yields remains significantly positive by 29-32 bps in EMDEs.
- **Institutional quality** (columns 7 and 14): Political, economic, and financial institutional quality are also found to be one of the key determinants of sovereign bond yields in emerging market economies (Sonenshine and Kumari, 2022; Huang et al., 2015). We additionally control the International Country Risk Guide (ICRG)'s composite risk rating, which comprehensively measures a country's overall institutional quality. The higher the ICRG rating, the level of domestic bond yields tends to decrease. Results in columns 7 and 14 show that the effect of fiscal policies remains significant and gets slightly stronger than the baseline estimate.

Table 3. Robustness Check to Extensive Control Variables

	(1) Baseline	(2) Debt	(3) TOT	(4) FSI	(5) Credit gap	(6) Spread	(7) Inst. quality	(8) Baseline	(9) Debt	(10) TOT	(11) FSI	(12) Credit gap	(13) Spread	(14) Inst. quality
Dependent variable: Δr_{t+4}														
$E_t(g_{t+4})$	0.259***	0.251***	0.268***	0.291***	0.294***	0.371***	0.268***	0.297***	0.282***	0.311***	0.338***	0.301***	0.431***	0.305***
	(0.074)	(0.081)	(0.069)	(0.090)	(0.074)	(0.084)	(0.071)	(0.090)	(0.104)	(0.088)	(0.103)	(0.090)	(0.098)	(0.090)
Public debt/GDP (t+4)		0.008							0.012					
		(0.012)							(0.015)					
Commodity Net Export Price Index			-0.019							-0.008				
			(0.029)							(0.038)				
Financial Stress Index (Ahir et al, 2023)				3.692*							3.745*			
				(2.179)							(2.229)			
Credit gap (HP filter)					0.028							-0.002		
					(0.024)							(0.034)		
$\Delta ln(spread)_{t+4}$						1.902***							2.266***	
						(0.311)							(0.379)	
ICRG Country Risk							0.066							0.067
							(0.046)							(0.052)
Observations	770	761	770	639	686	506	730	611	607	611	539	586	432	589
Adj. R2	0.440	0.428	0.423	0.402	0.427	0.524	0.423	0.471	0.447	0.445	0.414	0.431	0.572	0.445
Number of countries	53	53	53	39	48	41	49	36	36	36	29	34	31	34
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Source: Staff estimates.

Note: Heteroskedasticity-robust standard errors in parentheses

Alternative forecast horizon. We also check whether the result may be severely affected by the choice on forecast horizon in the expected primary deficit variable. While a longer forecast horizon (4-year ahead primary deficit) would better reflect a country's fiscal stance in the long-term and address endogeneity bias, Table 4 reports the results comparable to Table 3 using 2-year ahead primary deficit as the treatment variable. While the magnitude of the point estimate drops compared with our baseline estimates (by about 7 bps for 10-year bond yields), the main result remains robust indicating a strongly positive impact of expected fiscal expansion in driving up sovereign bond yields.

Table 4. Robustness Check Using 2-Year Ahead Primary Deficits
Change in Sovereign Bond Yields (in percentage)

	(1) 5 Year Yield			(2) 10 Year Yield		
	ALL	Excl CHN/IND	Major issuers	ALL	Excl CHN/IND	Major issuers
Dependent variable: Δr_t						
$E_t(g_{t+2})$	0.044	0.049	0.100**	0.033	0.035	0.058
	(0.034)	(0.035)	(0.040)	(0.033)	(0.035)	(0.038)
Observations	1046	994	765	856	804	664
Adj. R2	0.164	0.164	0.158	0.112	0.116	0.157
Number of countries	65	63	37	56	54	36
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+2}						
$E_t(g_{t+2})$	0.119**	0.132**	0.169***	0.095	0.095	0.122*
	(0.053)	(0.055)	(0.065)	(0.059)	(0.061)	(0.073)
Observations	1012	960	765	848	796	665
Adj. R2	0.277	0.279	0.344	0.354	0.361	0.386
Number of countries	63	61	37	54	52	35
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+4}						
$E_t(g_{t+2})$	0.195***	0.222***	0.351***	0.191***	0.215***	0.232***
	(0.066)	(0.068)	(0.076)	(0.065)	(0.065)	(0.077)
Observations	914	866	700	770	722	611
Adj. R2	0.343	0.347	0.426	0.434	0.446	0.466
Number of countries	63	61	37	53	51	36
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Source: Staff estimates.
Note: Heteroskedasticity-robust standard errors in parentheses

D. Comparison with External Bond Spread Sensitivity

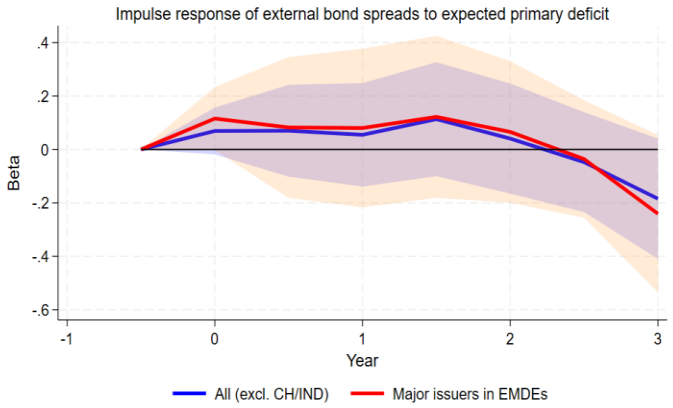
To highlight the difference in sensitivity of domestic and external bond yields to fiscal policy, we use the same LP specification to estimate the cumulative impulse response of external bond spreads to 4-year ahead of expected primary deficits. In addition to the explanatory variables included in eq. (1), the baseline specification additionally includes 4-year ahead forecasts of current account balance and total external debt (both in percent of GDP). Each country's external bond spread from IMF's SSM database is used as the outcome variable.

As Figure 6 shows, the sensitivity of external bond spread to 4-years ahead of expected primary deficits is statistically insignificant over the three-year horizons. [10] In contrast to domestic bond yields, external bond

[10] The point estimates in Figure 6 shows the impact in percentage. The impact in basis point is the estimates multiplied by 100.

spreads tend to react more strongly to global financial variables (US treasury interest rate and VIX), current account balance, and external debt, while finding smaller sensitivity to local factors including fiscal policy shock. The insignificant effect of expected primary deficit and greater importance of global risk factors in determining external bond spreads vis-a-vis domestic bonds, consistently hold when other confounding factors (such as foreign reserves-to-GDP) are controlled, as similarly found in the literature (IMF October 2024 Fiscal Monitor, Du and Schreger, 2016).[11]

Figure 6. Cumulative Response of External Bond Spreads to Higher Expected Primary Deficits (in percentage)



Source: Bloomberg, IMF, Haver, and staff estimates.

