

IMF Publication

State-Contingent Debt Instruments
for Sovereigns

INTERNATIONAL MONETARY FUND



IMF POLICY PAPER

STATE-CONTINGENT DEBT INSTRUMENTS FOR SOVEREIGNS

May, 2017

IMF staff regularly produces papers proposing new IMF policies, exploring options for reform, or reviewing existing IMF policies and operations. The following documents have been released and are included in this package:

- The **Staff Report**, prepared by IMF staff and completed on March 23, 2017 for the Executive Board's consideration on April 13, 2017
- A **Press Release** summarizing the views of the Executive Board as expressed during its April 13, 2017 consideration of the staff report and the supplements.

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IMF Discussed State-Contingent Debt Instruments

On April 13, 2017, the Executive Board of the International Monetary Fund (IMF) discussed the staff paper “State-contingent Debt Instruments for Sovereigns”.

Sovereign state-contingent debt instruments (SCDIs), such as GDP-linked bonds, as a countercyclical and risk-sharing tool remain appealing. Yet, take-up of such instruments has been limited. In view of recent renewed interest among academics, market participants, and policymakers, including the G20, IMF staff analyzed the benefits and challenges associated with SCDIs, possible benchmark designs that could underpin self-sustaining liquid markets, and the case for official sector interventions to support market development. The analysis has benefited from broad consultations with both investors and sovereign debt managers.

SCDIs have been used sporadically in “normal times”, although they have been a common feature in recent restructurings. The experience thus far highlights, the importance of confidence in the integrity, availability, and timeliness of data; the problems created by complex instrument design; and the need to meet the requirements of a broad range of issuers and investors.

Most surveyed issuers stated that their current menu of instruments was adequate and indicated no immediate plans to issue SCDIs. However, some issuers did see a role for SCDIs in specific contexts (such as small states facing natural disasters, commodity producers), and more positive prospects generally over the medium-term. Investors’ perspectives demonstrated an openness to the idea of SCDIs, while noting that their technical complexity could warrant high novelty and liquidity premiums in the early stage of market development.

Staff’s analysis suggests that careful instrument design, robust institutions, contracts, and regulation could help address the key barriers to SCDI market development. Three potential benchmarks are discussed: “*linkers*,” bonds with principal (and coupon) linked to the level of a state variable; “*floaters*,” variable rate bonds with a fixed principal, and coupon linked to changes in a state variable; and “*extendibles*,” which push out the maturity of a bond if a pre-defined trigger is breached. Each of these designs can be further adapted to adjust the level of

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upside shared with investors; and triggers can be identified that are closely tied to government repayment capacity, but which cannot be manipulated by the issuer sovereign.

The near future will likely be characterized by tailored issuance of SCDIs—either to meet the preferences of individual sovereigns and investors in normal times, or during restructurings. Without official sector support, it is unlikely that this will lead to self-sustaining and liquid markets, at least over the medium-term. Accordingly, the official sector could play a role in spurring market development, including through supporting contract design and providing demand-driven technical assistance.

Executive Board Assessment

Executive Directors welcomed the opportunity to discuss State-Contingent Debt Instruments (SCDIs) for sovereigns. They noted that the staff paper provided a comprehensive and balanced analysis of the benefits and costs of such instruments. Directors agreed, in particular, with the emphasis placed on practical design issues.

Directors agreed that, in principle, SCDIs have the potential to broaden the sovereign toolkit for debt management, reduce the probability of sovereign debt crises, make financial systems more resilient, diversify opportunities for investors and debt managers, and strengthen the international financial system.

Nevertheless, Directors underlined practical complications and risks associated with these instruments, including high initial liquidity and novelty premia demanded by investors, adverse selection, moral hazard, weaker incentives for sound fiscal management, and adverse consequences for conventional debt instruments. Many Directors were skeptical of the potential for broader use of SCDIs. They saw limited appetite from issuers and potential investors. They emphasized that any work on these issues should be done within the existing resource allocation to support member countries in their efforts to improve debt management capabilities. Some directors noted that careful instrument design, institutional support and appropriate financial sector regulation could help mitigate the risks associated with SCDIs. These Directors suggested that further analytical work, outreach and practical experience would help clarify the benefits of these instruments, as well as the preferences and constraints of a diverse set of issuers and investors. A few Directors suggested that further exploration of the three benchmark instruments proposed in the paper and other innovations could help fill gaps in the current architecture for debt management and support the gradual development of markets.

Directors stressed that the use of SCDIs cannot be a substitute for sound macroeconomic management, and in particular prudent fiscal policy. A few Directors thought that buffers and existing hedging instruments constituted alternatives to SCDIs. In the event that SCDIs are used, Directors emphasized that there should be no seniority for SCDIs relative to conventional debt instruments. Directors also emphasized the importance of strong financial

sector regulation to ensure that investors could deal with risks associated with SCDIs.

Going forward, Directors recommended that the Fund pursue a gradual, targeted and demand-driven approach. Some Directors felt that further work on SCDIs should not constitute a high priority for the Fund. Many Directors saw the greatest potential for Fund assistance in the development and use of SCDIs for small states and commodity exporters, and in supporting interested member countries through technical assistance. Most Directors saw limited scope for the official sector to play a lead role in fostering large-scale market development in SCDIs, although some Directors saw a role for multilateral development institutions to assist with tailored issuances for small economies subject to large shocks, including natural disasters.



March 23, 2017

STATE-CONTINGENT DEBT INSTRUMENTS FOR SOVEREIGNS

EXECUTIVE SUMMARY

Background. The case for sovereign state-contingent debt instruments (SCDIs) as a countercyclical and risk-sharing tool has been around for some time and remains appealing; but take-up has been limited. Earlier staff work had advocated the use of growth-indexed bonds in emerging markets and contingent *financial* instruments in low-income countries. In light of recent renewed interest among academics, policymakers, and market participants—staff has analyzed the conceptual and practical issues SCDIs raise with a view to accelerate the development of self-sustaining markets in these instruments. The analysis has benefited from broad consultations with both private market participants and policymakers.

The economic case for SCDIs. By linking debt service to a measure of the sovereign's capacity to pay, SCDIs can increase fiscal space, and thus allow greater policy flexibility in bad times. They can also broaden the sovereign's investor base, open opportunities for risk diversification for investors, and enhance the resilience of the international financial system. Should SCDI issuance rise to account for a large share of public debt, it could also significantly reduce the incidence and cost of sovereign debt crises. Some potential complications require mitigation: a high novelty and liquidity premium demanded by investors in the early stage of market development; adverse selection and moral hazard risks; undesirable pricing effects on conventional debt; pro-cyclical investor demand; migration of excessive risk to the private sector; and adverse political economy incentives.

Past experience of SCDIs and market feedback. The use of SCDIs in "normal times" has been limited to sporadic issuances, although they have been a common feature in recent restructurings. The experience highlights the importance of: confidence in the integrity, availability, and timeliness of data; simple and consistent instrument design; and political economy challenges. Feedback from surveyed issuers suggests a first-mover problem. Most sovereigns stated that their current menu of instruments was adequate and they had no plans to issue SCDIs in the near term. However, others did see a role for SCDIs and saw positive prospects over the medium-term. Investors' perspectives were more varied, but overall demonstrated some openness to the idea of SCDIs, while noting their technical complexity.

