Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Productive Finance for the Belt and Road Initiative: Reexamining China's Debt Sustainability Framework

Yan Liang

liangy@willamette.edu

Willamette University

Research Article

Keywords: Development Finance, Belt Road Initiative, Productive Finance, Public Assets

Posted Date: November 4th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10885243/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Productive Finance for the Belt and Road Initiative: Reexamining China's Debt Sustainability Framework

Abstract

China has committed over $1 trillion in financing across the world, investment in public assets that have been very productive, closed infrastructure gaps, triggered economic growth, and beyond. Nevertheless, numerous external shocks—that have little to do with China's finance-- have left many countries struggling to pay external debts or borrow more at costly terms. Chinese authorities have thus importantly begun to put a framework in place to assess the debt sustainability of its investment partners across the world. This paper analyzes China's debt sustainability assessment framework and identifies three areas that China's framework falls short. Because the framework is largely based on the one derived by the International Monetary Fund and World Bank, the Chinese framework does not account for the accumulation of public assets but rather only analyzes liabilities, it does not account for the productive nature nor the multiplier effects of external finance, and it does not differentiate between local and foreign currency forms of debt. After analyzing these flaws in the framework, new indicators are suggested that can remedy these flaws.

Key Words: Development Finance; Belt Road Initiative; Productive Finance; Public Assets

JEL Codes: F34; H63; O10

1. Introduction

China has become the largest bilateral provider of development finance to the Global South, committing over $1.3 trillion between 2000 and 2021. Since its launch in 2013, the Belt Road Initiative (BRI) encompasses the bulk of China's overseas development finance (ODF). From 2008-2024, Chinese development finance institutions (DFIs) committed $472 billion in public and publicly-guaranteed (PPG) finance across 1,304 loans and credit lines over $25 million in size (Ray et al 2025). These projects support China's own strategic economic objectives (Liang 2020) and provide significant developmental boost to recipient countries (Ruta et al 2019; Dreher et al 2022; Dreher et al 2021; Mandon and Woldemichael 2023; Wang and Xu 2024; Xu et al 2024; Amendolagine, Presbitero and Rabellotti 2025). Despite the mutual benefits, it is well documented that BRI has slowed down since 2016, and the slowdown accelerated during the Covid years. There are myriad challenges confronting BRI, one of which involves debt sustainability of the recipient countries. With decades of lending, China's development banks and development financial institutions are now facing an outstanding debt balance estimated at $1.1 trillion and elevated repayment risks. According to AidData, 55% of China's loans to low- and middle-income countries have entered principal repayment periods and this figure will continue to increase and reach 75% by 2030[1]. And yet, an estimated 80% of China's overseas lending portfolio in the Global

[1] Note that the AidData includes lending that is not strictly sovereign. It includes lending institutions beyond government agencies and policy banks but incorporate state-owned commercial banks, state-owned enterprises, state-owned funds, etc.; it includes recipients that are outside of the public sector and do not have sovereign repayment guarantees; and it includes a diverse set of debt instruments beyond long-term, dollar denominated bilateral loans (Parks et al 2023).

South is currently supporting countries in financial distress. It is noteworthy to point out that China is not the largest creditor to developing countries. According to the World Bank's international debt statistics, for the long-term public and publicly guarantee (PPG) debt stock of the low- and middle-income countries (LMCs) as of 2023, China accounts for a mere 2.2% whereas MDBs take up 27% of the total and the private bondholders 58%.

The heightened repayment risks have prompted various actions of the Chinese policy makers and lenders, ushering in a revamped BRI 2.0. Among some of the changes, BRI pivots from large-scale financing to high-impact financing, focusing more on "small and beautiful", "small yet smart" projects that focus on green energies, technologies, community-based and people-centered programs; as well as putting more emphasis on risk management and monitoring. As Parks et al (2023) observe a few new trends of BRI lending, including more commercial and syndicated lending in lieu of policy bank lending, more rescue lending rather than infrastructure financing, and more RMB-denominated lending instead of dollar lending. An important risk-mitigating practice that is not addressed in the literature, is China's own construct of the debt sustainability Framework (DSF) specifically tailored for BRI countries for debt sustainability assessment (DSA).

China's DSF of BRI is currently non-mandatory but serves as an optional tool for lending institutions to facilitate risk assessment and lending decisions. It is a meaningful move for China to establish its own risk assessment toolkit. However, given its close resemblance to the IMF/World Bank model, it suffers from similar defects, especially when it is applied to evaluate BRI financing. It is therefore imperative to critically examine the DSF of BRI to understand its strengths and demerits toward formulating an effective tool to assess, manage and defuse risks. The central research questions of this paper are therefore the following: first, to what extent China's DSF for BRI market access countries inherit the limitations of the IMF/World Bank framework, which loom larger given the productive finance nature of the BRI financing; and second, how China's DSF for BRI can be modified, through indicators that capture public assets, the growth effects of productive public investment, and the currency denomination of debt, so that it better assesses the sustainability of BRI-financed debt.

Several of the criticisms examined below are not new. Critiques of inaccuracies of growth projections, of the neglect of creditor composition and debt utilization, of the anti-investment bias, and of the treatment of climate and development needs come from earlier work on the IMF/World Bank framework (e.g., Lin and Wang 2017; Xiong et al 2019; Zucker-Marques, Gallagher and Volz 2023; Cömert et al 2024; Raga 2024). The case for public balance sheet analysis draws on Gaspar, Harris and Tieman (2018), Harris and Senhadji (2019) and Wang and Xu (2022), and the case for separating foreign-currency debt draws on the "original sin" literature (Eichengreen and Hausmann 1999; Hofmann et al 2022). This paper does not claim originality for those arguments. Its contribution is threefold. First, it examines China's own DSF for BRI market access countries (MOF 2023), which has received little attention in the literature. Second, it shows how the three limitations interact with the specific features of BRI financing, namely its nature of providing productive finance to bankroll infrastructure, utilities, industrial parks and other projects that form public assets, its lending terms, and its rising RMB share backed by Chinese central bank swap lines. Third, it translates the critiques into a set of indicators, with measurement and data requirements, tailored to that framework.

Evidence base and selection of cases. Because the exact formulas of the DSF could not be obtained, the paper relies on the published MOF (2023) guidance, two interviews with Sinosure risk assessors, and secondary evidence from different countries, periods and institutional sources. The evidence is illustrative rather than statistically representative, and cases were selected on three criteria. First, data availability: public sector balance sheet data exist for only a limited set of countries (31 to 38 in the IMF studies cited), which determines the samples; Kenya and Kazakhstan are highlighted because they contrast a country with relatively high gross debt but low net worth with a resource-rich country with low debt but very high net worth. Second, relevance to BRI: the growth and bottleneck evidence concentrates on Africa and on flagship BRI projects (such as the Mombasa–Nairobi railway, the China-Pakistan Economic Corridor and the China-Laos Railway) because these are the settings where systematic data and impact studies on Chinese-financed infrastructure are available. Third, relevance to market access countries: the cases used for the currency argument (e.g., Sri Lanka, Ethiopia, Zambia and Lebanon) illustrate foreign-currency debt stress and the loss of market access. These cases should be read as illustrations of mechanisms rather than as statistical generalizations; the limits to generalizability are discussed in the conclusion.

Given that the exact formulas for the DSF of BRI are not accessible despite our request to the MOF, this paper will scrutinize the DSF from a conceptual and theoretical perspective, rather than from an empirical basis. In the second section following the introduction, we will examine the basic features of the DSF of BRI, especially for the market access countries (MACs) and the motives of developing China's own DSF of BRI. In the third section, we will look into the kind of financing BRI provides and why the current DSF may not provide a sound framework to assess risks involved in BRI financing. Based on the analysis, we will provide suggestions to revamp the DSF of BRI in the fourth section, followed by the concluding remarks, which separate established empirical findings from the paper's theoretical expectations and discuss the limits to generalizability.

2. Debt Sustainability Assessment for BRI MACs

2.1.Incentives for China's Own DSA of BRI

China's Ministry of Finance (MOF) rolled out the DSA of BRI for low-income countries (LICs) in 2019 and subsequently, the DSA for MAC of BRI in 2023. These two DSFs are modeled, respectively, on the IMF/World Bank DSF for LICs and IMF's DSF for MACs, the latter was reviewed and renamed as Sovereign Risk and Debt Sustainability Framework (SRDSF) in 2021. The MOF explicitly acknowledges that its DSF for BRI participating countries is based on the IMF's framework as well as "conditions and development stages of BRI countries." (MOF 2023, 1) Following the IMF, MACs are defined as "countries that are able to tap international capital on a sustained basis through the contracting of loans and/or issuance of securities across a range of maturities, regardless of the currency denomination of the instruments, and at reasonable interest rates." (ibid., 1)

As mentioned in the Introduction, the main objective of developing China's own DSF is to monitor repayment risks and guide lending decisions. But it is interesting that China does not just utilize the IMF's existing framework but develop its own. The motives are four-fold. First, it is a

collective decision by China and BRI participating countries. As the MOF noted, since 2017, finance ministries of 29 countries have endorsed the Guiding Principles on Financing the Development of the Belt and Road, which call upon governments, financial institutions, enterprises and other BRI stakeholders to work together to build a long-term, stable, sustainable financing system that is well-placed to manage risks. It is certainly in the interest of China to ensure debt repayment but it is also vital for recipient countries to maintain sound debt carrying capacity so as to continue attracting BRI financing.

Second, the DSA would serve as an effective guidance to streamline BRI lending and to communicate to BRI participants regarding China's lending priorities and decisions. As the MOF (2023, 12) writes, "We encourage all participants to adhere to the principle of extensive consultation, joint contribution and shared benefits, take the DSF for MAC of BRI as a fundamental tool for financing cooperation, giving full play to the leading role of public funds as well as mobilizing long-term capital and private capital, and bring more benefits to people of all BRI countries." Given the changing BRI lending practices, e.g. shifting toward more commercial lending and involving non Chinese financial institutions, it makes sense for Chinese lenders to more openly exercise due diligence and demonstrate accountability when it comes to risk management.

Third, since its inception, BRI has been relentlessly attacked as putting countries in a "debt trap". But China is far from being the culprit for the current debt crisis in the Global South, as it accounts for only 2.2% of total outstanding external debt stocks of the LMCs as of 2023 (World Bank International Debt Statistics), nor is there any substantive evidence suggesting the existence of "debt-trap diplomacy" (Brautigam and Rithmire 2021; Jones and Hameiri 2020). To counter such a false and defamatory narrative, it is helpful for China to design and exercise rigorous debt sustainability assessment in a consistent and transparent manner.