Note: 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in shaded areas. The regression uses the amount of new long-term sovereign bond issuances as weight.

IV. Heterogeneity by Debt Holder Composition

This section extends the LP model to account for nonlinear effects of fiscal policies on domestic bond yields by investor base and sovereign-bank nexus. Given the evolving landscape of debt structure (section III.B), we analyze how the sensitivity varies across countries by the compositional change in public debt. We use the Kitagawa-Blinder-Oaxaca (KBO) decomposition to estimate the impulse response heterogeneity due to the differences in debt composition across countries over time following Cloyne et al. (2023):

$$r_{i,t+h} - r_{i,t-1} = \beta^h E_t\left(g_{i,t+4}\right) + \gamma^h\left(s_{i,t-1} - \bar{s}\right) \cdot E_t\left(g_{i,t+4}\right) + \eta_i^h\left(s_{i,t-1} - \bar{s}\right) + \theta_1^h E_t\left(m_{i,t+4}\right) + \theta_2^h X_{i,t} + \lambda_i + \tau_t + \epsilon_{i,t+h} \quad (2)$$

[11] Figure 6 shows the impulse response of the baseline specification. Foreign reserves-to-GDP is one of the critical determinants of external bond yields, but its 4-year ahead forecast is available from the IMF's Balance of Payment and International Investment Position statistics (BOP/IIP) only after 2014. When foreign reserves are included in the LP regression, it reduces the sample size, but the estimated impulse response remains robust.

where $s_{i,t-1}$ is structural variables, including (a) the sovereign-bank nexus ratio and (b) the investor composition of sovereign debt (i.e., the holdings by foreign non-banks, domestic banks, or domestic non-banks). We take one-year lag of each variable and compute the deviation from the pre-COVID global average of $s_{i,t}$, $(\bar{s})$. We also control for country-specific debt composition effect η_i^h.

We estimate country-year specific marginal effects of the 4-year ahead primary deficits on bond yield, a more flexible specification than the state-dependent LP model with binary state (high vs. low). Based on the linear-interaction specification, the coefficient of the interaction term γ^h captures the contribution of debt composition (as proxied by sovereign-bank nexus or investor base) in addition to the direct effect β^h of expected fiscal deficits on bond yields. The marginal effect is defined as equation (4) below:

$$\frac{\partial(r_{i,t+h}-r_{i,t-1})}{\partial E_t(g_{i,t+4})} = \beta^h + \gamma^h\left(s_{i,t-1} - \bar{s}\right) \qquad (3)$$

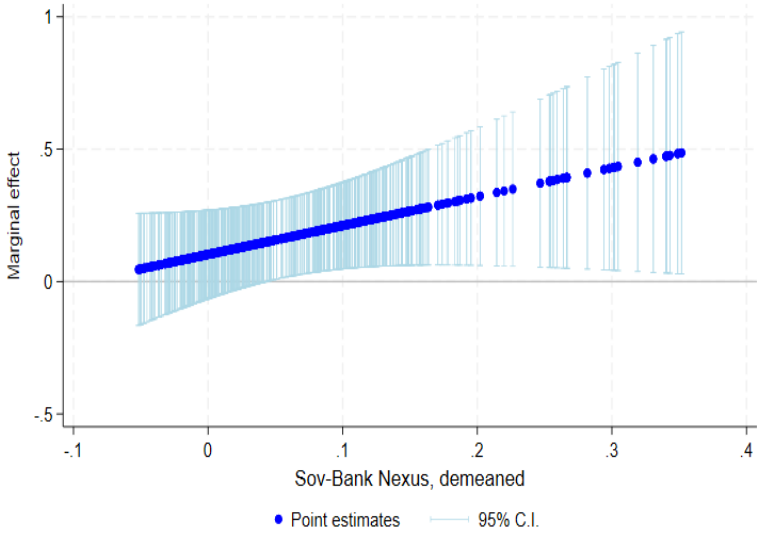
β^h is the direct effect of expected primary deficits when sovereign-bank nexus or the level of investors' holding is at pre-COVID global average ($s_{i,t-1} = \bar{s}$). The KBO decomposition allows the effect to vary across countries over time depending on the value of $\widehat{\gamma^h}\left(s_{i,t-1} - \bar{s}\right)$, while controlling for the difference in debt composition (Cloyne et al., 2023). This specification captures the evolution of domestic debt composition, i.e., an increase in domestic bank's holding of domestic debt (Figure 1), a reduction in non-resident investors' holding of local-currency denominated bonds in major EMDEs (Figure 2), and an increase in sovereign-bank nexus (Figure 3).

A. Results

Sovereign-Bank Nexus

Results show that domestic bond yields are more sensitive to expected fiscal loosening for countries with stronger sovereign-bank nexus. We estimate the cumulative impact over 2 years ($h = 4$) and report the estimated parameters from eq. (2) in Annex III. The coefficient γ is positive and significant at 95 percent confidence interval for sovereign-bank nexus (column 1), indicating elevated domestic borrowing costs due to fiscal loosening when the sovereign-bank nexus ratio is higher. Figure 7 shows the marginal effect of expected primary deficits on the 10-year bond yields as a y-axis, and how it varies over the distribution of the centered sovereign-bank nexus ratio as x-axis. The chart highlights the positive relationship and significant heterogeneity across countries. That is, the higher the sovereign-bank nexus ratio, the higher the sensitivity of domestic bond yields to fiscal policy, capturing creditor's concerns with financial stability risk. A shift from the 25th to 75th percentile of sovereign-bank nexus implies an average rise in yields by about 13 bps for all EMDEs, excluding China and India, and 17 bps for major EMDEs. As the exposure to government bonds approaches 40-50 percent of banking sector assets (top-end of the sovereign-bank nexus distribution), the result in Figure 6 implies that the impact of fiscal loosening on 10-year bond yields could exceed 50 bps.

Figure 7. Marginal Effect of 4-year Ahead Primary Deficits on 10-Year Bond Yield Heterogeneity by Sovereign-Bank Nexus (All EMDEs, excluding China/India)



Source: Bloomberg, IMF, Haver, and staff estimates.
Note: Estimates indicate cumulative impact over two years. 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in error bars. Sovereign-bank nexus is measured by the holding of domestic sovereign bonds as a share of banking sector's total assets.