Considerations for market development. Staff's analysis suggests that careful instrument design, robust institutions, contracts, and regulation can help overcome the key complications associated with SCDIs. Three potential benchmarks are discussed: "*linkers*," bonds with principal (and coupon) linked to the level of a state variable; "*floaters*," variable rate bonds with a fixed principal, and coupon linked to changes in a state variable; and "*extendibles*," which push out the maturity of a bond if a pre-defined trigger is breached. In this context, staff discusses the role of "caps" and "floors" to adjust the level of upside shared and protection sought, respectively, from investors; and discuss options for state variables/triggers that are closely tied to government repayment capacity, but are exogenous (i.e., cannot be manipulated by the issuer sovereign).

Ways forward. Absent intervention, sporadic SCDI issuance—either to meet the tailored preferences of sovereigns and investors, or during restructurings—is likely to continue, but will not lead to self-sustaining and liquid markets, at least over the medium-term. Accordingly, the official sector could play an important role in spurring market development. IFIs, including the Fund, would be well placed to provide tailored country advice to improve sovereign capacity to issue SCDIs. This includes providing guidance on the benefits and costs of these instruments, and technical assistance for statistical agencies and debt management offices. In addition, they could support the development of commonly agreed model contracts and better account for SCDIs in debt sustainability analyses and supranational fiscal rules. More ambitiously, official creditors could underwrite or guarantee SCDIs, or introduce state-contingent features into their lending. Further still, a major sovereign or regional institution could undertake a 'test issuance' of an SCDI to lead the way for others. Alternatively, several sovereigns could coordinate and issue SCDIs at the same time to help overcome first-mover issues.

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INTRODUCTION

1. Sovereign state-contingent debt instruments (SCDIs) are instruments that (i) bear contractual debt service obligations tied to a pre-defined state variable and (ii) are designed to alleviate pressure on sovereign indebtedness and/or financing needs in a bad state of the world.¹ SCDIs can take a number of forms, but can be broadly divided into two categories:

instruments featuring *continuous adjustment* of debt service payments, an example of which is the GDP-linked bond contract proposed by Benford and others (2016), where payments are tied to nominal GDP; and those involving *discrete adjustment*, such as the 2015 Grenada bond “hurricane clause,” where a one-off debt service deferral is triggered by a pre-defined event, in this case, a hurricane of given intensity; another example of this is an “extendible” design, where the maturity (or grace period) extends in the face of a shock (to exports, in the case of AFD official loans).

2. The idea of SCDIs as a countercyclical and risk-sharing tool has been around for some time and remains appealing, but take-up has been limited. Fund staff made the case for bonds with growth-indexed coupons in 2004 (in the context of the Argentina restructuring), but there was not sufficient support among issuers and investors at the time. In 2011, the Fund encouraged greater use of state-contingent *financial* instruments (with a focus on commodity hedging) to help manage volatility in low-income countries (LICs). However, there has been scant issuance of SCDIs in normal times, and instruments tied to general macroeconomic outcomes (such as GDP) have, thus far, mostly been issued during debt restructurings (as “sweeteners”).

3. Over the last few years, there has been renewed interest in SCDIs.² Some have argued that the case for these instruments is stronger in the current conjuncture as debt-to-GDP ratios have risen in many advanced and developing economies; and certain risks, for example, of natural disasters associated with climate change are rising. Some proponents have argued that SCDIs (such as GDP-linked bonds) would make particularly good sense in a currency union as a way of achieving greater fiscal risk-sharing as well as reducing sovereigns’ funding reliance on banks. Others have re-emphasized that SCDIs could help make financial markets more complete. On the investor side, the prevailing environment of low interest rates (by long-term historical standards) is propitious to the launch of new investment products.

4. Against this backdrop, staff has examined the conceptual and, in particular, practical issues SCDIs raise, with a view to enabling the sound development of a market in these instruments. Because the theoretical arguments in favor of SCDIs have already been made by a range of influential commentators, the paper devotes considerable attention to impediments to

¹While floating rate bonds and inflation-linked bonds also bear state-contingent returns, they are not designed to necessarily alleviate liquidity and/or solvency pressures on the sovereign; this note discusses them only insofar as there are relevant lessons obtaining from their experience for SCDI market development.

²For example, Kim and Ostry (2017), Pienkowski (2017), Cabrillac and others (2017), Makoff (2017), Blanchard and others (2016), Benford and others (2016), Bundesbank (2016), Zoheir and Tavakoli (2016), Bowman and Naylor (2016), Barr and others (2014), and Brooke and others (2013).

market development and how these could be overcome in light of past experience with such instruments and market feedback. Accordingly, staff's analysis has benefited from extensive consultations, both written and face-to-face, with a range of investors, legal practitioners, rating agencies, and debt managers. Staff also participated in a number of conferences and workshops organized over the last two years and hosted a Bretton Woods Committee roundtable on the margins of the 2016 Annual Meetings. Staff has also collaborated closely with the official sector, including the G20 which recently discussed a 'Compass for GDP-Linked Bonds'.³

5. The structure of this Board paper is as follows. The next section analyzes the economic case for SCDIs, taking into account both potential benefits and complications. In the third section, the paper discusses past experience with SCDI issuance, both in normal times and restructurings, as well as the feedback received from potential issuers and investors. Taking into account the conceptual and market considerations, the fourth section proposes three benchmark SCDI instrument designs around which liquid markets might emerge. This is followed by consideration of the possible pathways to, and measures to support, the development of self-sustaining SCDI markets. The final part of the paper presents issues for discussion.

THE ECONOMIC CASE FOR SCDIs

SCDIs have the potential to enhance policy space for sovereigns in bad states of the world, offer diversification opportunities to investors, and generate ancillary benefits for other economic agents and the broader system. These benefits do not require SCDIs to substantially replace conventional debt in sovereign debt portfolios. This said, SCDIs are associated with some non-trivial complications that need to be managed and, in some country cases, may outweigh the benefits.

A. Potential Benefits

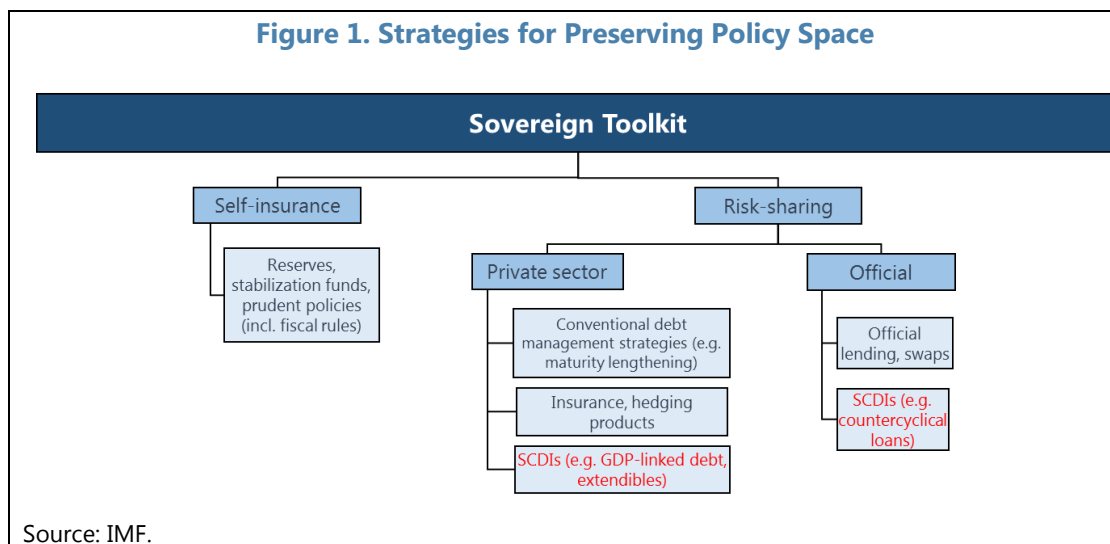
6. The main idea behind SCDIs is to help sovereigns preserve policy space in 'bad times.' Sovereigns require policy space (both fiscal and monetary) to undertake measures that can help mitigate the economic impact of adverse shocks. By tying sovereign obligations to a state variable (like GDP) that proxies the sovereign's capacity to pay, SCDIs seek to stabilize the sovereign's debt indicators and/or financing needs, thus helping preserve policy space precisely when it is most needed, e.g., in a downturn. Moreover, like any countercyclical tool, SCDIs can help attenuate boom-bust cycles in public spending by requiring the sovereign to allocate a larger share of revenue to debt service in 'good times.' This could be particularly useful for sovereigns that struggle to pay-down debt (or build rainy day buffers) in such times. Finally, the downside protection afforded by SCDIs could provide a mechanism to unlock productive public spending, carrying uncertain