Fourth and finally, while the IMF's DSA is used for policy advice as part of the IMF rescue package, China's BRI lending does not come with strings attached. However, China's DSA could be used for information sharing and to communicate with the BRI participants any risk-mitigation measures it may incorporate in the lending packages. In a recent interview with risk assessors of the Sinosure, the architect of the China DSA of BRI, we were told that China is skeptical of IMF's reliance on short term fiscal consolidation as its policy advice and its disregard of long-term growth potential of development financing (Interview 1). It seems that the Chinese policy makers intend to design a DSF to properly account for debt sustainability of BRI financing, attending to its unique features. However, a close scrutiny into China's DSF of BRI seems to suggest that at its current form, the DSA has not yet achieved the objective.

2.2. What is in China's DSA of BRI for MACs

Like the IMF's SRDSF, China's DSF of BRI for MACs defines debt coverage as the "future payments of interest and/or principal that are required from the general government to the creditor, including debt securities, loans and other accounts payable." And general government consists of all government units of central, state, provincial, regional, and local government, and social security funds imposed and controlled by those units as well as nonmarket, nonprofit institutions that are controlled by government units. While the MOF does not clearly define debt sustainability, it could be safely assumed that it follows the IMF's definition, which holds that "unsustainable

debt occurs when there are no politically and economically feasible policies that stabilize the debt-to-GDP ratio and deliver acceptably low rollover risk without restructuring and/or exceptional bilateral support, even in the presence of Fund financing." (IMF 2022, 6)

Modelled on the SRDSF, China's DSA also consists of near-term risk analysis (1-2 years), medium-term risk analysis (5 years) and long-term risk analysis (6-10 years). For the near-term analysis, it develops multivariate logistic regression models to produce probability of sovereign credit risk, based on 10 indicators covering four categories, including stress history, macro-economy, debt burden and buffers, as well as global conditions[2]. The medium-term analysis consists of two major tools, namely, the debt fanchart index (DFI) for solvency risk analysis, and the Gross Financing Needs (GFN) for liquidity risk analysis. The DFI in turn includes three weighted sub-indicators, namely, (1) the probability that debt does not stabilize in t+5 years; (2) debt to GDP ratio at t+5, controlling for the "government governance capacity"; and (3) the fanchart width, i.e. the distance between the 5th and 95th percentiles of the debt distribution at t+5. The GFN index also includes three weighted sub-indicators, namely, (1) 5-year Average GFN-to-GDP ratio; (2) initial bank claims on the government as a percentage of banking system assets and (3) the maximum cumulative change in bank claims on the government under stress scenarios. Both indexes are given low, medium and high risk thresholds to determine the risk levels. Finally, to account for shocks, triggered stress tests are added to perform the medium-term analysis, including (1) contingent liabilities; (2) banking crisis; (3) natural disasters; (4) commodity price shock; (5) real effective exchange rate (REER) shock; and (6) abnormal rise of financing cost.

The long-term risk analysis involves 6 to 10 years' projections of debt in comparison with debt solvency ratio, taking into account factors such as population ageing, and increase in pension and social security expenditures; impacts of changes of natural resources; measures to deal with climate change; as well as impacts of large debt amortizations on debt burden. Finally, DSA of BRI calls for user judgement for not only the probability but the severity of risk events by considering the expected loss given default (LGD) and country experts' advice[3].

Notably, country experts are called to analyze factors that are not considered in the risk assessment, "based on the specific situation of the debtor country and the actual use of the debt (such as whether it is used to increase productive assets, whether it is conducive to increasing future fiscal revenue, etc.)." (MOF 2023, 11) Specifically, MOF's document mentions giving considerations to mega projects that are economically sound and help break through infrastructural bottlenecks. This is particularly relevant when assessing BRI financing where much of it goes into infrastructure projects, however, failing to integrate the analysis into the baseline projections but adding it as user judgements fundamentally undermines the efficacy of debt sustainability analysis and creates anti-investment biases. We will turn to a systemic critique in the next section.

3. Design Flaws of the Current DSA of BRI for MACs

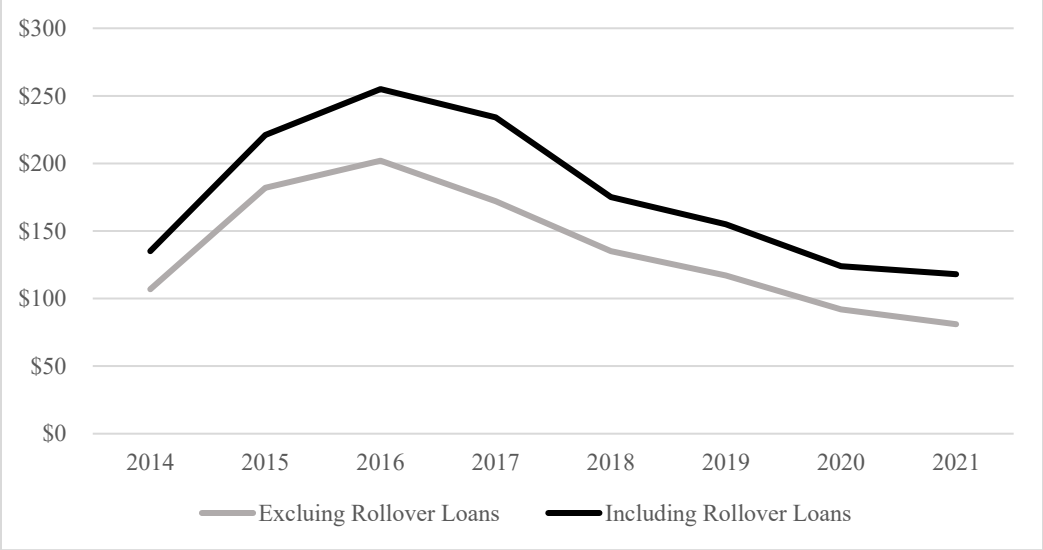
3.1. Important characteristics of BRI Financing

[2] Variables included in the four categories vary, depending on high- or middle-income countries.

[3] In the event of expected LGD being predicted to be lower than the 25% sub-point, a downward adjustment may be considered (e.g. from high to medium risk) whereas if it is predicted to be higher than 75% sub-point, then an upward adjustment may be considered.

Since the launch of BRI in 2013, China's overseas development finance (ODF) has committed $679.36 billion and supported 10,533 projects in the period of 2014-2021 (Figure 1).[4] Based on the OECD categorization, $574 billion of the ODF is "other official flows", $63 billion belongs to "official development assistance" and the remaining $43 billion is "vague" (undefined as concessionary or non-concessionary loans, aid, or others)[5]. The OECD's ODA is equivalent to China's foreign aid in its official definition, referring to grants, interest-free loans and concessional loans. While China's overseas development finance (ODF) includes not only foreign aid but non-concessional loans and export credits provided by policy banks as well as loans and credits provided by state-owned commercial banks and enterprise and guaranteed or insured by an official export credit agency. These non-foreign aid components of the ODF are equivalent to the "other official flows" and "vague" flows by the OECD standard.

Figure 1: China's Overseas Development Finance, 2014-2021



Source: AidData, accessed on May 19, 2025.

As Table 1 shows below, the majority of the ODF comes in the form of loans, accounting for 96% of the total commitment, but there are other project types, including grant, debt forgiveness, technical assistance and others. When it comes to sectors, energy is the top category, taking up close to 24% of the total committed financing, followed by industry/mining/construction with 22.4%. and transport and storage with 17.4% (Table 2).

[4] The committed amount is measured in constant 2021 US dollar and excludes 'rollover' amounts under emergency rescue lending and PBOC swap facilities. Rollover loans are those that are renewed upon maturity -- either through repayment and reissuance or a final repayment date extension.

[5] Based on the OECD definition (OECD u.d.), official development assistance (ODA) is government aid that promotes and specifically targets the economic development and welfare of developing countries. It emphasizes on concessionality and requires a grant element of at least 45% in the case of bilateral loans to the official sector of the least developed countries and other LICs, and 15% for lower-middle income countries, as well as 10% for upper-middle income countries, multilateral institutions and non-government organizations. Other official flows or OOF refers to 'official sector transactions that do not meet [ODA] criteria' and with the primarily purpose being to facilitate export (OECD u.d.).

Table 1. Commitments by Project Types

Commitments by project types	USD	Share to total (%)
Loan	$653 billion	96.2
Grant	$22 billion	3.2
Debt forgiveness	$4 billion	0.6
Vague TBD	$133 million	0.020
Technical assistance	$78 million	0.011
Scholarship/training	$22 million	0.003
Debt restructuring	$0	0.0
total	$679 billion	100

Source: AidData, accessed on May 20, 2025.

Table 2: Sectors of BRI Financing

Sector	$billion	Share of total (%)
Energy	162	23.8
Industry/mining/construction	152	22.4
Transport and storage	118	17.4
Banking/financial services	66	9.7
Other	56	8.2
General budget support	46	6.8
Other multisector	32	4.7
Communications	23	3.4
Business and other services	13	1.9
Unallocated/unspecified	12	1.8
Total	680	100

Source: AidData, accessed on May 20, 2025.

Numerous studies have demonstrated the economic benefits of BRI financing. First, BRI focuses on transportation infrastructure, energies and utilities, industrial parks, information and communication technology (ICT) and others (see Table 2). In comparison, World Bank finance largely went to the public administration for social projects pertaining to education and health. BRI finance is critical in supporting projects that unlock the infrastructural bottleneck, improve access to energies, enhance manufacturing capacity, as well as promote exports and foreign direct investment. World Bank's projections show that the BRI has the potential to bolster global trade between 1.7 and 6.2 percent, unlocking 0.7-2.9 percent of global economic growth (Ruta et al. 2019). Based on the International Consortium of Africa (ICA) (2018) data, China accounts for 16.7 percent of the cumulative infrastructure financing in Africa during 2012-2017, making it the third largest financing source after the African national governments and the ICA member donors. Drawing on AidData, Wang and Xu (2023, 15) find that Chinese companies have utilized various funds to "build and upgrade more than 10,000 km of railways, nearly 100,000 km of highways,

nearly 1000 bridges and 100 ports, and 66,000 km of power transmission and distribution. They have also helped to install 120 gigawatts (GW) of power-generating capacity, a communications backbone network of 150,000 km and a network service covering nearly 700 million user terminals." Their regression analysis also suggests that China's financing has a high probability of addressing infrastructure bottlenecks. There is a 76.1 percent probability of China financed or co-financed projects to hit one of the four hard infrastructure bottlenecks and 73.4 percent probability to hit one of the three soft infrastructure bottlenecks (ibid). In a separate study, Gallagher and Wang (2021) examine 214 hard infrastructure projects completed with Chinese development finance between 2000-2014, and find that 78 percent of projects addressed African countries' infrastructure bottlenecks for economic development. Overall, Dreher et al (2022, 216) concludes that the average Chinese development project increases a host country's economic growth rate by 0.95 percentage points two years after the funding for the project is approved. Moreover, these economic impacts materialize quickly (within 2-5 years) and they are especially strong in Africa. These studies consistently demonstrate that by and large, BRI financing enhances sustainable development, thereby generating fiscal revenues to pay back debt.