Concentration of Sovereign Debt's Holder Composition

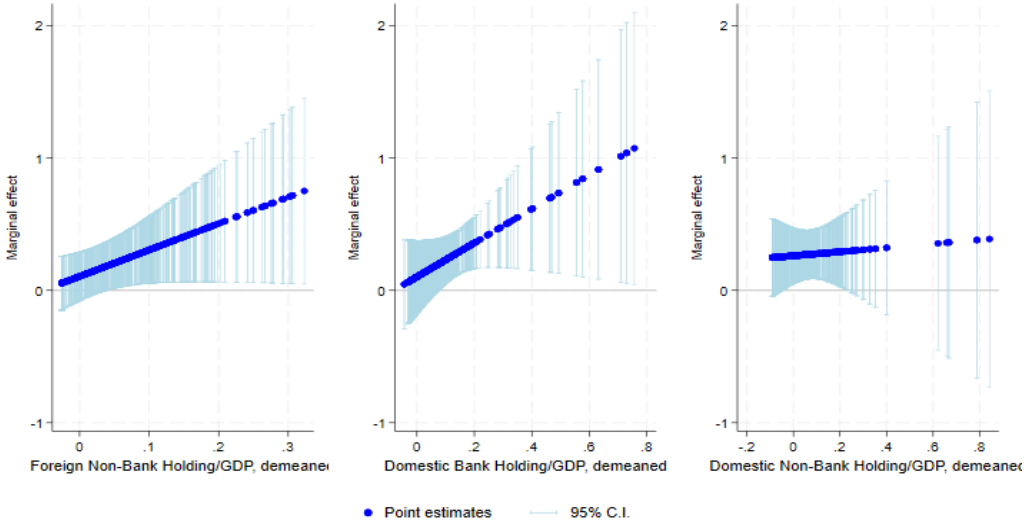
The sensitivity of domestic bond yields to fiscal policy is strengthened as the exposure to sovereign bonds concentrate more with particular creditors**.** Annex IV reports the coefficient γ for foreign NBFIs holding-to-GDP (column 2), domestic bank holding (column 3) and domestic NBFIs holding (column 4). The coefficient is positive and statistically significant (except for domestic non-bank holding), indicating higher borrowing costs due to fiscal loosening as the exposure to sovereign debt concentrates more with particular creditors.

Foreign investor base (Figure 8, left): In large EMs, this result indicates that an increase in non-residents' participation in local debt market (Figure 2) raises the contribution of fiscal shocks to domestic bond yields. From financial development perspective, the participation of non-resident investors in local bond markets has the benefit of overcoming the "original sin" and reducing credit risks associated with "home bias" (Saka, 2020; Andreeva and Vlassopoulos, 2019). However, this result highlights the risk that it could also be a "double-edge sword" for EMDEs' financing market. It could raise the vulnerability of sovereigns' financing to investors' risk perception (Hong Kong Monetary Authority).[12] While the vulnerability to foreign investors continue to rise in LICs, major EMDEs recently experienced a reduction in foreign investor holding after the COVID-19. After the COVID-19, due to limited external market access and the sell-outs of local bonds by foreign investors, the exposure of sovereign to foreign investors decreased, thus weakening the contribution of foreign NBFIs exposure to domestic bond yields.

[12] https://www.bis.org/publ/bppdf/bispap113_h.pdf

Domestic investor base (Figure 8, center and right): As large EMs have reallocated government financing from foreign to domestic sources after the COVID-19, the exposures to domestic investors have increasingly concentrated on domestic banks and NBFIs across the globe. Given their increased exposure, domestic banks and NBFIs started to demand higher yields for new issuances of domestic sovereign bonds, leading to higher sensitivity of local bond yields to fiscal expansion. The sensitivity of bond yields to fiscal policy is found to get significantly elevated in case of a larger concentration of government debt with domestic banks, as indicated by a sharp positive slope of the marginal effect line (Figure 8, center). A shift from the 25th to 75th percentile of domestic banks holding-to-GDP implies an average rise in yields by about 11 bps for all EMDEs, excluding China and India.

Figure 8. Marginal Effect of 4-Year Ahead Primary Deficits on 10-Year Bond Yield Heterogeneity by Debt Holders (All EMDEs, excluding China/India)



Source: Bloomberg, IMF, Haver, Arslanalp and Tsuda (2014), and staff estimates.
Note: Estimates indicate cumulative impact over two years. 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in error bars.

B. Heterogeneous Effect of Fiscal Policies on External Bond Spreads

As a comparison, Annex V explores the effect of fiscal policies on external bond spreads by sovereign-bank nexus and sovereign debt holder composition. Compared with the result for domestic bond yields (Figures 7 and 8), the impact of fiscal policies becomes weaker and insignificant for sovereign-bank nexus and domestic bank holding of sovereign debt. However, we find a significant effect of fiscal policies on external bond spreads as the level of sovereign debt held by foreign non-banks increases (Figure AV.2, left). An increase of foreign non-banks holding-to-GDP from the 25th to 75th percentile implies an average rise of external bond spreads by about 25 bps. The sharp positive slope of the marginal effect line indicates a much stronger effect in countries with large foreign non-banks' holding of external bonds. This highlights the stronger role of domestic banks in determining domestic bond yields, while the vulnerability to foreign investors' behavior is more pronounced for external bond yields.

C. A Counterfactual Local Projection: Sensitivity-based Estimation

We exploit cross-country variation in the response of domestic debt financing to fiscal policy to identify its interaction with fiscal policy in determining domestic bond yields. The reduced-form KBO approach (eq. 2) assumes debt composition $s_{i,t}$ as given, although investors' behavior and the government's reliance/access to deficit financing from them will also be endogenously determined by future fiscal policy stance. To address this identification challenge, we follow the sensitivity instrument approach (Cloyne, Jordà, and Taylor, 2023; Guren, McKay, Nakamura, and Steisson, 2020; Nakamura and Steisson, 2014). The identification assumption is that there is variation in the average response of domestic debt financing (from domestic banks, NBFIs, or foreign NBFIs) to fiscal shocks across countries but that this variation is not, on average, correlated with other omitted macroeconomic disturbances. The proposed method proceeds in two steps:

- **Step 1:** Estimate cross-country "sensitivity proxy" (φ_i^h) of domestic debt $s_{i,t}$ in response to 4-year ahead primary deficits, allowing the coefficient to be country-specific.

$$s_{i,t+h} = \varphi_i^h E_t(g_{i,t+4}) + \theta_1^h E_t(m_{i,t+4}) + \theta_2^h X_{i,t} + \lambda_i + \tau_t + \epsilon_{i,t+h} \quad (4)$$

- **Step 2:** Estimate the heterogeneous response of domestic bond yields to fiscal policy in a counterfactual experiment when the estimated sensitivity proxy $\widehat{\varphi_i^h}$ changes (i.e., hypothetical increase in the reliance on financing from domestic banks, NBFIs, or foreign NBFIs) relative to the mean.