³The Communique for the G20 Finance Ministers and Central Bank Governors Meeting (March 18, 2017, Baden Baden) states: "The Compass for GDP-linked Bonds provides an overview of important aspects of this instrument." <http://www.g20.utoronto.ca/2017/170318-finance-en.html>.

macroeconomic returns that sovereigns otherwise might avoid due to concerns about high debt and in spite of relatively low interest rates. Such SCDI-facilitated unlocking of productive spending can raise potential growth—with gains shared by both investors and sovereigns.⁴

7. The countercyclical/stabilization benefits of SCDIs can be illustrated using well-known debt dynamics and financing equations. Using these equations, Box 1 shows how SCDIs of the *continuous adjustment* variety (e.g., with debt payments linked to GDP) can reduce the variance of unexpected changes in the debt-to-GDP ratio; and of the *discrete adjustment* variety (e.g., with debt service deferral triggered by some pre-defined event) can stabilize gross financing needs (GFNs) in the face of a shock. The simple framework also helps to identify the conditions under which these benefits are likely to be maximized, for instance, in countries where public debt is elevated and the variance of the interest rate-growth differential is relatively high, and where there is exposure to large one-off shocks and near-term debt service is substantial.

8. Of course, sovereigns have other tools to preserve policy space (Figure 1). Sovereigns can undertake self-insurance to preserve their capacity to undertake supportive economic policies in difficult times. This includes building buffers, such as reserves or stabilization funds. Similarly, prudent fiscal policies, including through fiscal rules, can constrain spending in good times, leaving greater space for when conditions deteriorate. The sovereign can also utilize several risk-sharing options. Strategies with conventional debt management and derivatives can help deliver stable and low-cost funding for sovereigns across many (but not all) states of the world. Sovereigns vulnerable to commodity price movements or natural disasters can purchase protection from markets via hedging or insurance products respectively. Central bank swap lines (which share risk with the official sector) can help to manage foreign exchange liquidity.⁵ And in exceptional circumstances, the official sector can step in by providing emergency liquidity support.



⁴Investors, such as Swiss Re (2017), have made this point in the narrower context of infrastructure spending.

⁵Cross-border risk-sharing is highly valuable when access to external financing is constrained.

Box 1. Stabilizing Debt Dynamics with SCDIs

SCDIs can provide fiscal space by reducing uncertainty around the future public debt-to-GDP ratio. The evolution of the debt ratio can be described by the following expression:

$$\dot{d} = (r - g) \cdot d + pd + \delta \cdot d \cdot \varepsilon + sfa$$

where \dot{d} is the change in debt-to-GDP ratio; d is the initial debt-to-GDP ratio; δ is the share of debt in foreign currency; r , g , ε , pd and sfa are the real effective interest rate, real GDP growth, change in the nominal exchange rate, primary deficit, and stock-flow-adjustment, respectively.

Accordingly, the variance of *unexpected* changes in the debt ratio is given by the following formula (where the superscript u denotes the unexpected component of the corresponding variables):

$$Var(\dot{d}^u) = d^2 \cdot Var[(r^u - g^u)] + Var(pd^u) + (\delta d)^2 Var(\varepsilon^u) + Var(sfa^u) + 2 \cdot d \cdot Cov[(r^u - g^u), pd^u] + covars$$

Continuous adjustment SCDIs such as GDP-linked bonds, which reduce the variance of the interest-rate growth differential ($r - g$) as well as its covariance with the primary deficit, can help stabilize the debt ratio in the face of shocks. For example, in an illustrative simulation for the euro area (see Text Chart, solid lines), shifting a quarter of the debt portfolio to GDP-linked debt would modestly narrow the width of the forecast debt ratio distribution. The narrowing would be more pronounced for countries where the interest-rate growth differential behaves less favorably (Text Chart, dashed lines).¹

Similarly, SCDIs can reduce uncertainty about GFN and impart fiscal space to economies with constrained market access. The corresponding expression for unexpected changes in the GFN/GDP ratio is:

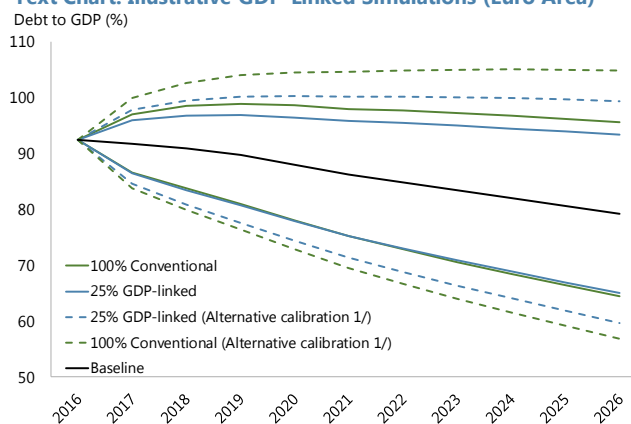
$$Var(gfn)^u = d^2 \cdot Var(i^u) + Var(d^{amort}^u) + Var(pd^u) + 2 \cdot Cov(d^{amort}^u, pd^u) + 2 \cdot d \cdot Cov(i^u, pd^u) + covars$$

where i^u , and d^{amort}^u represent the unexpected components of the nominal effective interest rate and debt amortization, respectively. Discrete adjustment SCDIs such as an extendible bond can reduce the covariance between the primary deficit and debt amortization, thus stabilizing gross financing needs.

The foregoing indicates that SCDIs are likely to be helpful in contexts where initial debt is high, growth and the primary deficit are volatile, the interest rate does not commove with growth (say because of constraints on monetary policy), and vulnerability to currency and stock-flow adjustment shocks (like bank recapitalizations) is elevated. SCDIs of the discrete-adjustment type could help stabilize gross financing needs where the economy is exposed to large one-off shocks, and refinancing risks are high.