Further, while China does not systemically disclose lending terms, a study by the Center for Global Development (Morris, Parks and Gardner 2020) that examines grants and loans from China and the World Bank to 157 countries between 2000 and 2014 unveils that China's lending is sizable and with generous terms. China's average loan size was $307 million, more than doubled the World Bank's average loan size of $148 million. The weighted mean interest rate from Chinese lenders during the same period was 4.14 percent, while it was higher than the World Bank, it was much more favorable than private creditors. According to the same study, among the subsample 28 countries the weighted mean interest rate was 3.11 percent by Chinese official lenders, compared to 5.71 percent by international private lenders[6]. Moreover, loans from China had a weighted mean maturity of 16.6. years, just 1.3 years shorter than that of the World Bank, but much longer than the usual private loans. Finally, China's lending came with relatively generous terms on the grace period and concessionality. Chinese loans had a weighted mean grace period of 4.8 years, compared to the 7.7 years of the World Bank; its volume of grants accounted for 3.77 percent of the total financing, compared to the 6.42 percent of the World Bank. Finally, China has a 17.69 percent of loan concessionality rate, compared to the 35.73 percent of the World Bank; and a 21.46 percent of portfolio concessionality, compared to the World Bank's 42.15 percent. The favorable lending terms help ease the debt burden of the borrower countries.

Second, BRI financiers, including Chinese policy bankers like the China Development Bank and China Export-Import Bank, state-owned commercial banks and state-owned enterprises, among others, work with multilateral development banks (MDBs) and recipient countries' financial institutions to pool together financial resources and to diversify risks. Research reveals that borrowing countries often find borrowing from China and from Bretton Woods institutions complementary, BRI thus augments the total credit provisioning. Further, BRI financing produces an emulative effect. For example, Zeitz (2021) finds that World Bank allocates a greater share of

[6] These 28 countries include Angola, Bangladesh, Cambodia, Cameroon, Republic of the Congo, Costa Rica, Dominica, Ethiopia, Gabon, Ghana, Guyana, Kyrgyz Republic, Mauritania, Moldova, Mongolia, Montenegro, Nepal, Niger, Nigeria, Papua New Guinea, the Philippines, Samoa, Serbia, Sri Lanka, Tonga, Uganda, Uzbekistan, and Zambia.

finance to infrastructure in African countries that receive more Chinese development finance[7]. China's ODF also crowds in private equity and debt finance (Gallagher et al 2023). Finally, concerns about losing out in the competition with China for global influences prompt the US and European countries to launch their own infrastructure investment projects, such as the US's Build Back Better, the EU's Global Gateway initiative, and the G7's Partnership for Global Infrastructure and Investment. While these initiatives have yet to produce any material impacts, the potential of having alternatives and an infrastructure "race" could still benefit the developing South.

Third, China's ODF provides liquidity to diversify and deepen the global financial safety net (GFSN). China's central bank, People's Bank of China (PBOC) has established swap lines with over 40 countries, with $381.6 billion lending capacity as of 2023 (Global Financial Safety Net Tracker). In addition, China's participation in regional contingent reserves arrangement, such as the Chiang Mai Initiative Multilateralization (CMIM) and the BRICS Contingent Reserve Arrangement (CRA), add another $340 billion of liquidity to the GFSN (Kring and Gallagher 2019; Mühlich et al. 2023). These liquidity provisions constitute a helpful cushion against financial exigencies. 22 countries, inducing Argentina, Pakistan, Mongolia, Egypt and others, drew on the PBOC swap lines for emergency liquidity support between 2000 and 2021 (Horn et al 2023). These swap lines provided over $170 billion in financial rescue assistance, primarily to countries facing macroeconomic or financial distress.

With the understanding of the unique features of BRI financing, including its developmental impacts, the terms and formats of financing, and liquidity facilities, we will turn to an assessment of the DSF of BRI.

3.2. Limitations and Pitfalls of the DSA of BRI

3.2.1. Critiques of the IMF/World Bank DSF

The IMF/World Bank DSF has long received much criticism. Critics point out several design flaws of the framework. Four critiques are particularly worth noting. First, DSA relies on growth projections but these projections are plagued with low precision and yet, they are used for high-stake decisions. Xiong et al (2019) argue that on average, the IMF underestimated the economic growth of member countries from 2003 to 2007 and in 2010, while it overestimated growth in 2008 and from 2011 to 2015. Cömert et al (2024) contend that the IMF persistently forecasts overoptimistic growth, which paves the way for tighter fiscal policies.

Second, the IMF DSF does not differentiate sources of debt and the impacts of different creditors. As Raga (2024) points out, the disproportionate optimism in LICs reflects the IMF's lack of attention to LICs' growing commercial sources of debt. Differentiating sources of credit would be useful to provide direct references or suggestions for how creditors should achieve responsible lending or how to coordinate lending multilaterally. Further, there is a lack of analysis of debt utilization, that is, the contribution of debt to economic growth and varying effects on economic

[7] In addition, the alternative of China financing pressures the World Bank and IMF to reduce their conditionalities and give more policy autonomy to borrowing countries. Hernandez (2017) found that countries who are recipients of loans from China had 15 percent fewer conditions for every percentage-point increase in Chinese development finance.

structure (Xiong et al 2019). Lin and Wang (2017) have long argued that the IMF DSA has an anti-investment bias as there is no distinction between debt used to finance investment or consumption. Similarly, Gupta (2021) finds that fiscal multipliers were only explicitly mentioned in 15 percent of the IMF programme documents. Based on nine case studies, Raga (2024, 13) shows that only 6 out of 32 DSAs between 2018/9 and 2023 included discussions on the size of fiscal multipliers and their inclusion in baseline projections; and only in three cases where the size of fiscal multipliers was explicitly reported in the baseline projections. The neglect of fiscal multiplier in the baseline projects and the downplay of productivity effects of public investment significantly undermine the efficacy of the IMF's DSA, and lead to counterproductive, anti-public investment policy advice.

Third, while the IMF DSF accounts for climate shocks, it tends to underestimate the impacts of large shocks (including but not limited to climate shocks) and the scarring effects on the long-term evolution of debt burden (Raga 2024). Based on case studies of Colombia and Peru, Maldonado and Gallagher (2022) demonstrate that climate shocks could significantly alter the countries' public debt trajectory, pushing higher the debt converge level and in some cases, increasing the probability of a stress event.

Finally, the IMF/World Bank LICs-DSF increasingly takes into account climate change risk to assess public debt sustainability, but it still grotesquely ignores countries' need to invest in climate and development to meet Paris Agreement and Sustainable Development Goals (SDGs)[8]. Zucker-Marques, Gallagher and Volz (2023) finds that if such investment and spending needs are taken into account, an estimated 47 emerging and developing economies (EMDEs) would surpass the external debt solvency threshold in the next five years, and another 19 EMDEs would lack liquidity and fiscal space for climate and development investment without credit enhancement or liquidity support.

The four critiques above are drawn from the existing literature and are summarized here as the foundation of the analysis. What is specific to this paper is their application to China's DSF, whose guidance (MOF 2023) mirrors the IMF's design but also acknowledges some of these issues, for example by asking country experts to consider whether debt is used to build productive assets. In what follows, we will examine, for each limitation, how far the Chinese framework addresses it, and why the characteristics of BRI financing reviewed above make the omission more consequential.

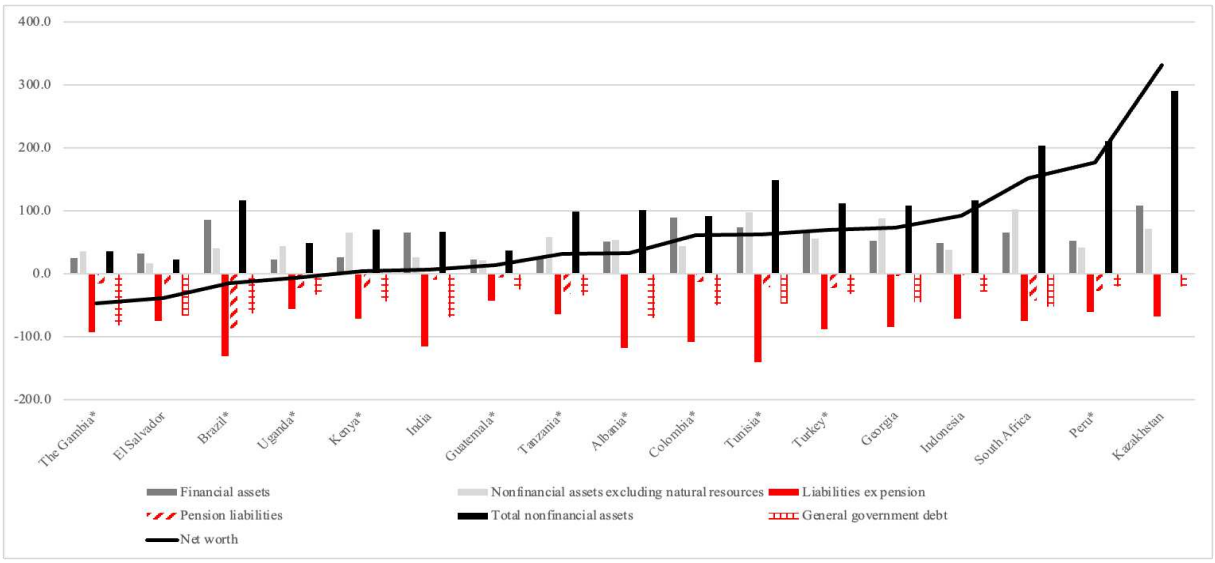
3.2.2. DSA of BRI: The Need to Account for the Asset Side of the Public Sector Balance Sheet

[8] According to the Independent Evaluation Group (IEG) (2023), the IMF/World Bank DSF for LICs has been paying increasing attention to climate risks. It finds that about 60 percent of all DSAs discuss climate change or natural disasters. For Small Island Developing States (SIDS) that are particularly vulnerable to climate shocks, climate change considerations were incorporated in 13 of 18 baseline projections and in 15 of 18 tailored stress tests. Still, while climate change was discussed in four of nine case study countries, it was incorporated only in long-term growth assumptions for two countries. IEG recommends that the Country Climate and Development Report be "adequately and systematically" integrated into DSAs, and extend the forecast horizon for DSAs to 20 years to include more forward-looking assessments of vulnerability to climate change for both the medium and long term.