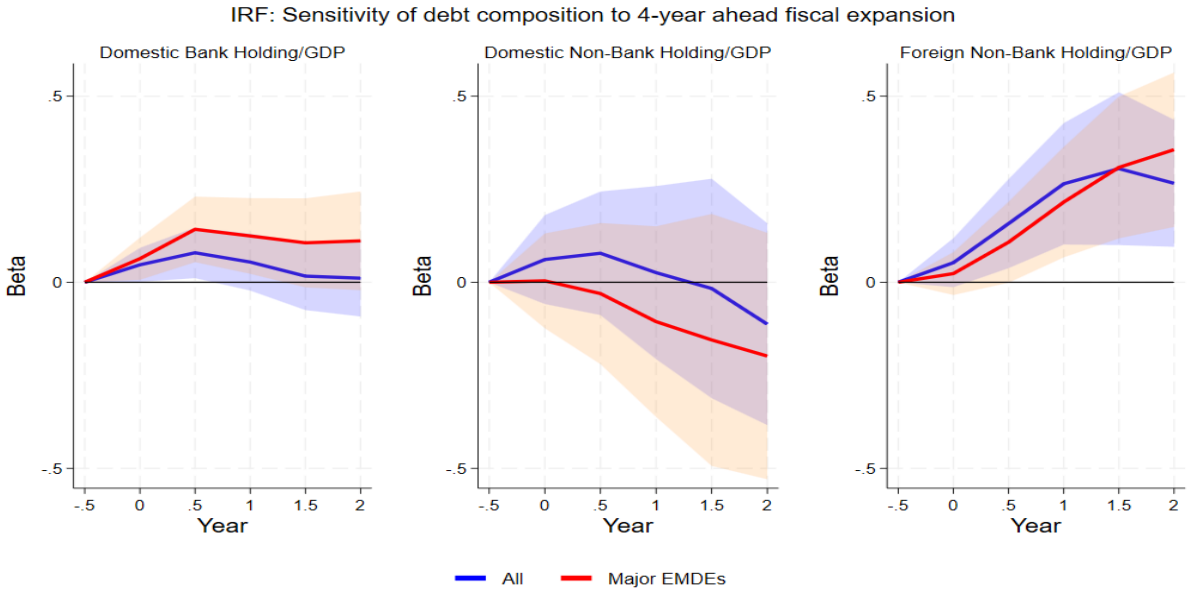
$$r_{i,t+h} - r_{i,t-1} = \beta^h E_t\left(g_{i,t+4}\right) + \gamma^h \widehat{\varphi_i^h} \cdot E_t\left(g_{i,t+4}\right) + \theta_1^h E_t(m_{i,t+4}) + \theta_2^h X_{i,t} + \lambda_i + \tau_t + \epsilon_{i,t+h} \quad (5)$$

where all covariates and $\widehat{\varphi_i^h}$ are centered relative to the mean. The marginal effect of fiscal policy is $\frac{\partial(r_{i,t+h} - r_{i,t-1})}{\partial E_t(g_{i,t+4})} = \beta^h + \gamma^h \widehat{\varphi_i^h}$.

D. Results of the Counterfactual LP Regression

The impulse response from **the first-stage estimation** indicates the sovereign's increased reliance on debt financing from domestic banks, domestic non-banks, and foreign non-banks in response to expected fiscal expansion (Figure 9). A 1 p.p. of GDP increase in 4-year ahead primary deficits is associated with an increase in the holding of government debt for domestic banks by about 0.2 p.p of GDP (left); and a persistent increase for foreign non-banks cumulatively by about 0.3 p.p of GDP (right) over two years, both statistically significant at 95 percent significance level. The response of financing from domestic non-banks appears to be insignificant (center).

Figure 9. Cumulative Response of Debt Composition to Expected Fiscal Expansion (First-stage Results, In Percent of GDP)



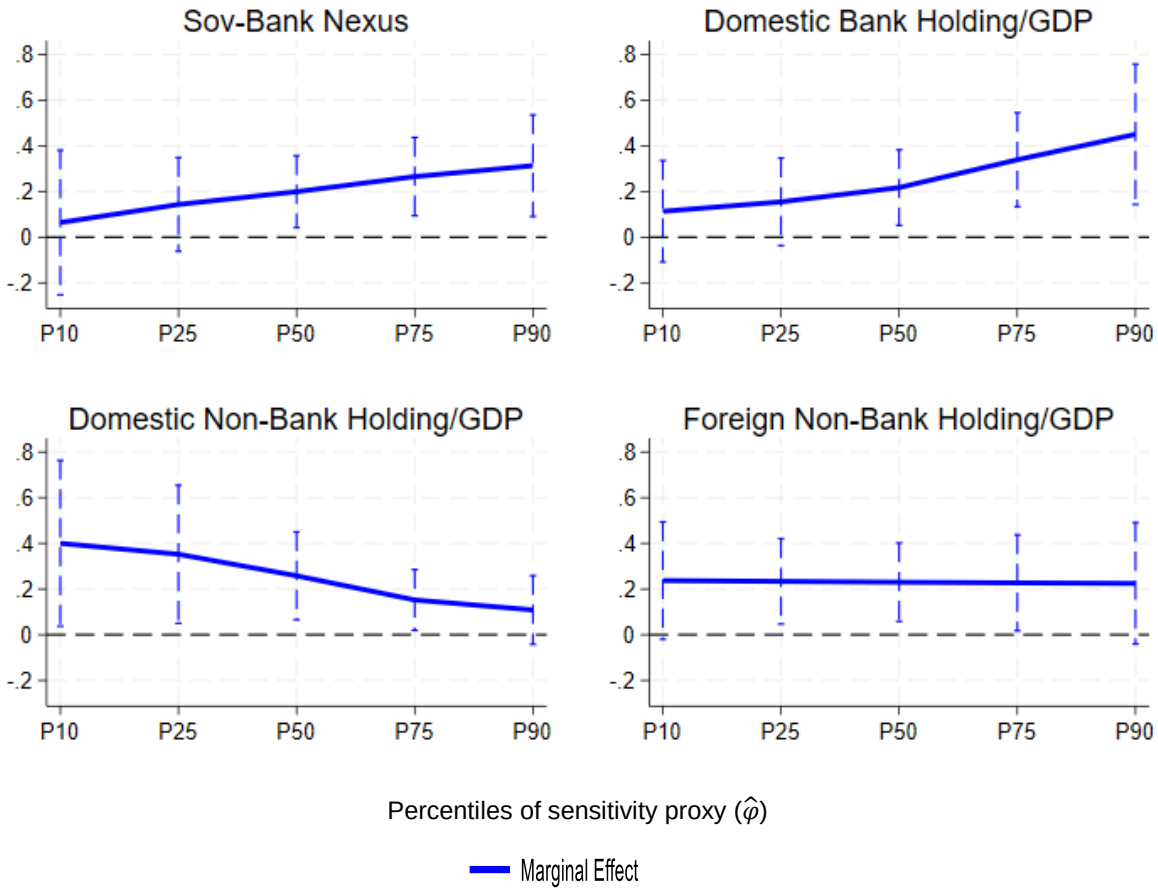
Source: Bloomberg, IMF, Haver, Arslanalp and Tsuda (2014), and staff estimates.
Note: φ (y-axis) is the impact of 1 percentage point of GDP increase in 4-year ahead primary deficits on sovereign debt holding of each type of creditor (in percent of GDP). The estimates indicate cumulative impact over two years. 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in shaded areas. All EMDEs (blue line) excludes China and India.