¹This exercise uses the methodology suggested by Blanchard, Mauro and Acalin (2016) to estimate the impact of moving to a 25 percent share of GDP-linked debt in the debt stock of the euro area as a whole. The chart shows the 5th and 95th percentiles of simulated debt projections. The baseline forecast is drawn from the October 2016 WEO, while the covariance of shocks to macroeconomic variables is estimated from euro area data covering the period 1999–2015. As an alternative, illustrative results are also shown for the case where the covariance of macroeconomic shocks is estimated using data for the euro area countries that experienced greatest stress in the 2010–12 period. Results are presented for the case where the GDP-risk premium is zero; a positive premium would erode these benefits.

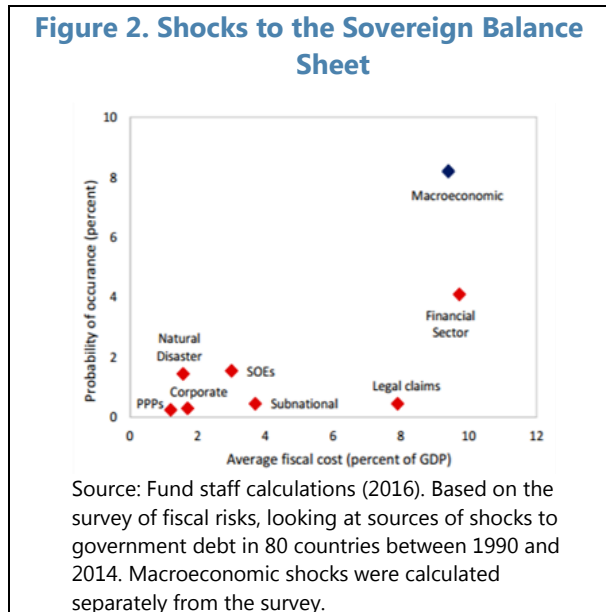
Text Chart: Illustrative GDP-Linked Simulations (Euro Area)



^{1/} In the alternative calibration, shocks are drawn based on a variance-covariance matrix calibrated using data only for the 'stressed' euro-area countries whose bonds were included in the ECB SMP program from 2010-12.

9. However, for most sovereigns, the existing toolkit has deficiencies. For instance:

- *Self-insurance can be inefficient and is vulnerable to political cycles.* Excessive reserve accumulation represents an expensive and globally inefficient way to meet a country's insurance needs (see Mateos y Lago and others 2009). And short-term political horizons mean that buffers can get spent in good times and fiscal rules can be broken or manipulated, especially where discretion exists.
- *Conventional debt instruments are not designed to mitigate the solvency effects of large negative macroeconomic shocks.* Long-term debt can guard sovereigns against refinancing risks but not against the impact on repayment capacity of say, a sharp adverse macroeconomic shock.⁶ As Figure 2 shows, such generalized shocks are, by far, the most frequent and the second most-costly (after banking crises). By contrast, SCDIs are designed to help insulate solvency indicators such as the debt-to-GDP ratio from such shocks.



- *Protection via commodity hedges and natural catastrophe insurance is typically available over a short horizon, can be expensive, and exposes the sovereign to counterparty risk.*⁷ In comparison, by imbedding the insurance component within a financing (cash) instrument, SCDIs can potentially help sovereigns tap into a broader investor base with longer investment horizons. They would also allow the sovereign to avoid counterparty risk (Besley and Powell, 1989). Some insurers argued that the “bundling” of the insurance and financing elements in SCDIs can help issuers arbitrage across (re)insurance and capital markets to the extent that these markets price risks differentially; as well as better integrate risk management in sovereign decision-making.⁸
- *Official liquidity support may not be available or accessible on a timely basis.* Smaller economies may not have immediate access to bilateral swap lines, while multilateral financing can take time to arrange. Well-designed SCDIs, by contrast, can provide (some) immediate relief in bad times. Moreover, insofar as they support sovereign debt sustainability and lock in private creditors

⁶In fact, for many economies, the burden of servicing some conventional instruments like floating rate debt and inflation-linked or FX-denominated bonds can rise sharply in bad times, casting doubts over debt sustainability, and amplifying the crisis.

⁷Counterparty risk is less of a concern with futures contracts that go through clearing houses.

⁸For instance, while finance ministry treasurers are well versed in accessing debt markets, they are less inclined toward/equipped for standalone discussions on “downside protection.” The embedding of risk transfer within debt instruments would enable the existing processes to be leveraged and, more generally, improve the dialogue on risk management with sovereigns.

(through extendibles, for instance), they can also facilitate a request for access to financing support from the Fund.

10. SCDIs may also offer important additional benefits:

- **Increased diversification opportunities.** Instruments such as nominal GDP-linked bonds may be appealing to savers that seek to preserve both *absolute* and *relative* purchasing power. The inflation component of these bonds preserves savers' absolute purchasing power; while the real GDP component ensures that they receive a return similar to that of the 'average' earner. Indeed, annuity payments by pension funds in some countries (like Uruguay) are explicitly tied to average earnings movements, creating a natural demand for assets linked to earnings. In the words of Kamstra and Shiller (2009), these instruments can give "the people and their pensions funds a stake in the wealth of the nation". Insofar as SCDIs can allow the sovereign to tap into a broader investor base, sovereigns can reduce their funding reliance on domestic (or currency union) banks, and thus weaken potentially perverse sovereign-bank linkages (Deutsche Bundesbank, 2016).
- **More resilient domestic and international financial system.** *First*, SCDIs can facilitate the discovery of market-based macroeconomic expectations (e.g., on real GDP growth) which could aid planning and risk-management by sub-national governments and corporations whose fortunes are tied to developments in the broader economy. This could boost economic resilience within countries, with favorable spillovers internationally. *Second*, because they involve variable nominal returns, SCDIs can strengthen incentives for investors to look more closely at the macroeconomic outlook and the sovereign's fundamentals, more broadly, and thus promote more accurate pricing of sovereign risk. This can reduce over-borrowing in the system. *Third*, they can reduce the burden on the official sector to provide support if they can procure financing from investors in times of crisis. This should reduce the potential moral hazard associated with official sector lending, and could act as a useful complement to initiatives to strengthen the Global Financial Safety Net (GFSN).
- **Reduction in the probability of sovereign debt crises.** Insofar as they ease debt payments in times of stress, SCDIs can, alongside other policies, reduce the likelihood of sovereign debt crises; this is more likely to be true when SCDI issuance has expanded to constitute a substantial proportion of the sovereign's debt stock. The avoidance of debt crises and associated deadweight losses should, in turn, benefit all parties: sovereigns, investors, and the system. A number of recent papers attempt to quantify the reduction in the probability of sovereign default—and, by implication, the credit risk premium demanded by investors on all debt—due to large-scale issuance of SCDIs, especially when debt is high.⁹ Staff's own preliminary simulations appear to confirm these benefits (Box 2).

⁹See Barr and others (2014), Blanchard and others (2016), Kim and Ostry (2017), and Pienkowski (2017).

Box 2. Reducing the Probability of Default

Simulations with GDP-linked bonds (with principal and coupon both linked to the nominal GDP level), using the methodology in Ostry and others (2010), suggest that, if GDP-linked bonds made up 20 percent of the debt stock, the sovereign's debt limit would increase by around 15 percentage points of GDP for advanced economies and 8 percentage points for emerging markets. In contrast, while LICs would benefit significantly from moving to local currency denominated debt, there would be little benefit from GDP-linked bonds of this design¹. Similar intuition obtains from a parallel exercise with all debt held as GDP-linked debt, showed the debt limit increased by 15–70 percent of GDP in a representative advanced economy, depending on assumptions about growth uncertainty. Insofar as SCDIs reduce the risk from macroeconomic shocks, the probability of default is likely to decline for both conventional and state-contingent debt. However, these simulations also point to diminishing marginal benefits from increasing the share of GDP-linked debt above a certain level (Annex I).