Based on the IMF DSF, China's DSA of BRI makes certain methodological improvements (e.g. the use of machine learning to improve forecasting), but it still shares some of the same limitations and pitfalls as outlined above. The DSA of BRI for MACs still place almost exclusive emphasis on the liability side of the balance sheet, that is, the level of debt and debt services, in relation to GDP, fiscal and export revenues; while ignoring the asset side of the balance sheet. As discussed above, much of the BRI lending supports specific infrastructure and industrial projects and leads to the formation of public assets, such as roads, ports and industrial parks, just to mention a few. And these public assets help improve repayment capacities in three ways.

First, by operating these public assets, the government directly derives revenues. According to the IMF (Gasper, Harris and Tieman 2018), based on 31 countries where data are available, the total value of public assets amounts to more than 2 times their GDP, and these assets generate additional government revenues by at least 3% of GDP annually. An update of the study shows that total public sector assets in the 38 countries covered (representing 63% of global GDP) are worth $103 trillion, or 216% of GDP. After deducting the total liabilities of $93 trillion, their net worth comes to $10 trillion or 21% of GDP for this group of countries (Harris and Senhadji 2019). It is also estimated that the total value of public assets in Africa is over $5.2 trillion (Wang and Xu 2022); these public assets have the potential of generating an additional $80 billion in revenue every year (or 3 percent of GDP annually), more than most countries collect in corporate taxes. Based on the IMF data (2018), while countries like Kenya have a high level of general government debt at 44% of GDP as of 2013, after counting for its public assets, its public net worth was 4.6% of GDP. Another salient example is Kazakhstan, its general government debt was 19.7% of GDP, but its net worth amounted to 331.7% of GDP as of 2016. The public asset helped cushion external shocks when Kazakhstan faced a halving of oil prices and a slump in external demand in 2014. The government responded by using part of its financial assets in the National Fund to ease the downturn (Gaspar, Harris and Tieman 2018). Figure 2 below shows a selective sample of EMDEs that have built up public assets to offset public debt. Figure 3 provides an update for a small sample of countries selected on data availability (and not necessarily representative of all BRI borrowers), which again demonstrates the large amount of net worth EMDEs have built up. Failing to account for the large amount of public assets leads to an underestimation of the governments' revenues from owning and operating these assets.

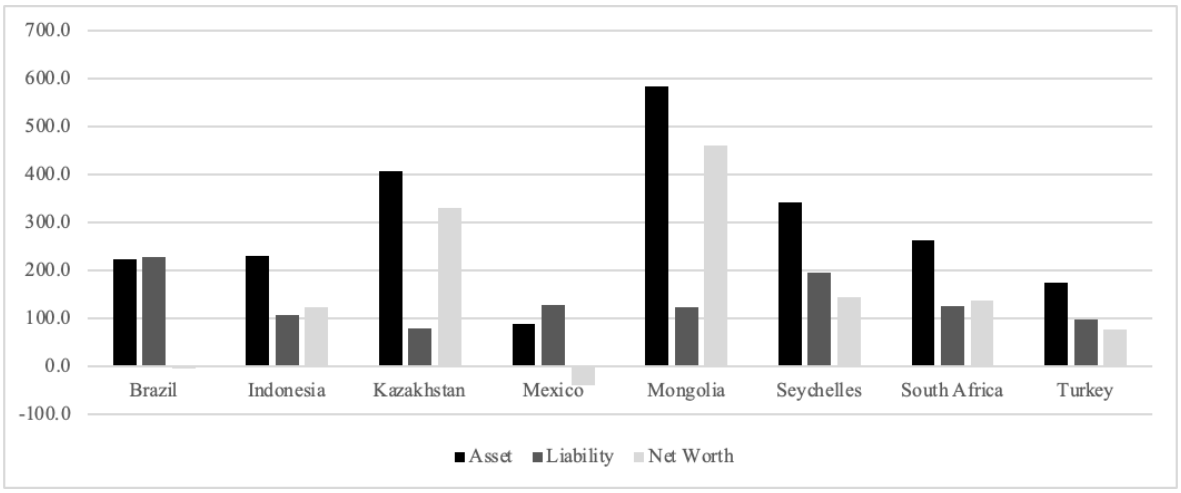
Figure 2: Public Sector Balance Sheet of Selective Countries (Percent of GDP)



Note: *Based on a single year of data, in most cases compiled as part of the Fiscal Transparency Evaluation: Brazil, 2014; Colombia, 2016; The Gambia, 2016; Guatemala, 2014; Kenya, 2013; Peru, 2013; Portugal, 2012; Tanzania, 2014; Tunisia, 2013; Turkey, 2013; Uganda, 2015.

Source: IMF 2018.

Figure 3: Asset, Liability and Net Worth of the Public Sector, Selected Countries, 2020



Source: IMF (2024), accessed on May 24 2025.

Second, public net worth affects government borrowing costs and hence debt services. Using government balance sheet data for a panel of 10 OECD countries from 1990 to 2014 and for the United States from 1870 to 2010, Peppel-Srebrny (2023) finds that the central country-specific fiscal factor driving bond yields appears to be government net worth. The regression results imply that an increase in government debt that is accompanied by a commensurate increase in government asset accumulation should leave bond yields unaffected. Further, such assets could be either financial or non-financial, even though the latter may imply a higher liquidity risk.

Third, public assets can be used as collateral to expand borrowing capacity. As Gallagher and Wang (2020) propose, if countries run into liquidity problems, they could use the equity share of a public asset as collateral to obtain refinancing, that is, the asset-based refinancing approach. While China and borrower countries may have some reservations about this approach, as China risks the "asset-seizing" accusations and borrower countries lose part of the asset ownership, an alternative could be using the potential or future revenues of the asset as collateral, similar to China's energy or resources-backed loans. This approach takes advantage of the non-synchronized debt service and revenue generation timeline, as debt service typically occurs before certain infrastructure or projects start generating sufficient revenues, so using discounted future revenues as collateral to refinance and meet debt obligations help to bridge the cash flow gap.

The failure to incorporate public assets and net worth in the DSA is partly due to the misconceptions of what affects debt sustainability but also partly to the difficulty of evaluating public commercial assets, which include not just financial assets but many others, such as real estate and operational assets (roads, bridges, and buildings) and, in some countries, financial institutions (public banks) and other corporate assets (state-owned or state-holding companies), not to mention, natural resource reserve. Therefore, it is imperative for the IMF, World Bank, other MDBs, and governments to systematically collect the data and evaluate the value of public assets using comparable standards. Further, some assets are more liquid than others. This should not only be taken into account when assessing solvency versus liquidity risks but measures should be taken to mobilize finance with even illiquid assets.

In fact, China's lending institutions are well aware of the importance of mobilizing and repurposing assets to enhance debt sustainability. During an interview with staff from the Sinosure (Interview 2), they emphasized that China's approach to debt sustainability is not to reduce borrowing and debt indiscriminately; rather, it is about repurposing, remobilizing and re-invigorating assets ("盘活") to improve the productive use and management of assets and to enhance repayment capacity. An example is after the construction of an electricity generating power station, complementary infrastructure, such as power transmission upgrade, could help improve the revenue-generating capacity of the power station. Aligning debt with the construction of productive assets yields a more accurate assessment of debt sustainability, and suggests more efficacious ways to improve repayment capacity.

3.2.3. DSA of BRI: The Need to Account for Growth Impacts of Public Investment

While the DSA of BRI acknowledges the growth-enhancing role of public investment and considers the "pulling effect" of public investment by incorporating the "output elasticity", it only considers the relationship between public investment and GDP growth, as well as the relationship between fiscal adjustment and GDP growth as part of the realism tools. In other words, this only checks whether fiscal adjustments are aligned with possible debt, debt services and growth paths, based on a *predetermined* fiscal multiplier in the baseline projections. Notably, the output elasticity is estimated based on historical data. Such a static approach gravely underestimates the output elasticity resulting from BRI financed public investment projects, many of which alter and update economic structure and change the growth trajectory. The MOF (2023, 4) recognizes the caveat, and states that "When a new public investment project is implemented, if the economic growth

calculated using the historical empirical output elasticity is inconsistent with the actual economic growth, possible explanations or adjustment of macroeconomic projections should be considered."[9] Still, such consideration is ex post, after actual growth deviates from projected growth and fails to provide any ex-ante assessment of debt sustainability by failing to capture the dynamic role of public investment in enhancing growth. Government finance can enable long-term investment in infrastructure and technology, public spending could finance counter-cyclical measures in times of shocks, and government debt securities help deepen financial development by providing less risky financial instruments and facilitating price discovery of private financial assets.

Within public spending, investment has larger growth effects than consumption, especially over the medium and long term (Alichi et al. 2019; Izquierdo et al 2019; Furceri and Li 2017). This is particularly pertinent to the BRI financing, which is mostly utilized for investment rather than supporting government consumption or public services. Using a large sample of 129 countries over 1980–2019, Adarov, Clements and Jalles (2024) find that public investment can significantly boost economic growth: the scaling up of public investment equivalent to 1 percent of GDP leads to an increase in output of 1.1 percent after five years in EMDEs, on average. Their findings also suggest that public investment can crowd in private investment, as well as boost productivity and potential output. In EMDEs, the scaling up of public investment by 1 percent of GDP leads to an increase in private investment by up to 2.2 percent over five years, on average. Finally, in a subset of EMDEs with available data, a 1 percent of GDP increase in public investment can increase labor productivity by 1.9 percent and total factor productivity by 0.8 percent over five years. As mentioned above, the DSA of BRI utilizes past data to estimate the fiscal multiplier of public spending. But this method is rendered ineffective due to two reasons. First, without differentiating public spending for investment or consumption, the estimated multiplier could either over- or under-estimate the size of the multiplier effect. And second, given many of the BRI infrastructure projects are done in countries with low initial capital stock, these projects relieve bottlenecks in the economy and could significantly boost productivity growth. For example, Kenya's Mombasa–Nairobi Standard Gauge Railway is estimated to boost GDP growth rate by 1.5% per year from 2017 to 2020 (Mboya-Kwanya 2022). Similarly, the China-Pakistan Economic Corridor, the China-Laos Railway, and the Sihanoukville International Airport and Phnom Penh-Sihanoukville Expressway in Cambodia all play a transformative role in boosting economic growth in the recipient countries. Assuming pre-determined fiscal multipliers would not adequately account for the growth-enhancing impacts of such public investment. Furthermore, public investment also generates social benefits and regional spillover effects. These indirect effects are difficult to estimate and quantify, and yet, they make long-term positive contributions to growth. The UNESCAP proposes an augmented DSA approach and argues that public debt is found to decline over the long term when the socio-economic benefits of public investment are incorporated into the analysis (Sirimaneetham 2023) [10].