The second-stage regression result (Figure 10) shows that the sensitivity of 10-year bond yields to fiscal expansion is stronger in countries relying more on domestic banks to finance their deficit (with higher sovereign-bank nexus). In Figure 9, we show the marginal effect of 1 pp expansion in the 4-year ahead primary deficits ($\beta + \gamma\hat{\varphi}_i$) over 2 years ($h = 4$) as y-axis, and examine its variation at different percentile values (10th – 90th percentile) of the financing sensitivity proxy.

The result confirms that 10-year bond yields react more strongly to expected fiscal expansion in EMDEs that rely more on deficit financing from domestic banks (upper panels). The transition from the 25th to 75th percentile of the sensitivity-proxy (both in terms of sovereign-bank nexus and domestic banks holding-to-GDP) implies an average rise in yields by about 20 bps in response to a 1 pp of GDP increase in expected primary deficits. While the government's financing response through foreign non-banks was significant in the first-stage (Figure 9, right), the sensitivity of 10-year bond yields to fiscal loosening appears the same across different percentile values of sensitivity-proxy regarding foreign non-bank holding. This finding is robust when the sample is restricted only to major EMDEs, and when we estimate the same model for short-term (5-year) bond yields.

Overall, the counterfactual LP analysis confirms the reduced-form KBO decomposition result (Section V.A), showing that (a) the contribution of loose fiscal policy to domestic yields is amplified in the countries where sovereign-bank nexus is high and (b) for major EMs, domestic banks seem to have become more punitive of expansionary fiscal policy.

Figure 10. Sensitivity of 10 Year Yields to 4-Year Ahead Fiscal Deficits: Heterogeneity by Financing Sensitivity Proxy (Second-stage Results) for all EMDES excluding China and India



Source: Bloomberg, IMF, Haver, Arslanalp and Tsuda (2014), and staff estimates.
Note: 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in error bars. Estimates indicate cumulative impact over two years.

V. Conclusions

This paper investigates the role of fiscal policies in determining domestic bond yields in EMDEs, and how this relationship varies depending on the debt holder composition. It contributes to the existing literature by extending the analysis to encompass a large set of emerging and low-income countries, while also investigating the post-COVID dynamics of local debt markets. Furthermore, the paper explores the extent to which fiscal discipline impacts domestic borrowing costs, in comparison with external bond yields, considering the moderating or amplifying effects of creditor composition of domestic debt.

We find robust evidence on the importance of fiscal policy in shaping sovereign borrowing costs in EMDEs. That is, local debt markets can discern default risk, and expectations regarding fiscal deficits play a significant role in determining local bond yields. The local projection estimation shows that a 1 percentage point increase

in expected primary deficits leads to a persistent increase in 10-year domestic bond yields, whose peak is around 36 basis points after 2.5 years in EMDEs excluding China and India. The sensitivity of bond yields to fiscal expansion has slightly increased when the sample is extended to the post-COVID period. We find that the results are robust when controlling for other omitted factors, such as the country's sovereign credit risk (debt-to-GDP), commodity terms-of-trade, global financial stress and domestic credit conditions, external bond spreads, and institutional quality. Overall, the findings underscore the pronounced role fiscal policy plays in determining the cost of domestic borrowing, in contrasts with external bond spreads that are more sensitive to external and global risk factors.

In terms of the creditor composition of domestic debt, we find that the impact of expansionary fiscal policy on domestic bond yields is amplified in countries with a pronounced sovereign-bank nexus. The marginal effect of an increase in the 4-year ahead primary deficits is estimated to reach about 50 bps over two years in countries where domestic banks have the highest exposure to the sovereign. In contrast, the sensitivity of external bond spreads to fiscal policy is more pronounced in countries with larger foreign non-banks participation.

The extra borrowing costs by 30 basis points for a country that has large annual domestic gross financing needs of about 30 percent of GDP, would imply a 1 percent of GDP additional interest cost associated with issuing a 10-year bond at the new higher interest rates. Our paper also identifies the sovereign-bank nexus as a crucial factor that magnifies the impact of loose fiscal policies. The marginal effect of a 4-year ahead increase in primary deficits can reach about 50 bps over two years in countries where domestic banks have the highest exposure to the sovereign.

These results highlight the necessity of maintaining robust fiscal positions to positively influence market perceptions and borrowing costs. The amplifying effect of banking sector exposure to sovereign debt elucidates the interconnectedness of fiscal and financial sectors. In countries characterized by a tighter sovereign-bank nexus, loose fiscal policies are associated with an elevated risk premium. This situation not only leads to higher borrowing costs for countries with significant banking sector exposure to the public sector but also renders these economies susceptible to "doom loops." Such loops can occur when negative shocks to the sovereign balance sheet initiate adverse feedback loops between sovereign entities and banks, potentially jeopardizing macro-financial stability (IMF GFSR, 2022). Consequently, these findings underscore the necessity for vigilant supervision of the financial sector and the development of robust resolution frameworks (IMF GFSR, 2022).

Furthermore, our results regarding the amplifying role of a concentrated investor base on borrowing costs accentuate the importance of fostering a deep and diversified investor base. Such diversification would mitigate the risk of abrupt shifts in risk appetite that could induce volatility in local debt markets.