The results should be viewed with caution as they abstract from novelty/liquidity premia which, as discussed below, could be significant in the transition phase; and are sensitive to assumptions about the return volatility premium demanded by investors over fixed-rate debt (the simulations conservatively assume a high premium of around 200 bps). The analysis does not consider the full range of debt management instruments including any alternative to short-term bills, and assumes that the GDP-linked bonds transfer all downside risk to investors.

Text Table: Debt Limits with Various Instrument Designs

Country Group	Baseline debt limit	Debt limit - 100% local currency	Debt limit - 100% local currency; 20% GDP linked	Debt limit - 100% local currency; 50% GDP linked
	<i>percent of GDP</i>			
All countries	52	78	80	84
Advanced economies	137	137	152	175
Emerging markets	58	98	106	120
Low income countries	40	54	54	52

¹This is because the additional premium required to issue GDP-linked bonds has a more negative effect on debt dynamics than the reduction in GDP volatility risk associated with these instruments.

11. The aforementioned benefits can only be realized if investors are willing to buy these instruments at a price acceptable to the sovereign. The overarching *economic* condition for an SCDI market to emerge is that there be opportunities for ongoing mutually beneficial exchanges between issuers and investors. There are several *ceteris paribus* sub-conditions that make such exchange more likely (for a formal derivation of these, see Annex II):

- *There is scope for diversification of risks.* Specifically, the return on the SCDI should have (i) a high correlation with the investor's liabilities; and/or (ii) a low correlation with the investor's assets (and sources of income). SCDIs are intended to satisfy the equivalent of (i) and (ii) for the sovereign by design. From the investor perspective, GDP-linked bonds may be a natural liability hedge for some domestic institutions and individuals, satisfying (i). And asset return correlations between foreign GDP and established market benchmarks (such as S&P 500), and the implied CAPM volatility premia, have been estimated—including by staff—to be relatively modest (Table 1), which suggests that there are reasonable prospects for satisfying (ii), especially for international investors.

Table 1. Estimates of the Volatility Risk Premium on GDP-linked Bonds (CAPM)

Coverage	Benchmark portfolio	Estimated premium (bps)	Source
All Countries	S&P500	17	Staff estimates
All Countries	MSCI World bond index	36	Staff estimates
G20	Global equities	27	Staff calculation using Bowman and Naylor (2016) estimates
G20	US equities	24	Staff calculation using Bowman and Naylor (2016) estimates
United States	US equities	150	Kamstra and Shiller (2009)

- *Issuer and investor expectations on the path of, and risks surrounding, the underlying state variable diverge.* If the sovereign believes that an SCDI will be associated with lower *average payouts* than markets expect—because the state variable (say GDP) will perform worse—the sovereign will be willing to accept a higher yield, and a trade would be more likely. This could be the case, for instance, in a boom period, if the sovereign is more concerned about a cyclical downturn than the markets are.¹⁰ Alternatively, the sovereign may not be more pessimistic on the most likely return than investors, but sees higher tail risks. In sum, trades would be more likely, *ceteris paribus*, if the expected payout on the SCDI (adjusted for the full range of risks) is lower for the sovereign than for investors.
- *There is differential tolerance of risk.* If the investors have a greater tolerance for bearing risk than the sovereign (i.e., the investor is less risk averse) they will be more willing to hold the SCDI at a price that is acceptable to the sovereign. This condition should hold insofar as sovereigns take into account the welfare of the entire country, while investors are more narrowly focused on their asset returns. The condition also implies that SCDIs would most naturally appeal to investors that can withstand short-term return fluctuations rather than to commercial banks and other mark-to-market investors with strict mandates. SCDIs could also be viable in a context where there is exposure to global shocks (i.e., no risk correlation benefit *per se*): in such cases, the risk would be borne by those that can best absorb the shock i.e., those with the ‘deepest pockets.’

B. Potential Complications

12. There are a number of complications associated with SCDIs. While many of these are manageable, their combined effect may be prohibitive in some country cases and for some SCDI designs.

(i) **Novelty and liquidity premia**

- *High novelty, liquidity, and model risk premia demanded by investors.* Novelty premium would be high if, *inter alia*, the design is more complex. Investors will need the prospect of substantial and sustained returns to set up requisite operational arrangements and to undertake the additional research needed to price the instruments. Liquidity premia would be expected to be high initially, but should fall with a build-up in supply (although would not likely disappear). Premia for model uncertainty may be large, especially if there are questions about data integrity (as could be the case with nominal GDP data). The premia

¹⁰Another example of such a situation is during debt restructuring negotiations, where creditors often question the sovereign’s baseline as too pessimistic.

would fall over time as investors became more familiar with SCDIs and had more data with which to fit pricing models, but could be persistent if the behavior of the state variable is subject to structural breaks and uncertainty over trends. Standardization, robust contract design, and coordinated issuance by a number of sovereigns can substantially reduce these premia over time.

(ii) ***Adverse selection and moral hazard***

- *Adverse selection.* Investors may suspect that countries facing the worst macroeconomic outlook/risks will be most eager to issue SCDIs and, correspondingly, may demand high compensation. Anticipating this, issuers that could benefit the most from the protection afforded by SCDIs may be unwilling to issue. However, the extent to which adverse selection is important would depend on whether the sovereign has private information that is not available to the investor. Countries in which fiscal transparency is already high should be less subject to these concerns. Also, asymmetric information problems do not solely apply to SCDIs, but also to other risk-sharing instruments and strategies in the toolkit (though conventional debt instruments are generally more incentive compatible).
- *Moral hazard.* The possibility of paying high debt service in good times and receiving automatic debt relief in bad times can reduce incentives to keep vulnerabilities at bay. There are two possible mitigating factors: (i) as long as SCDIs would not be expected to substantially replace the stock of conventional debt, the sovereign would retain sufficient “skin in the game;” (ii) there should be sufficiently strong political incentives to avoid bad states of the world. Even if there are significant moral hazard risks, these could be substantially attenuated by using state variables/triggers that are exogenous (outside issuer control) and independently verifiable; and by setting caps and floors on the relief obtained. Finally, instruments such as *nominal* GDP-linked bonds that provide investors with a degree of protection against inflation will reduce the scope for sovereigns to ‘inflate away’ the real value of debt, thus potentially strengthening policy discipline.

(iii) ***Undesirable political economy incentives***

- *Myopia on the part of issuers.* The issuance of SCDIs may not be supported if policymakers have short horizons, i.e., they focus only on the near-term cost-benefit calculus, and ignore longer-term benefits. This problem could potentially be attenuated insofar as decisions on SCDI issuance are assigned to debt managers with independent mandates, clear objectives, and a long-term horizon.
- *Incentives for data manipulation.* Policymakers may have incentives to spend cyclical revenues in good times and may—in the extreme—choose to renege on their SCDI commitments, for instance, by resorting to data manipulation (Cecchetti and Schoenholtz, 2017). Similarly, in bad times, the authorities may have the incentive to over-report the worsening in the state variable in order to maximize debt relief. Especially for an SCDI based on a macroeconomic state variable, external verification of a realization and the imposition of penalties for misreporting may be difficult. This said, consistent manipulation of data

would be difficult to sustain in a repeated game context, and consistent under-reporting of the state variable, say GDP, would also not be compatible with political incentives to report good macroeconomic performance. Moreover, the use of proxy indicators (outside the issuer's control) for macroeconomic state variables, as well as caps and floors on the payoffs, could potentially attenuate some of these incentive problems.