[9] The MOF does not provide the actual range of the fiscal multipliers it uses in the DSA. The IMF (2022) considers three sizes of the FM, .5, 1 and 1.5. In addition, public investment is considered in the long-term assessment with a focus on the investment needs for climate change adaptation and mitigation. However, such risk assessment is not part of the realism check but included in judgement.

[10] The augmented public debt sustainability analysis includes four additional key components, namely, additional spending to achieve sustainable development goals, structural development policies, national sustainable development goals financing strategies, and stress tests and contingent liabilities (such as government bailouts for major commercial

Corollary, underestimating the fiscal multiplier of fiscal spending would lead to an underestimation of the negative economic impacts resulting from fiscal consolidation (Ismail, Perrelli and Yang 2020). As much as 80 percent of loans from China to Africa have been for infrastructure projects. As the IMF's DSA and proposed fiscal consolidation does not distinguish debt incurred for investment from that for consumption (salaries and pensions), it thus has an anti-investment bias (Lin and Wang 2017, 66-67).

3.2.4. DSF of BRI: the Need to Distinguish Local Currency and Foreign Currency Denominated Debt

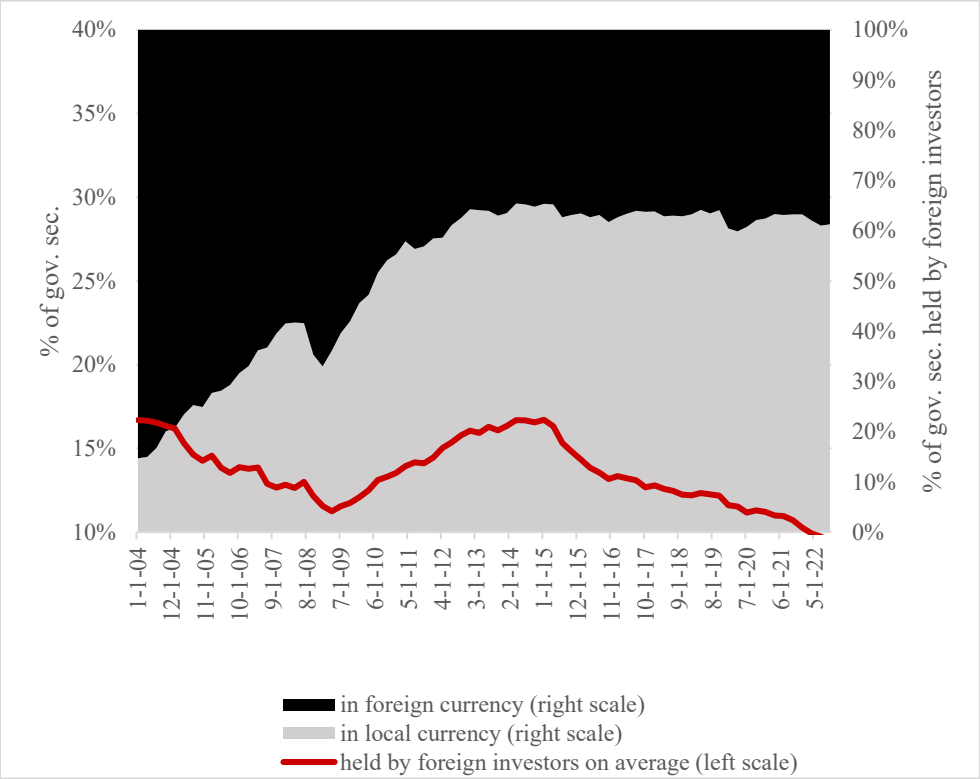
Unlike the DSF-LICs, the IMF's DSF-MACs does not differentiate public debt and external debt. What underpin the framework is the (mis)conception that external borrowing is an extension of and substitute for domestic debt, as encapsulated in the "twin deficit" theory. But conflating the two types of debt could engender misleading assessment for debt sustainability for three reasons. First, the assumption that countries could always count on market access to borrow foreign exchanges is questionable. The recent global financial uncertainty and market volatility has shown that countries' market access is fluid - some countries could expose themselves too much to commercial lending and bear untenable risks; while others may be cut off access to international markets due to sudden changes in domestic or international conditions. Second, repaying foreign currency debt depends ultimately on a country's ability to generate foreign exchange revenues through trade, overseas employment and investment. So even if foreign currency debt is productive and increases GDP growth, it could still heighten debt sustainability risk if foreign sector's earning capacity does not increase commensurately. Third and finally, measures taken to address fiscal imbalances and public debt may not help reduce the need to borrow externally in foreign currency. As Comert et al (2023) argues, the IMF's framework does not pay enough attention to the underlying reasons for accumulating external debt in EMDEs and fails to account for the asymmetric international financial architecture.

It is often argued that because EMDEs have limited domestic savings and investor base, their governments must look outward to borrow. But that does not explain why countries also borrow in foreign exchanges. The "original sin" thesis contends that the domestic currency cannot be used to borrow abroad or to borrow long term even domestically (Eichengreen and Hausmann 1999). When it comes to international trade, EMDEs often can't pay local currency for their imports (as exporters demand "hard" currencies) and when they sell sovereign bonds, local currency denominated bonds often have limited demand at reasonable prices. Although in the past two decades, the share of local currency bond issuance by EMDE governments increased steadily, foreign currency denominated government securities still account for slightly over half of the total. Also, over a quarter of government securities were held by foreign investors (see Figure 4 below). These lend support to the so-called "original sin, redux" argument (Hofmann et al 2022), which posits that even if EMDEs are increasingly able to issue local currency debt, it does not completely shield them from the risks of capital account volatility and exchange rate fluctuations, which undermine their capacity to repay foreign currency denominated debt. As Figure 5 suggests, the ability to issue local currency bonds varies greatly from country to country. While countries like

banks, loss-making State-owned enterprises, or large-scale investment projects under a public-private partnership modality).

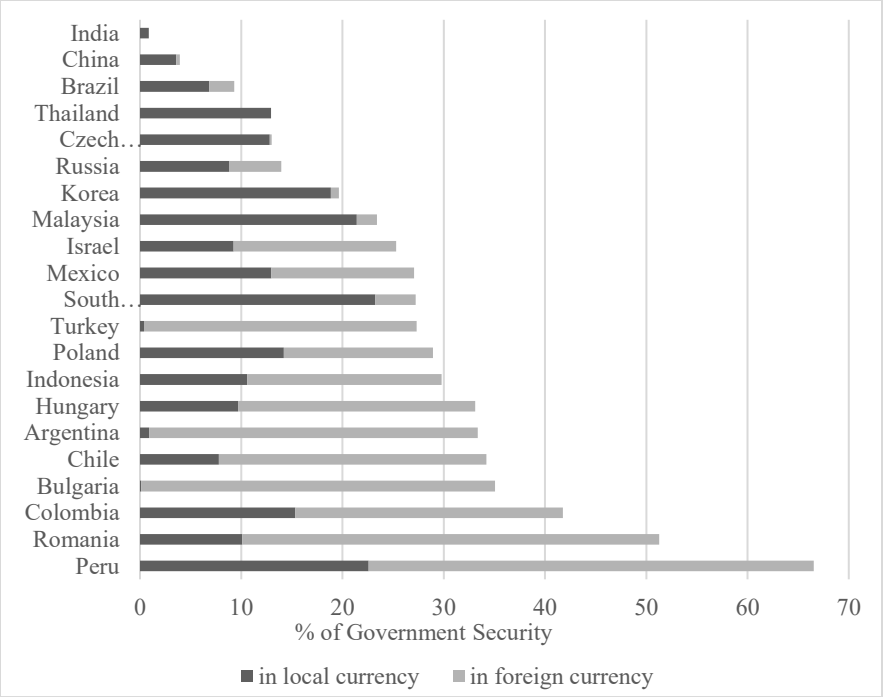
India, Brazil, China, Thailand, and Russia were able to borrow externally by mostly issuing local currency debt, others such as Turkey, Argentina, Ukraine, Uruguay and Peru still rely on the issuance of foreign currency denominated government securities. Further, looking beyond the bond market, foreign currency debt accounts for over 80% of the gross external debt of EMDEs (see Figure 6).

Figure 4. EME government securities held by foreign investors and currency breakdown



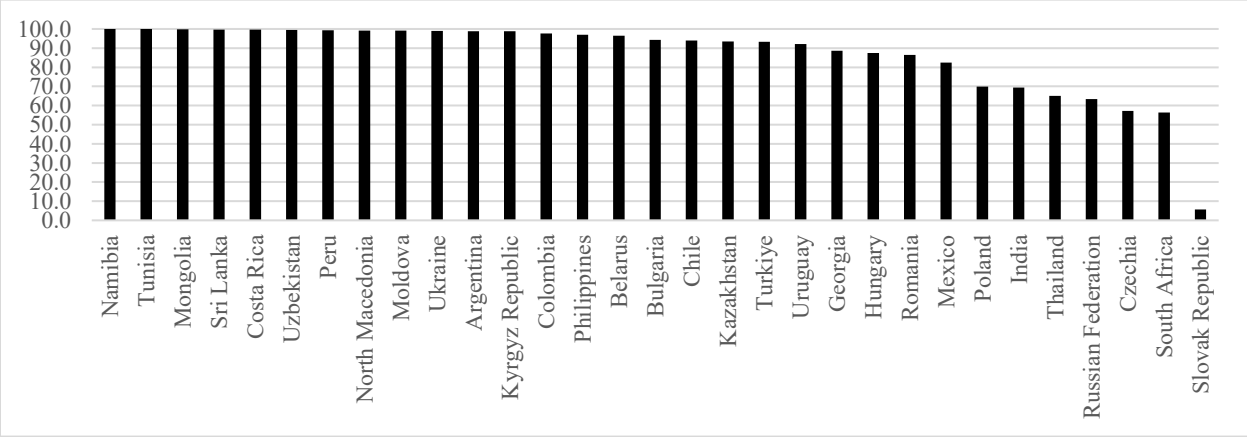
Note: EMEs include: Argentina, Brazil, Bulgaria, Chile, China, Chinese Taipei, Colombia, Czech Republic, Hungary, India, Indonesia, Israel, Korea, Malaysia, Mexico, Peru, Poland, Romania, Russia, South Africa, Thailand, Turkey.
Source: BIS, IMF, ECB via Onen et al (2023).

Figure 5. EMDE government securities held by foreign investors (% of total), end 2022



Source: BIS, IMF, ECB via Onen et al (2023).