Annex I. List of EMDEs in the Analysis Sample

Table AI.1. A Country List in the Baseline Analysis Sample

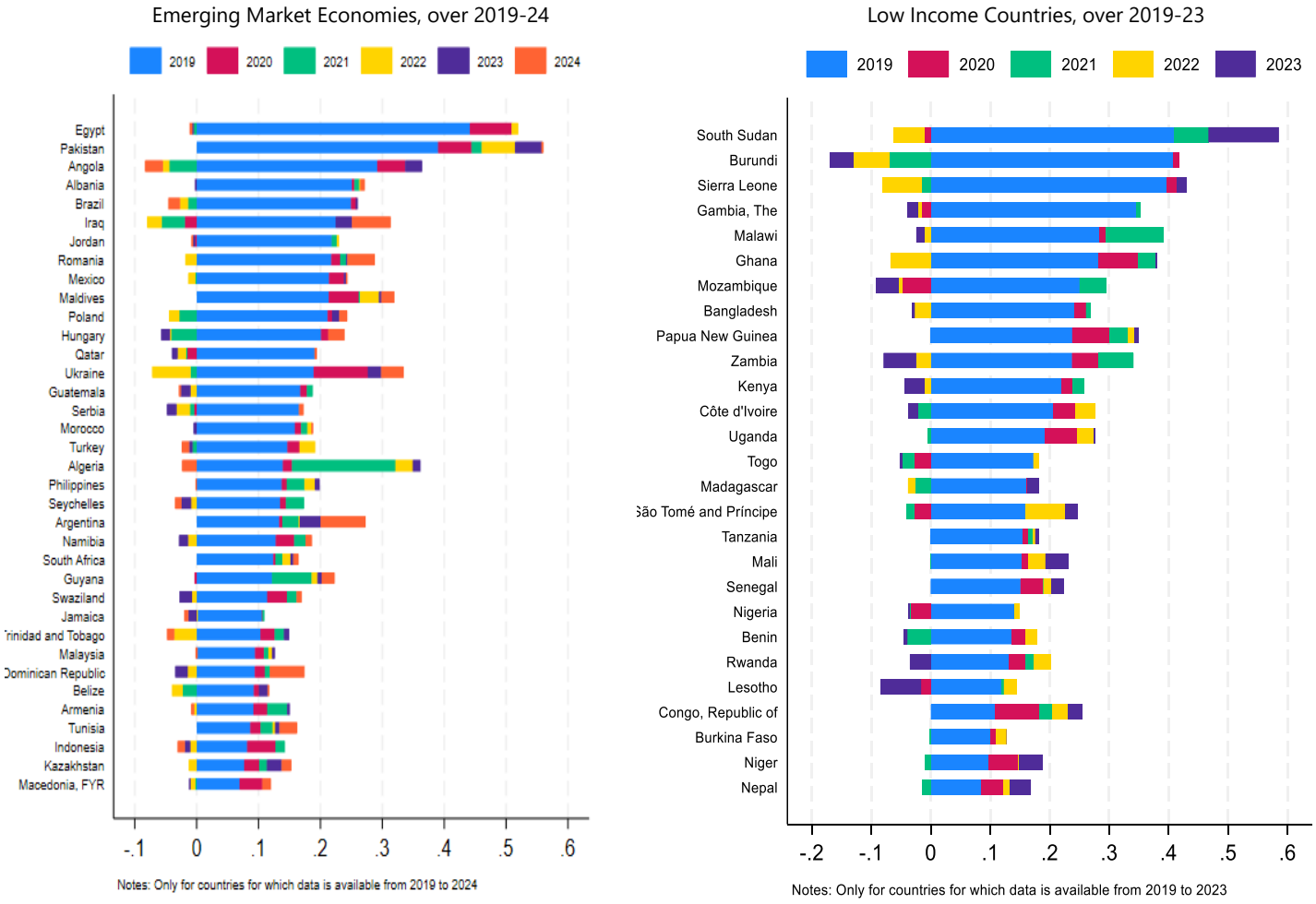
	10-year bond rate	Primary deficit/GDP (t+4)	Public debt/GDP (t+4)	External bond spread (bps)
Albania	6.35	0.35	66.73	340.7
Angola	7.72	-1.82	67.15	538.1
Argentina	8.70	1.02	52.93	424.1
Armenia	12.32	0.15	50.25	338.0
Bahamas, The	4.14	-1.33	70.25	449.7
Bangladesh	8.58	1.93	39.32	…
Bolivia	2.45	2.52	54.74	335.4
Bosnia and Herzegovina	3.11	-0.98	35.94	…
Botswana	5.79	-1.45	15.24	…
Brazil	7.19	-2.77	85.98	223.0
Bulgaria	2.65	-0.67	21.90	138.4
Cabo Verde	4.04	-0.57	123.74	…
Chile	4.33	-0.43	25.27	87.8
China	3.63	2.39	53.46	61.4
Colombia	7.36	-1.92	44.08	206.7
Costa Rica	8.37	-0.73	63.56	461.5
Côte d'Ivoire	5.91	1.27	45.59	637.1
Dominican Republic	10.64	-0.45	49.56	364.7
Egypt	15.83	-1.10	90.41	496.6
Georgia	10.20	0.63	40.26	302.9
Ghana	21.25	-0.96	76.91	882.1
Honduras	8.30	-1.33	49.06	375.4
India	9.42	2.36	76.46	…
Indonesia	7.43	0.46	31.95	176.3
Jamaica	8.02	-7.19	98.72	397.1
Jordan	5.71	-1.43	86.30	425.0
Kazakhstan	8.15	-1.52	23.89	147.4
Kenya	12.70	0.96	59.64	518.2
Kuwait	13.27	-1.59	45.74	54.5
Lebanon	7.67	-0.97	145.85	550.9
Malawi	21.34	0.49	77.42	…
Malaysia	3.92	0.72	60.47	…
Mauritius	5.58	0.50	71.07	…
Mexico	6.62	-0.95	54.81	161.4
Morocco	3.20	0.66	68.11	206.6
Namibia	9.69	0.95	59.97	314.8
Nigeria	13.29	1.87	29.64	494.2
Oman	4.80	4.37	50.01	417.9
Pakistan	10.87	-0.41	71.54	741.1
Peru	5.21	-0.77	26.17	136.4
Philippines	4.90	-0.61	42.81	111.0
Poland	3.55	0.61	54.93	77.4
Romania	5.29	1.65	46.64	227.1
Russia	8.00	0.13	17.72	458.8
Saudi Arabia	2.92	1.55	34.98	141.0

South Africa	7.54	-0.21	64.60	265.7
Sri Lanka	10.74	-0.20	89.56	820.4
Eswatini	10.52	0.55	52.74	…
Tanzania	12.31	0.64	42.27	…
Thailand	2.71	0.54	50.64	…
Trinidad and Tobago	4.25	3.24	69.94	199.0
Tunisia	8.05	-1.25	79.28	981.7
Turkey	7.46	-0.20	40.24	365.5
Uganda	15.71	0.81	46.32	…
Ukraine	12.85	-0.51	51.75	734.2
Uruguay	6.39	-0.82	66.78	171.1
Venezuela	12.16	6.65	90.05	…
Vietnam	5.94	2.41	59.27	193.6
Zambia	23.23	-0.39	72.87	1526.0
Total	8.31	0.12	58.19	384.30

Source: Bloomberg, IMF, and staff estimates.
Note: Statistics are the sample average. Shaded countries are included in major (frequent) bond issuers in EMDEs sample.

Annex II. Sovereign-Bank Nexus: Country-level Evidence

Figure AII.1. Change in the Sovereign-Bank Nexus
(In Percent of Total Bank Assets)



Source: IMF Monetary and Financial Statistics (MFS), and staff estimates.