(iv) ***Adverse effects on conventional debt markets***

- *Pricing impact on conventional debt.* Although large-scale SCDI issuance could in theory reduce the default risk premium—and hence yields—on conventional debt, the reverse can occur if SCDIs erode the liquidity of existing instruments or are perceived as more senior than conventional debt instruments. The extent to which this would be a concern partly depends on the relative size of a country's "medium-to-long term" bond portfolio that the SCDIs would seek to replace. Where such portfolios are small, careful thought would be needed on how to integrate SCDIs with sovereign debt portfolios without leading to cannibalization. A not-too-large share of SCDIs, such as 10–25 percent of total debt (as in the case of inflation-linked bonds), and contract design that does not attempt to give SCDIs seniority over other debt could mitigate these risk.
- *Decline in supply of 'safer' conventional assets.* Fixed-rate bonds play an important role as a store of wealth, collateral for financial transactions, and an anchor for the pricing of other instruments. Moreover, insofar as they help discipline government behavior, they offer attractive incentive-compatibility features (as viewed from the investors' perspective). That said, proponents of SCDIs do not expect them to fully replace conventional debt; rather to complement it. Also, SCDIs (especially if featuring a "floor" and issued by a "safe haven" issuer) may still be able to provide similar safe asset functions, especially as a store of wealth, over the long term.

(v) ***Risk migration and amplification***

- *Excessive risk migration to the private sector.* SCDIs are designed to transfer risk from the sovereign to the investor. In some cases, especially during tail-risk events, domestic private sector investors may not be well suited to bear this risk. Such events could lead to pro-cyclical deleveraging and large contractions in aggregate demand. Ultimately, the cost of these events could circle back to the sovereign in the form of recapitalization costs, lower tax receipts or fiscal stimulus packages. This "circularity of risks" could be a concern for large economies with sophisticated financial markets where SCDIs are held mostly by domestic investors. However, such circularities would be less of a concern where the volume of SCDIs issued is small in relation to private balance sheets, and/or where SCDIs are largely held by international investors (as would be more likely in the case of smaller open economies) rather than domestic banks.¹¹ Moreover, insofar as SCDIs reduce the risk of a sovereign debt crisis, the associated spillovers to the private sector should also diminish. Nevertheless, this issue highlights the importance of appropriate regulatory frameworks that check the buildup

¹¹It has to be recognized that sophisticated financial markets could strip out state contingent risk from a composite SCDI and transfer this risk to banks even if they are not the initial investors.

and excessive migration of risks, and design considerations (such as caps and floors) that limit the size of potential losses for investors.

- *Pro-cyclical investor demand.* Insofar as investor expectations of the state variable are highly pro-cyclical, demand for SCDIs could rise (fall) in good (bad) times, making SCDI issuance very cheap (costly). This could amplify public spending, driving a boom-bust cycle. On the other hand, it is not clear that investor demand would be that pro-cyclical because the maturity of the instrument may be longer than the business cycle, the behavior of the business cycle is predictable, or investors could be less sensitive to short-term cyclical variations. Moreover, the existence of SCDI markets may itself induce private investors to sharpen their projections on state-variables, mitigating the risk of random-walk type expectations and associated demand fluctuations. Further, debt managers would likely temper any pro-cyclicality to the extent they adhere to their predetermined issuance calendars.

13. Overall, the balance of benefits and risk is likely to support a gradual approach to SCDI issuance for some countries with the right characteristics. Not all sovereigns will have the right characteristics to ensure that the premia demanded by investors would be lower than the value of risk mitigation for the sovereign. Getting past that barrier, rapid issuance in large volumes would achieve scale, but could exacerbate concerns about moral hazard, affect conventional debt markets, and lead to excessive risk migration to the private sector. Accordingly, a reasonable approach for countries where the prospects are strongest, could be to pursue SCDI issuance in an incremental manner—perhaps starting in good times—carefully integrating them into debt markets and sovereign portfolios, and with initial designs including limits on upside and downside risk-sharing. The optimal steady-state share of SCDIs in the sovereign debt portfolio would likely vary with country characteristics and instrument types.

REVIEW OF PAST EXPERIENCE AND MARKET FEEDBACK

To complement the conceptual approach outlined above, this section summarizes the practical experience with SCDIs—including their use in debt restructurings—to better understand the key impediments to market development. The discussion is supplemented with feedback received from market participants, both via formal surveys as well as informal contacts, to provide a fuller understanding of market preferences for these instruments.

A. SCDI Issuance in Normal Times

State-contingent instruments used by sovereigns in normal times have primarily been non-debt instruments. Sovereign debt managers in established markets have been using interest and exchange rate hedges for some time. Markets in these instruments are well developed and, in most cases, sovereigns have used the same instrument as the private sector uses. With most

sovereign debt in advanced economies denominated in local currency and on fixed rates, the risks hedged by these instruments are likely to be small in relation to, say, GDP risk. The use of contingent financial instruments by emerging markets and low-income countries has been more sporadic, focused mostly on commodity hedges and disaster risk insurance (see Box 3 for a 2011 review by Fund staff). These instruments have also been unable to provide sufficient size and term of risk mitigation; standardized derivative products (such as commodity hedges) were generally only available at short tenors, while more customized derivatives or insurance products (such as catastrophe insurance) have proven to be expensive.¹²

Box 3. Use of Contingent Financial Instruments by Low-Income Countries

In 2011, the IMF published *Managing Volatility in Low-Income Countries: The Role and Potential for Contingent Financial Instruments*, which reviewed the use of contingent financial instruments, such as commodity hedges, weather and disaster risk insurance, and contingent credit lines by LICs.

Such instruments have been used with some success by both commodity exporters (e.g., put options for exports of Mexico and Panama's oil, and Ghana's cocoa) and importers (Ghana's and Panama's use of oil call options, Sri Lanka's use of oil call and put options, Malawi's use of maize call options). Countries prone to natural disasters have resorted to regional risk pooling (such as the Caribbean Catastrophic Risk Insurance Facility (CCRIF)) to help lower the cost of insurance.

The 2011 paper highlighted the importance of well-specified and easily monitorable triggers, and sound institutional frameworks (with feasible transaction and regulatory costs). technical capacity, consensus-building within the government and with the broader public, and support from the IFIs to build governments' capacity to issue and manage such instruments (e.g. the World Bank helped develop weather derivatives in Malawi and Ethiopia). These lessons carry over naturally to SCDIs.

14. The use of SCDIs by sovereigns has been limited thus far.¹³ To date, sovereigns have not used SCDIs as a regular instrument of budget financing. The SCDIs issued have generally formed only a small part of the debt stock, have been used mainly as a complement to the existing portfolio of conventional debt instruments,¹⁴ and have often been discontinued after a small number of issuances. Table 2 presents some features of selected instruments issued in recent years (see Annex IV for more details on some of the case studies). The specific design of instruments used in practice has reflected the type of risk being addressed, the investor base, and the issuer's technical capacity. SCDIs have also been used in official sector lending, with two important examples outlined in Box 4.