Figure 6: Share of Foreign Currency Debt to Gross External Debt, Selective Emerging and Development Economies, Q4 2024

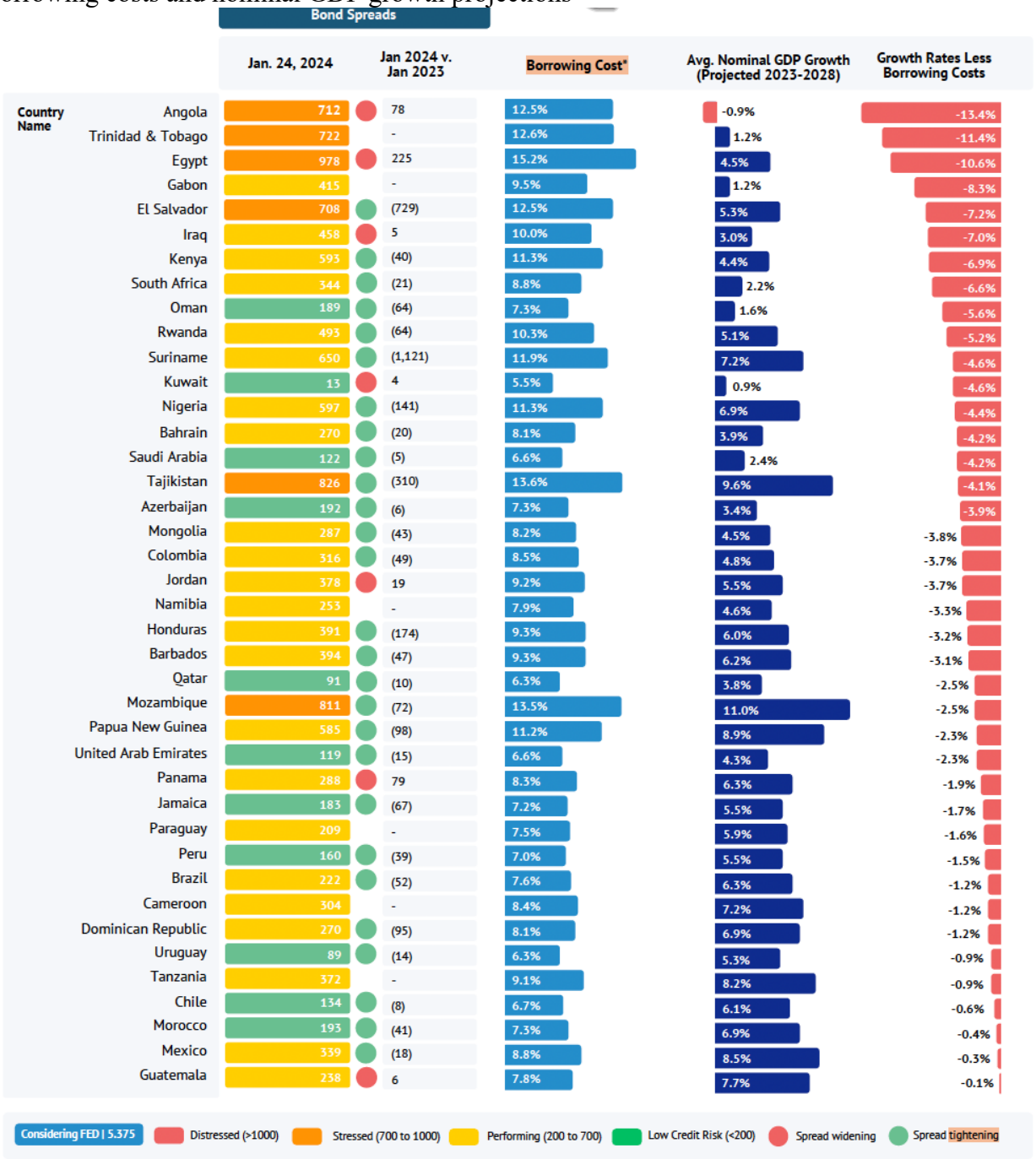


Source: World Bank, Quarterly External Debt Statistics (2025).

DSA for MACs does not separate the two different types of currency denominated debt, based on the presumption that if a country has the market access, it could always sell foreign currency denominated sovereign bonds and raise foreign exchanges. But this presumption does not always hold. In recent years, a record number of MACs were cut off from access to international bond markets, as their bond spreads were above 1,000 basis points. For example, 24 MACs breached the threshold in 2022, and in 2024, despite improvement in financial conditions, 17 countries were still well above threshold, with countries like Lebanon having a bond spread of 54,882 basis points as of January 2024 and Ethiopia with 5,156 basis points. Furthermore, even countries have the

market access, they also sell bonds at a hefty interest rate, exceeding the economic growth rate (see Figure 7 below). This borrowing path is hardly sustainable.

Figure 7: Selected countries—Sovereign bond spreads (change between Jan 2023-Jan 2024), borrowing costs and nominal GDP growth projections



Note: Comparison of financial spreads from January 24, 2024, to January 24, 2023. Positive values (signed in red) account for increase in spreads, while negative values (signed in green), represent reduced spreads. Borrowing costs for individual countries factor their respective spreads in addition to the Federal Reserve's average rate of 5.375 percent. This average rate is derived from

the current Federal Reserve target range of 5.25 percent to 5.50 percent. FED rates are a reference for the cost of risk-free assets, which are the parameter for investment decisions regarding different maturities and assets.
Source: Zucker-Marques, Gallagher and Volz (2024).

Second, external debt denominated in foreign currency could subject borrower countries to additional risks due to currency mismatch, procyclical capital flows and exchange rate fluctuations. Based on a panel of 41 emerging economies over the years 1999–2019 based on quarterly data, Fisera, Tiruneh and Hojdan (2021) found that domestic currency depreciation leads to an increase in the external debt to GDP ratio over the long-term. The recent episode of EMDE currency depreciation also shows its perverse effect on foreign currency debt. Countries that participated in the G20 Debt Service Suspension Initiative (DSSI) saw their currency value depreciate by 22.5% on average against the US dollar from end 2019 to end 2022. Due to the depreciation, every dollar of debt suspended has in practice turned into $1.225 of debt in local currency terms. Ethiopia received $800 million payment holiday and yet its effective debt burden increased by 35% over 2020-2022 due to the Ethiopian birr depreciation and Zambia got $700 million debt service expansion but its debt rose by $1.7 billion due to the kwacha depreciation (Brouwer 2023).

Ultimately, for the external debt ratio to be stable, it requires that current account surplus (trade surplus, current transfers and net income receipts) be sufficient to cover the difference between net capital inflows and interest payments on external debt. The surplus needed increases with external debt ratio and interest rate on external debt. Therefore, if foreign currency debt does not help the country's capacity to earn foreign exchanges, risks of debt unsustainability would rise. That is to say, if foreign currency debt is not poised to directly or indirectly increase foreign currency revenues, then currency mismatch and exchange rate depreciation are likely to increase risks of debt sustainability. It is thus imperative to consider if there is a need to borrow foreign exchanges and if so, how foreign exchanges should be used. This means to manage external debt, considerations must be given to the underlying causes of indebtedness.

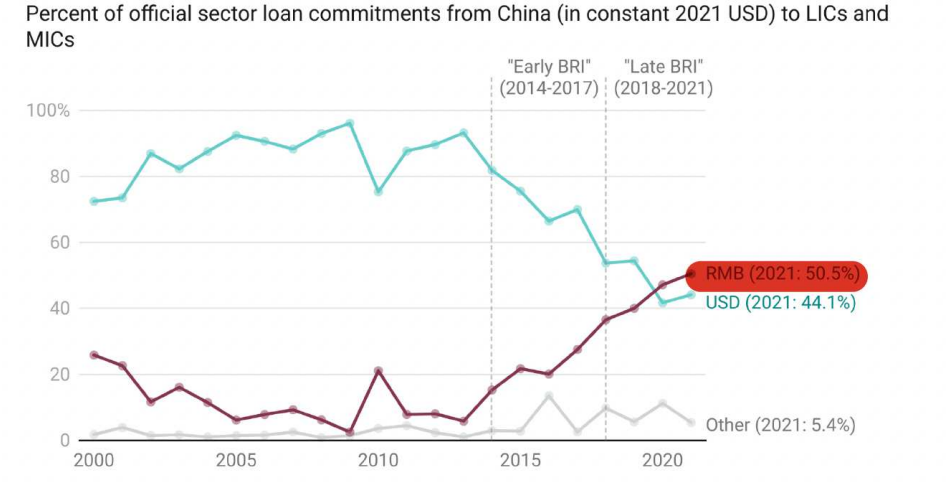
Third, EMDEs often borrow foreign exchanges not simply to augment fiscal revenues; rather, the needs include to finance imports, to replenish foreign exchange reserves, to meet debt obligations, and so on. Raising fiscal revenues or reducing government spending may not help reduce the need to borrow foreign exchanges. Coronally, a fiscal retrenchment designed to raise the primary budget surplus does not automatically increase foreign exchange earnings. Worse still, it could reduce public investment and slow down economic activities, worsening earning capacity and hence external debt sustainability (Chandrasekhar 2024).

All these have significant implications for DSA of BRI for MACs. On the positive side, BRI financed-projects often help improve physical and digital connectivity and industrial capacity, which boost trade. A World Bank survey of 70 BRI projects (2018) projected that once concluded, these BRI projects could increase trade by 2.7-9.7%. Another study finds that due to BRI, exports by African countries could increase by an additional 1.2 percentage points from 2015 to 2030, compared to the baseline. Notably, it is not only the volume of trade that would increase, but the structure of trade is likely to improve. The largest increase in trade for Africa is to be seen in electronics, machinery and equipment and transport equipment (Maliszewska and van der Mensbrugghe 2019). The upgrade of trade structure and the improvements on value-added are a

significant benefit to the recipient countries, not only enhancing their repayment capacity but facilitating industrial transformation.

Another point worth noting with regard to BRI is the changes in the currency composition of BRI financing. The RMB share of BRI lending has been rising over time. This, coupled with the increasing access of recipient countries to the Chinese central bank's swap lines, seems to suggest that China is internalizing risk control. Based on the AidData, Parks et al (2023) estimated that in the early stage of BRI, dollar share of China's official lending was between 60-80%, but over time, dollar share has consistently declined to 44.1% as of 2021. Meanwhile, yuan share of the official lending has steadily increased from less than 20% in 2015 to 50.5% in 2021 (see Figure 8 below). As mentioned earlier, PBOC has established swap lines with more than 40 central banks since 2008 (Horn et al 2023) with a $381.6 billion lending capacity as of 2023 (Global Financial Safety Net Tracker), the switch from dollar lending to RMB lending means that debtor countries could have a readier access to liquidity backstop in time of needs. DSA of BRI should take into account the currency composition of debt and the safety net arrangements recipient countries avail.