Annex III. Baseline Local Projection Estimates

Table AIII.1. Determinants of the Change in Sovereign Bond Yields (in percentage)

	(1) 5 Year Yield			(2) 10 Year Yield		
	ALL	Excl CHN/IND	Major issuers	ALL	Excl CHN/IND	Major issuers
Dependent variable: Δr_t						
$E_t(g_{t+4})$	0.067*	0.074**	0.126***	0.060	0.067	0.096**
	(0.036)	(0.037)	(0.049)	(0.040)	(0.043)	(0.048)
Observations	1046	994	765	856	804	664
Adj. R2	0.166	0.166	0.161	0.114	0.119	0.162
Number of countries	65	63	37	56	54	36
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+2}						
$E_t(g_{t+4})$	0.152**	0.171***	0.221***	0.123*	0.126*	0.163*
	(0.060)	(0.063)	(0.073)	(0.070)	(0.073)	(0.085)
Observations	1012	960	765	848	796	665
Adj. R2	0.279	0.282	0.348	0.355	0.363	0.388
Number of countries	63	61	37	54	52	35
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+4}						
$E_t(g_{t+4})$	0.311***	0.344***	0.480***	0.259***	0.286***	0.297***
	(0.074)	(0.077)	(0.087)	(0.074)	(0.076)	(0.090)
Observations	914	866	700	770	722	611
Adj. R2	0.356	0.362	0.442	0.440	0.453	0.471
Number of countries	63	61	37	53	51	36
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes
Dependent variable: Δr_{t+6}						
$E_t(g_{t+4})$	0.213***	0.270***	0.333***	0.244***	0.309***	0.329***
	(0.079)	(0.080)	(0.097)	(0.087)	(0.089)	(0.096)
Observations	827	783	639	679	635	549
Adj. R2	0.382	0.390	0.429	0.473	0.494	0.487
Number of countries	61	59	37	50	48	34
Country-Year-Semester FE	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Source: Staff estimates.

Note: Heteroskedasticity-robust standard errors in parentheses. Δr_t in the first row indicates the instantaneous impact at time t. Δr_{t+2} in the second row, Δr_{t+4} in the third row, and Δr_{t+6} in the fourth row indicate the impact after one, two, and three years, respectively.

Annex IV. Estimates from a Linear-interaction Model

Table AIV.1. Linear-interactive effect: fiscal policy and debt composition
Impact on the change in 10-year bond yields over 2 years (from t-1 to t+4), All EMDE sample

	(1)	(2)	(3)	(4)
	Change in 10 Yr bond yields: Δr_{t+4}			
$E_t(g_{t+4})$	0.102	0.135	0.118	0.303***
	(0.085)	(0.094)	(0.140)	(0.107)
l1.Sov-bank nexus	-5.482			
	(8.475)			
$E_t(g_{t+4}) \times$ l1.Sov-bank nexus	1.091			
	(0.738)			
l1.Foreign Non-bank holding/GDP		-17.152		
		(70.830)		
$E_t(g_{t+4}) \times$ l1.Foreign Non-bank holding/GDP		1.947*		
		(1.147)		
l1.Domestic Bank holding/GDP			-9.612	
			(11.047)	
$E_t(g_{t+4}) \times$ l1.Domestic Bank holding/GDP			1.440*	
			(0.835)	
l1.Domestic Non-bank holding/GDP				-128.334*
				(74.854)
$E_t(g_{t+4}) \times$ l1.Domestic Non-bank holding/GDP				0.009
				(0.683)
Observations	679	662	685	676
Adj. R2	0.464	0.481	0.445	0.438
Number of countries	48	45	46	45
Country FE	Yes	Yes	Yes	Yes

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$

Source: Staff estimates.

Note: Heteroskedasticity-robust standard errors in parentheses. Explanatory variables related to sovereign debt structure (i.e., sovereign-bank nexus for column 1; foreign non-bank, domestic bank, and domestic non-bank holdings for columns 2-4) are all centered around pre-Covid global average. "l1" indicates one-year lag of these variables.

Annex V. Effect of Fiscal Policies on External Bond Spreads: by Sovereign-Bank Nexus and Debt's Holder Composition

Figure AV.1. Marginal Effect of 4-year Ahead Primary Deficits on External Sovereign Bond Spreads Heterogeneity by Sovereign-Bank Nexus (All EMDEs, excluding China/India)

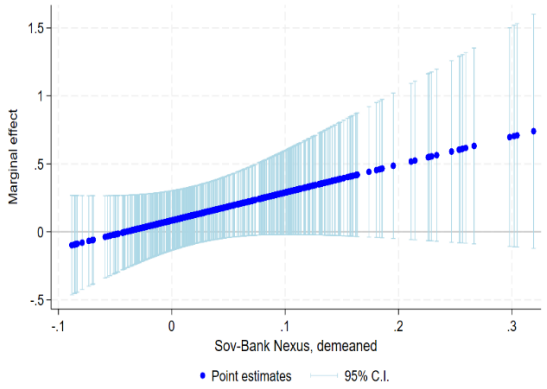
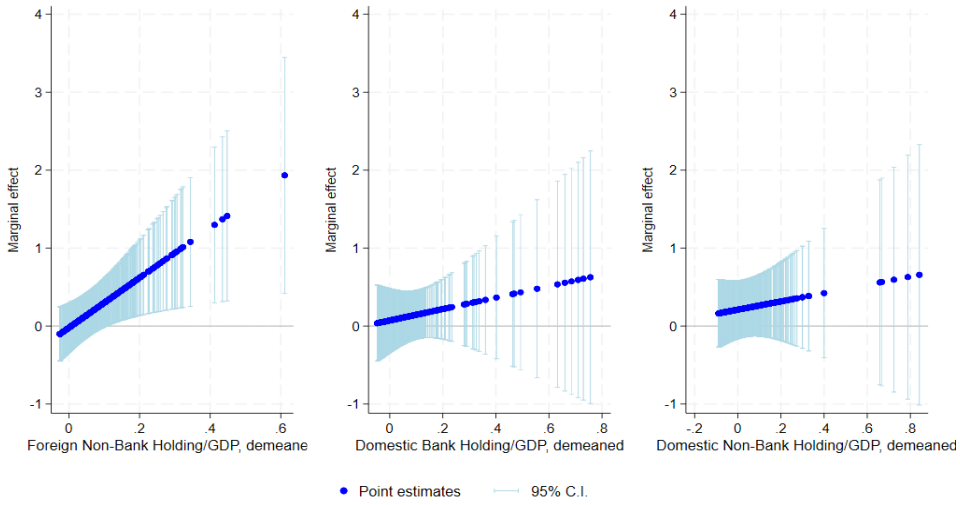


Figure AV.2. Marginal Effect of 4-Year Ahead Primary Deficits on External Sovereign Bond Spreads Heterogeneity by Debt Holders (All EMDEs, excluding China/India)



Source: Bloomberg, IMF, Haver, Arslanalp and Tsuda (2014), and staff estimates.
Note: Estimates indicate cumulative impact over two years. 95 percent confidence intervals using heteroskedasticity-robust standard errors are shown in error bars.