¹²In some cases, the novelty premium has accounted for as much as 1/3 of the total insurance premium (IMF, 2011).

¹³A prominent illustration of the use of SCDIs by the *private sector* is the recent introduction of "Contingent Convertible" bonds by banks; for a discussion of this experience, see Annex III.

¹⁴Islamic financial products could be viewed as bearing state-contingency and risk-sharing properties because Sharia law bars fixed interest and principal payments. However, much of the sovereigns' actual use of Islamic financial products has been limited to Sukuk, a type of securitized project financing that usually works akin to a lease/rental agreement, and offers de facto fixed returns to the investor except if the project fails.

Table 2. Selected Examples of Debt Instruments with State Contingent Features

Instrument	Country (period)	Continuous/discrete adjustment	Currency	Tenor (years)	State/trigger variable	Payout/Deferral type	Tradeable/non-tradeable
Guaranteed equity bond	UK (2002-2009)	Continuous (with principal cap/floor)	LCY	5	Equity index	Payout at redemption linked to FTSE 100 level	Non-tradeable (retail)
Gold Bond	India (2015-)	Continuous	LCY	8 (redeemable at 5)	Price of Gold	Principal linked to price of gold	Non-tradeable (retail)
Nominal wage linked bond	Uruguay(2014)	Continuous (with coupon floor)	LCY	30	Nominal wage index	Principal linked to level of nominal wage index	Tradeable
GDP-linked treasury certificates	Portugal (2013-)	Continuous (with coupon floor)	LCY	5	Real GDP growth	Coupon linked to GDP growth (in final 2 years only)	Non-tradeable (retail)
Revenue indexed bond	Turkey (2009-12)	Continuous (with coupon floor)	USD /LCY	3	Government SoE Revenues	Coupon linked to income from SoEs	Tradeable
Oil-linked bond	Mexico (1977-1980)	Continuous (with coupon floor)	LCY	3	Export price of oil in USD	Principal linked to local currency price of oil	Tradeable
Petrocaribe loans from Venezuela	11 Petrocaribe members ¹ (2005 -)	Hybrid	USD /LCY	25	Price of oil in USD	Down payment share, interest rate, and grace period linked to price of oil & ex. rate	Non-tradeable (Official)
AFD countercyclical loans	5 countries ² (2007 -)	Discrete ³	EUR	25 (w/ 5 year grace)	Export earnings	Maturity and Grace period extended by up to 5 years	Non-tradeable (Official)
Extendible municipal paper	USA municipalities (2000-)	Discrete	LCY	180-270 days	Issuer's discretion	90 day Maturity extension if triggered (from 180 to 270 days)	Tradeable

Sources: http://www.petrocaribe.org/index.php?tpl=interface.en/design/participantes/participantes_principal.html; <http://www.afd.fr/lang/en/home/outils-de-financement-du-developpement/prets>; Zoheir, E., and Tavakoli, H., 2016, "Countercyclical Financial Instruments—Building Fiscal Resilience to Exogenous Shocks," The Commonwealth Secretariat. Available at: <http://thecommonwealth.org/sites/default/files/inline/Countercyclical.PDF>

1/Guyana, Nicaragua, Haiti, Belize, Jamaica, Antigua, Dominica, Grenada, St. Kitts & Nevis, St. Vincent & the Grenadines, and the Dominican Republic.

2/Burkina Faso, Mali, Mozambique, Senegal, and Tanzania.

3/Grace period and maturity extensions trigger for years in which nominal exports (in €) fall below 95% of their average over the previous 5 years.

Box 4. State Contingent Features in Official Lending

State-contingent features can be effectively incorporated in official lending. Two recent examples are:

- The **Agence Française de Développement** (AFD) offers concessional project financing with countercyclical terms (Prêt Très Concessionnel Contracyclique facility) to post-HIPC countries. The instrument consists of a thirty-year loan, a five-year grace period, and a five-year "floating grace period" for principal payments. The debtor has the right to exercise the floating grace period in the event export earnings fall below a predefined threshold. Repayments can be deferred up to five times after the threshold is met. Since 2007, the AFD has offered 16 such loans, amounting to €344mn, to five low-income countries. As of yet, the floating grace periods has not been triggered in any of the loans.
- **Petrocaribe** lending involves bilateral loans extended by Venezuela to other countries to purchase oil produced by PDVSA (Petroleos de Venezuela, S.A.), Venezuela's state-owned oil company on predetermined flexible financing terms. The terms of the loan are linked to the prevailing price of oil, potentially providing either the creditor (Venezuela) or the debtor protection in the face of an adverse oil price shock. Payment terms are negotiated bilaterally; debtor countries can also offer goods and services in lieu of currency. The loans were first issued in 2005, with Jamaica the first recipient, in a backdrop of unprecedented high oil prices.

15. The experience with SCDIs in ‘normal times’ offers several clear takeaways:

- *Confidence in data quality is important.* Market indices or prices have been used more frequently than economic statistics, in part owing to greater measurement certainty, including the lack of subsequent revisions.
- *SCDIs need to match the interests of specific investor groups.* Many SCDIs have been placed privately with targeted investor groups and have been non-tradeable. For example, Turkey’s revenue-indexed bonds were designed as instruments suitable for banks that had a preference for Sharia compliant (non-interest bearing) instruments,¹⁵ while the U.K., Portugal, and India have all issued non-tradeable SCDIs targeted at retail investors. Uruguay issued a nominal wage linked bond privately placed with a public social security fund that had a clear demand for an asset linked to nominal wages to match their long-term liabilities.¹⁶ It also recently announced plans to create a daily accounting unit to track the wage index, in part with a view to attracting more private providers of pension fund services.
- *Investors have often demanded floors on instrument payments.* The SCDIs issued to date have generally had continuous adjustment of the principal and/or coupon. Among these, caps and floors on payments have been common, and the instruments issued by Turkey, Portugal, India, and Mexico all offered a guaranteed minimum return. For investors, the activation of instrument triggers that generate losses without floors can disincentivize future appetite (as in Mexico’s triggering of its 2015 Multicat bond).
- *Loss aversion can be an impediment.* For issuers, political constraints can make it difficult for sovereigns to justify sharing returns in good times, especially when payouts are due to external creditors. For example, Mexico’s 1977 oil-linked bond issuance illustrates this risk; principal payments were linked to the export price of oil in USD, and oil prices increased during the period the bond was outstanding. However, the government used a less favorable official exchange rate to determine the payout, causing a net loss for investors.
- *Institutional support.* In addition to independent statistical agencies, these cases also highlight the importance of strong debt management capacity (with SCDIs having only been used by sovereigns with well-established debt management offices), and official sector support (such as through multilateral development banks (MDBs)), which can encourage repeat use of state-contingent instruments by lowering issuance costs.

¹⁵Issuance of these instruments was discontinued after 2012, as Sukuk issuance in domestic and international markets catered to the market originally targeted by the revenue-indexed bonds.

¹⁶The government could, in this sense, provide (receive) insurance to the pension funds against strong (weak) wage growth because its own revenue is strongly correlated with nominal wages.