Figure 8: Currency Composition of China's Official Lending



Notes: The "Other" category includes all other currencies of denomination, including EUR, GBP, and local currencies in low-income and middle-income countries.

Source: Parks et al (2023)

On the other hand, having market access doesn't ensure a higher level of debt payment capacity. A MAC with strong domestic growth might handle high home currency denominated debt but buckle under external debt if exports falter or reserves dwindle. A recent case in point is Sri Lanka's macro-linked eurobond program under the IMF bond structuring program. The IMF determines bond value and coupon rates on projected dollar value of GDP, downplaying the risks of rigid import needs, small export base and ultra-thin foreign exchange reserves. It risks overestimating Sri Lanka's repayment capacity for foreign currency debt. While the DSA of BRI for MACs includes currency composition of debt, creditor structure and stress test involving exchange depreciation, it should be noted that the share of external debt and external debt in foreign currency could *endogenously* induce more exchange rate volatility, increasing the probability of debt distress due to exchange rate depreciation. In addition, one-time REER shock does not adequately account for an extended period of currency depreciation.

All in all, currency composition of public debt has a significant bearing on debt sustainability. Mixing domestic currency debt and foreign currency debt, and conflating public debt and external debt could lead to a misunderstanding of the driving factors of indebtedness, the repayment capacity, and measures that can be deployed to enhance repayment capacity. Given the evolving currency composition of the BRI lending, it would make sense to separate domestic currency public debt from foreign currency debt to better gauge debt risks and measures to enhance debt sustainability.

4. Proposals for Revamping the DSA of BRI for MACs

The analysis above highlights three major flaws of the DSA of BRI for MACs, namely, the negligence of asset side of the public balance sheet and the implications for debt-carrying capacity; the inability to account for fiscal multiplier due to the transformative public investment enabled by BRI financing; and the conflation of domestic currency debt and foreign currency debt when the causes of debt and measures to manage debt are very different. With these in mind, we will propose to revamp the DSA of BRI for MACs as follows.

First, rather than using indicators such as debt to GDP ratio or debt service to revenues ratios, DSA of BRI should use net worth or net debt to GDP ratio as a key indicator of debt sustainability. Net worth would be measured as the sum of financial and non-financial public assets less total liabilities, rather than only financial assets by the current IMF standard. The perimeter should be extended to public corporations where data allow. For BRI-financed assets, three types of data are required: (i) project-level records linking each loan to the asset it finances, which can be assembled from lender records and AidData's project-level database; (ii) the asset's cost, completion date and operating status; and (iii) revenue and operating-cost data from the owning agency or state-owned enterprise. Where market valuations are unavailable, assets could be valued at depreciated historical cost as a conservative floor, and revenue-generating assets (such as power plants, ports and toll roads) at the discounted value of expected net revenues, with haircuts for illiquid or non-revenue-generating assets so that the indicator does not overstate repayment capacity.

The new indicator would complement rather than replace existing ones: gross debt-to-GDP and debt service-to-revenue ratios would continue to be reported, and net worth, together with a liquidity-adjusted version counting only financial and readily marketable assets, would be added as an additional sub-indicator to the medium-term solvency (DFI) and liquidity (GFN) assessments, so that assessors can see how the assessment changes once assets are counted. Further, to account for the long-term impacts of public asset formation, the DSA long-term analysis should extend from the current 10 years to 20 years to fully account for the lifecycle of assets. This is consistent with the IEG (2023) recommendation to extend DSA forecast horizons.

Second, DSA of BRI should dynamically calibrate the fiscal multiplier in the baseline projections as countries receive BRI financing and carry out public investment. As the bulk of BRI financing goes into public investment and much of the investment unlocks growth potential, it is important to project the multiplier effect and spillover effect, rather than relying on past data and estimation. The multiplier could be calibrated in three steps. First, BRI-financed investment in each borrower's pipeline would be separated from other public spending, using disbursement and completion schedules, and entered in the baseline as public investment rather than as aggregate spending.

Second, the multiplier applied to that investment would be conditioned on relevant characteristics established in the literature, including the initial capital stock, fiscal space, the efficiency of investment and the position in the business cycle (Adarov, Clements and Jalles 2024), rather than estimated from the country's historical average. Third, the assessment would report a range rather than a point estimate: a central case (for example, the average EMDE estimate of Adarov et al., in which an increase in public investment of 1 percent of GDP raises output by 1.1 percent after five years, as mentioned above) and a low case in which projects are delayed or less productive, so that the baseline does not rest on optimistic assumptions. The data needed are project disbursement schedules, national accounts, estimates of the public capital stock and project appraisals. This complements the existing realism tools by making the multiplier an explicit *ex ante* baseline assumption that can be stress tested rather than corrected *ex post*.

Third, DSA of BRI for MACs should separate domestic currency denominated debt from foreign currency denominated debt and construct separate indicators to account for the two different types of debt. Foreign currency debt is not a simple extension of domestic currency debt but necessitated by the need to pay for imports, external debt and other obligations. The ability to generate fiscal revenues to meet domestic currency debt commitment should be evaluated separately from that to generate foreign exchange revenues. Closer monitoring of exchange rate and capital account dynamics is important for evaluating external debt sustainability.

Two indicators are proposed: net foreign-currency public debt to GDP, defined as foreign-currency public and publicly guaranteed external debt less foreign-currency reserves and other liquid foreign-currency government assets; and foreign-currency debt service to foreign-exchange earnings, where earnings comprise exports of goods and services, remittances and other net current receipts. The data come from the World Bank's Quarterly External Debt Statistics and International Debt Statistics for the currency composition of external debt, from central bank data for reserves, and from lender records for the currency of BRI loans (RMB or US dollar; Parks et al 2023). Central bank swap lines (Global Financial Safety Net Tracker) would be recorded as a separate contingent liquidity backstop rather than counted as reserves, because access depends on the terms of each arrangement. Domestic-currency debt would continue to be assessed with fiscal indicators (debt-to-GDP and debt service-to-revenue). The existing one-time REER shock would be supplemented by a persistent depreciation path, as a conservative measure, since prolonged depreciation raises the local-currency burden of foreign-currency debt (Fisera, Tiruneh and Hojdan 2021). These indicators would sit alongside the GFN analysis and would let assessors see whether foreign-currency repayment capacity keeps pace with growth.

Finally, a comprehensive and accurate assessment of debt sustainability should take into account the need for EMDEs to take on debt for development and climate financing. In this regard, the DSA of BRI should emulate the United Nations' Sustainable Development Finance Assessment or the augmented debt sustainability analysis.

Taken together, the new indicators would extend the existing dashboard rather than replace it. Data availability will vary across borrowers; where public balance sheet or currency composition data are incomplete, assessors could begin with the asset registry for BRI-financed projects and with proxy measures, and flag the resulting uncertainty explicitly.

5. Conclusion

As the BRI entered the second 10 years, it is evident that risk assessment and debt management have become increasingly important for the Chinese development finance institutions. MOF's issuance of DSA as an optional tool to assess debt sustainability is a positive step toward the right direction. However, as analyzed above, China's DSF is based on the IMF's framework and fraught with similar drawbacks. These drawbacks loom even larger when the framework fails to adapt to the unique characteristics of BRI financing and the conditions and development stages of the BRI countries. As illustrated in this paper, China's DSA of BRI for MACs suffer from three major flaws. First, the framework fails to fully account for the asset side of the public sector balance sheet. BRI financing is mostly considered to add debt to the balance sheet, while the commensurate increase in the public asset is often ignored or underplayed. Second, the DSA of BRI does not incorporate the dynamics of the fiscal multiplier in projecting baseline GDP growth. As a result of the productive public investment financed by the BRI lending, the fiscal multiplier is expected to be higher where projects are productive, providing more growth impetus. Failing to account for the productive nature of public investment not only underestimate the repayment capacity of the recipient countries but lead to anti-public investment bias when addressing public debt. Third, the DSA of BRI does not differentiate local currency denominated public debt from foreign currency denominated foreign debt. Such a conflation leads to a misunderstanding of countries' need to borrow externally and their capacity to generate different currency denominated revenues to repay debt. These three flaws could potentially undermine the relevance and effectiveness of debt assessment.

The DSA of BRI countries should make meaningful revisions to account for the contributions of BRI financing on public asset formation, economic growth and generation of foreign exchange revenues. It would entail the construction of different debt sustainability indicators, including net public debt (or net public worth) to GDP ratio, net foreign-currency denominated external debt to GDP ratio, and foreign currency denominated debt service to export revenue ratio, among others. It would also need to provide a dynamic projection of fiscal multipliers as a result of productive public investment. A properly designed DSA would not only provide a more accurate assessment of solvency and liquidity risks but help host governments make sensible policies to manage debt rather than resorting voluntarily or otherwise to fiscal consolidation. Properly accounting for the implications of BRI financing on debt sustainability could also have a bearing on the terms and procedures of debt restructuring, since arguably, more productive debt should be given priority over less productive debt so as not to interrupt the formation and operation of productive public assets.

It is important to distinguish what is established from what is expected. The established empirical findings used in this paper come from secondary sources: the positive average growth effects of Chinese-financed projects (Dreher et al 2022), the size of public assets and their revenues (Gaspar, Harris and Tieman 2018), the relation between government net worth and bond yields in OECD samples (Peppel-Srebrny 2023), and the effect of currency depreciation on external debt ratios (Fisera, Tiruneh and Hojdan 2021). By contrast, the claims that China's DSF understates repayment capacity, that BRI-financed investment raises multipliers above those implied by historical elasticities, and that the proposed indicators would yield more accurate assessments are

theoretical expectations. They rest on the published MOF (2023) guidance and on interviews, not on a replication of the framework's calculations or on tests of the new indicators.

The implications of the proposed framework are also likely to differ across countries. First, institutional capacity matters: reliability of the net worth estimate depends on the asset registers, valuation methods and accounting standards behind it, and weak capacity may lead to overstated assets. Second, the productivity of public assets varies; crediting assets that generate neither revenue nor growth because of poor project selection or missing complementary infrastructure could understate risk in such cases. The proposals should therefore apply to well-appraised, operating assets, with haircuts for the rest. Third, foreign exchange constraints also differ. Countries with narrow export bases, thin reserves or limited swap line access face greater risk even when domestic growth is strong, so the foreign currency indicators are likely to bind more tightly for them than for diversified exporters. The cases in this paper should therefore not be generalized to all BRI borrowers, and the indicators should be calibrated and tested country by country.