Annex VI. Summary Statistics: Bloomberg Bond-level Issuance Data

We use new domestic bond issuance data retrieved from the Bloomberg Finance L.P. The data query selects all bonds issued by central government, regional government, local government, central bank, SOEs and development banks under domestic law from 2000 until 2023.[1] This paper focuses on bonds issued by central government. The data contains basic information such as the issuer name, the amount issued, coupon rate, and whether bonds are indexed to inflation or have a floating rate. In the main analysis, we excluded inflation-indexed bonds. Table AVI.1 provides the summary statistics of these bond characteristics for each country listed in Table AI.1.

Table AVI.1. Summary Statistics: Bloomberg Bond Issuance Data, from 2000-2023

Country	Number of issuance (total)	Frequency of annual issuance (p50)	Annual Issuance (in mil USD, p50)	Annual issuance /GDP (p50)	Tenor (p50)	Tenor (max)	Coupon rate (mean)	Share of floating	Share of inflation - indexed
Albania	403	20	31.0	6.1	3.0	15.0	6.0	0.16	0.00
Angola	1355	59	9.4	2.6	4.0	24.0	7.8	0.02	0.00
Argentina	326	8	763.6	2.7	5.4	48.0	7.4	0.33	0.16
Armenia	152	4	4.1	1.8	4.0	31.0	6.3	0.00	0.00
Bahamas, The	231	11	11.0	1.8	17.0	30.0	4.0	0.34	0.00
Bangladesh	575	20	58.4	1.3	10.0	20.0	9.2	0.00	0.00
Bolivia	1319	32	2.9	0.6	6.0	100.0	5.0	0.00	0.28
Bosnia Herzegovina	179	11	17.4	1.4	5.0	15.0	3.0	0.00	0.00
Botswana	17	1	292.0	2.6	10.0	25.0	7.8	0.00	0.00
Brazil	307	10	7,590.8	14.2	3.5	40.7	4.8	0.39	0.15
Bulgaria	92	3	95.0	1.1	5.0	20.0	4.4	0.01	0.00
Cabo Verde	201	18	4.9	4.2	8.0	12.0	3.7	0.00	0.00
Chile	68	4	0.3	0.6	10.0	31.5	3.3	0.00	0.50
China	753	28	4,215.0	2.8	5.0	50.0	3.2	0.01	0.00
Colombia	171	3	329.6	3.5	5.0	32.0	5.2	0.20	0.20
Costa Rica	363	15	178.8	7.4	5.0	34.0	7.5	0.09	0.06
Côte d'Ivoire	194	10	67.7	2.1	5.0	12.0	5.2	0.00	0.00
Dominican Republic	50	3	186.8	0.9	7.0	20.0	9.5	0.00	0.02
Egypt	414	10	568.5	4.5	3.0	20.0	10.7	0.02	0.00
Eswatini	50	4	11.3	1.3	5.5	10.0	8.9	0.08	0.00
Georgia	150	7	8.4	1.4	3.5	11.0	10.0	0.00	0.00
Ghana	625	25	11.4	3.6	2.0	19.9	18.2	0.00	0.00
Honduras	121	5	13.8	0.8	4.9	15.5	7.5	0.00	0.00
India	2607	140	666.1	8.5	12.9	50.0	7.4	0.05	0.00
Indonesia	443	13	545.1	2.5	6.0	30.6	6.8	0.37	0.00
Jamaica	503	21	19.1	6.1	6.3	40.0	9.8	0.42	0.00

[1] As data were collected in February 2024, all new issuances until January 2024 recorded in the Bloomberg are covered.

Jordan	874	36	70.7	11.6	3.0	15.0	5.3	0.00	0.00
Kazakhstan	452	14	94.6	1.7	5.0	30.0	7.6	0.17	0.15
Kenya	273	10	108.7	3.9	5.0	29.9	10.2	0.13	0.00
Kuwait	75	3	325.3	8.0	3.0	10.0	2.5	0.00	0.00
Lebanon	1493	72	68.9	20.8	3.0	14.9	7.3	0.00	0.00
Malawi	128	4	35.2	0.9	5.0	10.0	11.8	0.00	0.00
Malaysia	191	8	2,697.2	8.5	7.5	30.5	3.8	0.00	0.00
Mauritius	749	21	14.4	8.2	3.0	20.0	4.6	0.01	0.01
Mexico	807	31	986.4	4.6	4.9	32.4	6.1	0.83	0.10
Morocco	385	15	392.1	6.5	2.4	30.9	3.9	0.01	0.00
Namibia	46	2	159.1	3.5	7.1	31.1	6.4	0.00	0.13
Nigeria	1351	4	0.2	1.8	3.0	30.0	0.8	0.00	0.00
Oman	54	2	259.7	0.8	5.0	10.0	4.8	0.00	0.00
Pakistan	463	10	288.5	2.3	5.0	30.0	12.8	0.33	0.00
Peru	55	2	97.9	1.4	7.0	40.6	6.8	0.05	0.24
Philippines	354	10	185.9	4.8	5.0	25.0	8.6	0.00	0.00
Poland	200	8	1,749.2	7.2	3.0	30.2	3.3	0.38	0.01
Romania	243	6	59.2	3.3	3.0	15.4	6.6	0.00	0.06
Russia	188	6	1,939.8	1.5	6.7	30.0	6.8	0.13	0.03
Saudi Arabia	238	12	801.3	1.1	7.0	30.0	4.2	0.08	0.00
South Africa	85	2	4,082.3	6.4	5.6	38.5	3.6	0.05	0.19
Sri Lanka	796	21	87.0	10.3	4.7	30.0	9.7	0.08	0.00
Tanzania	530	24	18.6	1.1	6.0	25.0	10.0	0.00	0.00
Trinidad and Tobago	88	4	55.4	1.5	12.0	25.0	5.4	0.00	0.00
Tunisia	143	7	40.6	2.4	1.0	15.3	2.7	0.00	0.00
Turkey	597	26	1,540.4	9.3	3.0	14.9	7.1	0.23	0.09
Uganda	168	9	40.0	2.4	3.0	19.9	12.1	0.00	0.00
Ukraine	697	24	149.5	3.7	4.8	30.1	10.7	0.04	0.03
Uruguay	394	4	5.0	1.6	2.0	30.0	1.2	0.04	0.71
Venezuela	339	12	114.9	2.1	4.0	19.7	15.2	0.76	0.00
Vietnam	788	30	52.7	2.3	5.0	30.0	7.1	0.00	0.00
Zambia	624	33	8.9	4.2	5.0	15.0	11.4	0.00	0.00

Source: Bloomberg, IMF, and staff estimates.

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