Because the exact formulas and template of the framework were not accessible despite requests to the MOF, the paper is limited to a conceptual and theoretical critique of the DSA of BRI, highlighting the unique features of the BRI financing and its incompatibility with the IMF SRDSF framework. Further research is needed to provide an empirical check on DSA of BRI for MACs, and compare the result with an alternative construct outlined here. For future research, a natural next step is to reconstruct the framework from the published guidance for a sample of BRI MACs that differ in institutional capacity, asset productivity and foreign exchange exposure, and to test whether the proposed indicators change their risk classifications.

References:

Adarov, A., Clements, B., & Jalles, J. T. (2024). *Revisiting public investment multipliers: Nonlinear effects of the business cycle, fiscal space, efficiency, and capital stock* (Policy Research Working Paper No. 10954). World Bank.

AidData. (n.d.). *China's portfolio of overseas loans & grants*. https://china.aiddata.org/

Alichi, A., Shibata, I., & Tanyeri, K. (2019). *Fiscal policy multipliers in small states* (IMF Working Paper No. 2019/072). International Monetary Fund.

Amendolagine, V., Presbitero, A. F., & Rabellotti, R. (2025). Chinese infrastructure lending in Africa and participation in global value chains. *Review of World Economics, 161*(1), 7–48. https://doi.org/10.1007/s10290-024-00566-0

Brautigam, D., & Rithmire, M. (2021). The Chinese "debt trap" is a myth. *The Atlantic*. https://www.theatlantic.com/international/archive/2021/02/china-debt-trap-diplomacy/617953/

Brouwer, R. (2023). It's the currency, stupid: Breaking the debt doom loop. *Financial Times*. https://www.ft.com/content/ef56e83b-4e6c-41b9-b404-ab84da34776f

Chandrasekhar, C. P. (2024). *External debt stress and domestic debt restructuring: Resolving a paradox* (PERI Working Paper). Political Economy Research Institute.

Cömert, H., Düzçay, G., & Öncü, T. S. (2025). *Navigating debt sustainability: An in-depth analysis of the IMF's debt sustainability framework and its critique* (PERI Working Paper). Political Economy Research Institute.

Development Co-operation Directorate, OECD. (n.d.). *Official development assistance—Definition and coverage*.

Dreher, A., Fuchs, A., Parks, B., Strange, A., & Tierney, M. J. (2021). Aid, China, and growth: Evidence from a new global development finance dataset. *American Economic Journal: Economic Policy, 13*(2), 135–174. https://doi.org/10.1257/pol.2018063

Dreher, A., Fuchs, A., Parks, B., Strange, A., & Tierney, M. J. (2022). *Banking on Beijing: The aims and impacts of China's overseas development program*. Cambridge University Press.

Eichengreen, B., & Hausmann, R. (1999). *Exchange rates and financial fragility* (NBER Working Paper No. 7418). National Bureau of Economic Research. https://doi.org/10.3386/w7418

Fisera, B., Tiruneh, M. W., & Hojdan, D. (2021). Currency depreciations in emerging economies: A blessing or a curse for external debt management? *International Economics, 168*, 132–165.

Furceri, D., & Li, G. B. (2017). *The macroeconomic (and distributional) effects of public investment in developing economies* (IMF Working Paper No. 2017/217). International Monetary Fund.

Gallagher, K. P., & Wang, Y. (2020). *Sovereign debt through the lens of asset management: Implications for SADC countries* (GEGI Working Paper 042). Boston University.

Gaspar, V., Harris, J., & Tieman, A. F. (2018). The wealth of nations: Governments can better manage what they own and owe. *IMF Blog*. https://www.imf.org/en/Blogs/Articles/2018/10/10/blog-FM-the-wealth-of-nations-govts-can-better-manage-what-they-own-owe

Gupta, S. (2021). *Fiscal adjustment and growth in IMF-supported programs* (Background Paper No. BP/21-01/03). Independent Evaluation Office, IMF.

Harris, J., & Senhadji, A. (2019). A global picture of public wealth. *IMF Blog*. https://www.imf.org/en/Blogs/Articles/2019/06/18/blog-a-global-picture-of-public-wealth

Hernandez, D. (2017). Are "new" donors challenging World Bank conditionality? *World Development, 96*, 529–549.

Hofmann, B., Patel, N., & Wu, S. P. Y. (2022). *Original sin redux: A model-based evaluation* (BIS Working Paper No. 1004). Bank for International Settlements.

Horn, S., Parks, B. C., Reinhart, C. M., & Trebesch, C. (2023). *China as an international lender of last resort* (NBER Working Paper No. 31105). National Bureau of Economic Research.

Independent Evaluation Group (IEG). (2023). *The World Bank's role in and use of the Low-Income Country Debt Sustainability Framework*.

Infrastructure Consortium for Africa (ICA). (2018). *Infrastructure financing trends in Africa – 2017*. African Development Bank.

Interview 1. (2025, April 21). Interview with Sinosure, Beijing.

Interview 2. (2025, April 24). Interview with Sinosure, Beijing.

International Monetary Fund. (2018). *Public Monitor Database*. https://www.imf.org/external/datamapper/datasets/FM

International Monetary Fund. (2022). *Staff guidance note on the sovereign risk and debt sustainability framework for market access countries*.

International Monetary Fund. (2024). *Public Monitor Database*. https://www.imf.org/external/datamapper/datasets/FM

International Monetary Fund. (2025). *Press release on the completion of the first review of Pakistan's EFF arrangement and approval of RSF*.

Ismail, K., Perrelli, R., & Yang, J. (2020). *Optimism bias in growth forecasts—The role of planned policy adjustments* (IMF Working Paper No. 20/229). International Monetary Fund.

Izquierdo, A., Lama, R. E., Medina, J. P., Puig, J. P., Riera-Crichton, D., Végh, C. A., & Vuletin, G. (2019). *Is the public investment multiplier higher in developing countries?* (NBER Working Paper No. 26478).

Jones, L., & Hameiri, S. (2020). *Debunking the myth of "debt-trap diplomacy"*. Chatham House.

Kring, W., & Gallagher, K. (2019). Leaving the nest: The rise of regional financial arrangements and the future of global governance. *Development and Change, 50*(1), 72–95.

Liang, Y. (2020). RMB internationalization and financing Belt-Road Initiative: An MMT perspective. *The Chinese Economy, 53*(4), 317–328.

Lin, J., & Wang, Y. (2017). *Going beyond aid: Development cooperation for structural transformation*. Cambridge University Press.

Maldonado, F., & Gallagher, K. P. (2022). *Climate change and IMF debt sustainability analysis*. Boston University.

Maliszewska, M., & van der Mensbrugghe, D. (2019). *The Belt and Road Initiative: Economic, poverty and environmental impacts* (Policy Research Working Paper No. 8814). World Bank.

Mandon, P., & Woldemichael, M. T. (2023). Has Chinese aid benefited recipient countries? *World Development, 166*, Article 106211.

Mboya-Kwanya, L. (2022). Impact of the Standard Gauge Railway on the Kenyan economy. *International Journal of Latest Research in Science and Technology, 11*(1), 1–7.

Ministry of Finance of the People's Republic of China. (2023). *Debt sustainability framework for market access countries of the Belt and Road Initiative*.

Morris, S., Parks, B., & Gardner, A. (2020). *Chinese and World Bank lending terms: A systematic comparison across 157 countries and 15 years* (CGD Policy Paper No. 170). Center for Global Development.

Mühlich, L., Fritz, B., Kring, W. N., Gallagher, K. P., Pitts, J. D., Zucker-Marques, M., & Gaitán, N. (2023). *Global Financial Safety Net Tracker*.

OECD. (n.d.). *Other official flows (OOF)*.

Onen, M., Shin, H. S., & von Peter, G. (2023). *Overcoming original sin: Insights from a new dataset* (BIS Working Paper No. 1075).

Parks, B. C., Malik, A. A., Escobar, B., Zhang, S., Fedorochko, R., Solomon, K., Wang, F., Vlasto, L., Walsh, K., & Goodman, S. (2023). *Belt and Road reboot: Beijing's bid to de-risk its global infrastructure initiative*. AidData.

Pedrono, J., & Ishii, K. (2024). Original sin in EMEs: Less currency risk but more capital flow volatility. *Eco Notepad*.

Peppel-Srebrny, J. (2018). *Government borrowing cost and balance sheets: Do assets matter?* University of Oxford.

Peppel-Srebrny, J. (2023). Hello from the other side: Both government liabilities and assets matter for sovereign risk. *Journal of Money, Credit and Banking, 56*(6), 1595–1604.

Raga, S. (2024). *An appraisal of debt sustainability analyses amid multiple crises*. Friedrich-Ebert-Stiftung.

Ray, R., Morro, D., Ni, A., Yue, M., & Zhapabayeva, R. (2025). *Peer-to-peer lending: China's overseas development finance pivots to national and regional development banks* (GCI Policy Brief 026). Boston University.

Ruta, M., Dappe, M., Lall, S., Zhang, C., Constantinescu, C., Lebrand, M., Mulabdic, A., & Churchill, E. (2019). *Belt and Road economics: Opportunities and risks of transport corridors*. World Bank.

Sirimaneetham, V. (2023). *An augmented long-term approach to public debt sustainability analysis* (MPFD Policy Brief No. 127). ESCAP.

Stubbs, T., Kentikelenis, A., Ray, R., & Gallagher, K. P. (2022). Poverty, inequality, and the International Monetary Fund: How austerity hurts the poor and widens inequality. *Journal of Globalization and Development, 13*(1), 61–89.

Wang, Y., & Xu, Y. (2022). Why building public assets is key for debt sustainability and economic growth. *China Global South Project*.

Wang, Y., & Xu, Y. (2023). China and Africa: A new narrative on debt sustainability and infrastructure financing. *Journal of Infrastructure, Policy and Development, 7*(1), Article 2181.

Wang, Y., & Xu, Y. (2024). Direct impacts and spatial spillovers: The impact of Chinese infrastructure projects on economic activities in Sub-Saharan Africa. Boston University.

World Bank. (n.d.). *Quarterly External Debt Statistics*. https://www.worldbank.org/en/programs/debt-statistics/qeds

Xiong, W., Chang, S., & Xiao, L. (2019). IMF debt sustainability framework: Key contents, issues, and implications. *International Economic Review, 4*.

Xu, Q., Xiong, W., Sun, J., Chen, Z., & Zhang, J. (2024). *Productive debt: China's overseas lending and economic growth in developing countries*. Institute for World Economics and Politics.

Zucker-Marques, M., Gallagher, K. P., & Volz, U., with Akhtar, S., Espinosa, M. F., Haas, J., Njoroge, P., & Kenewendo, B. (2024). *Defaulting on development and climate: Debt sustainability and the race for the 2030 Agenda and Paris Agreement*. BU/Heinrich Böll/ SOAS.