16. The successful launch of inflation-linked bonds in advanced economies since the 1980s affirms the above takeaways, while also reveals some additional insights:¹⁷

- The launch was seen as a win-win for both sides. There was a natural investor base in the form of pension funds carrying long-term ‘real’ liabilities. The issuers also thought that these instruments “could lower the cost of borrowing over the longer term.”¹⁸
- The instruments were issued at a time when there was significant uncertainty around inflation (ahead of the transition in many countries to inflation targeting). The current uncertainty around future growth could, therefore, provide fertile ground for SCDIs with a link to GDP.
- The bonds strengthened the incentive for issuers to keep inflation low. And the availability of credible inflation data was key to securing investor confidence in these bonds.
- The emergence of a simple standardized design around the “Canadian-model” helped boost liquidity, reduce costs, and facilitate further issuance.
- Issuance took time in some cases and political will was critical. In the U.S., it took several years for the idea to translate into reality and only after there was a strong push from the U.S. Treasury.
- Novelty/liquidity premia fell with scale but did not disappear. Some estimates suggest that U.S. inflation-linked treasury bonds continue to pay a premium of about 40 basis points, even with more than US\$1 trillion outstanding (Abrahams and others, 2015).

¹⁷Rising prominence of inflation-linked debt in the early 2000s has also been documented in a number of EM sovereigns (see Annex V and Figure 3).

¹⁸U.S. Treasury Borrowing Advisory Committee, 1995: <https://www.treasury.gov/resource-center/data-chart-center/quarterly-refunding/Documents/rpt-1995-q2.pdf>

B. Issuance in Restructuring Contexts

17. State-contingent instruments have become a common component of sovereign debt restructurings. The first use of state contingent bonds in debt restructurings occurred in the Brady deals from 1989–97 (Box 5). The Brady instruments offered contingent upside payments to investors, tied to a specified economic variable, but did not foresee any fall in payments in the event of a downside scenario. More recently, ‘upside’ GDP-warrants have featured as part of the package of bonds issued to creditors in each of the three major restructurings of the past decade: Argentina (2005 and 2010), Greece (2012), and Ukraine (2015) (Table 3). In the case of Grenada (2015),¹⁹ the restructuring deal included instruments with both upside and downside features (Table 3).

Box 5. Brady Deals

The first prominent use of SCDIs in a restructuring context arose with the so-called ‘Brady bonds’ issued in the 1980s and 1990s. The key innovation of the Brady deals was that they allowed commercial banks to exchange their claims on the participating countries for tradable instruments, allowing the banks to transfer this debt off their balance sheets. Each Brady country negotiated the specific terms and details of its restructuring, and this often resulted in a ‘menu of options’ for their exchange of eligible debt.

A number of these Brady bonds included ‘value recovery rights’ (VRRs). The general principle was that if the debtor country’s terms of trade or economic conditions improved, creditors could also benefit by receiving additional debt service payments. Oil exporters generally issued VRRs linked to oil prices, while other countries linked either to GDP or measures of the terms of trade (Table). The Brady bond VRRs offered contingent payments only in an upside scenario, and obligations were often imbedded in the bonds rather than issued as detachable instruments. Most deals included some form of limit on upside payments, either in the form of a payment cap or a buyback option.

State-contingent Brady Instruments

Index / warrant	GDP	Commodity Price	Terms of Trade
Detachable	Bosnia & Herzegovina (1997)	Venezuela (1990), Nigeria (1992), Mexico (1990)	Uruguay (1991)
Non-detachable	Honduras (1989), Costa Rica (1990), Bulgaria (1993), Côte d'Ivoire (1997)	Bolivia (1992)	

Many of the Brady instruments subsequently made significant upside payments. In some cases, sovereigns chose to repurchase the instruments as it became clear that upside payments would be triggered (e.g., Mexico, Bulgaria in the mid-2000s), while in other cases sovereigns have made ongoing payments on these instruments (e.g., Bosnia, Venezuela).

The Brady VRR instruments faced a number of problems, which gave them a mixed reputation among both debtors and creditors. Data issues recurred frequently, and took a number of forms including ambiguity over the precise index referenced (Bulgaria) and confusion around the treatment of revisions (Bosnia). The non-detachability and guarantees embedded in some Brady instruments also caused issues, and therefore faced a higher liquidity premium. Similarly, bonds where the formula determining payoffs was overly complicated were not popular with investors.

¹⁹Annex IV discusses the hurricane clauses introduced in the Grenada restructuring in more detail.

18. Divergent debtor-creditor expectations have often encouraged the emergence of these instruments in these circumstances. Upside instruments have helped to bridge expectation gaps between debtors and creditors over the economic outlook for the economy and the degree of debt relief required in the restructuring, by allowing investors to receive higher payments if their more optimistic expectations are realized, while also exploiting the lower (political) cost for governments of promising payments in good states of the world.

19. The recent experience with state-contingent instruments in restructurings (Table 3) highlights several key considerations:

- *The state variable chosen should be closely tied to the repayment capacity of the sovereign, while also being readily available and well-understood by investors.* For example, Grenada was able to introduce its ‘hurricane clause’ because of the clear effect of hurricane damage on fiscal capacity and because there was a credible quantitative metric to determine when the clause should be triggered.²⁰
- *Indexation lags, and links to highly persistent state variables are problematic.* Upside payments are likely to be more politically unpopular when they occur well after the event that triggered their payout, while indexation lags can erode the countercyclical properties of a SCDI. For example, with Argentina’s GDP warrants the link to the level of GDP necessitated ongoing payments for growth in the early years after issuance—which proved politically very difficult, and the indexation lag led to high payments even in years when the economy was in recession (BoE, 2016).
- *Complexity has brought costs in terms of volatile pricing, low liquidity, and high premia.* Some instruments have experienced volatile pricing, in part because of their non-linear payment structures. Market participants do not seem to have converged on a single method for valuation and have tended to rely on very simple pricing mechanisms, perhaps because of the relative rarity and tailored nature of such instruments. Low liquidity has also deterred investors from developing pricing models, particularly when they have been “out of the money.”
- *Governments undergoing a restructuring can place a high discount factor on future payments.* Faced with a debt crisis, a government’s most immediate concern tends to be concluding an orderly restructuring quickly, securing the requisite debt relief. As such, sovereigns may be more focused on the current payment schedule than investors, who may put more weight on future payments promised in an upside instrument, or the uncertainty around these. In some cases, this has resulted in instruments offering relatively generous payments in the event of an upside scenario.

²⁰The Caribbean Catastrophe Risk Insurance Facility Segregated Portfolio Company (CCRIF SPC) produces modelled estimates of the economic damage caused by natural disasters, which are used to determine insurance payouts.

Table 3. Issuance of State-Contingent Instruments in Recent Sovereign Debt Restructurings

Type	Country	Haircut ^{1,2} Nominal/NPV	Currency of denomination	Period covered (years)	Main trigger	Formula for payout/deferral	Caps/Exercise limits
Upside	Argentina (2005 & 2010) - GDP-linked warrant	29.8%/ 76.8%	Local and Foreign currency	20	Real GDP level	•Pays out 5% of real GDP in excess of reference level	Total payments capped at 48% of notional principal
	Greece (2012) - GDP-linked warrant	53.5%/ 64.6%	Local Currency	27	Real GDP growth	•Pays out 1.5 times real GDP growth in excess of reference growth rate	Annual cap at 1%
	Ukraine (2015)-GDP-linked warrant	20%/ 28%	Foreign Currency	20	Real GDP growth, level of GDP in USD	•Pays out 15% of real GDP growth between 3-4% •Pays out 40% of real GDP growth in excess of 4% •No payments unless nominal GDP is higher than USD 125.4bn	Annual cap at 1% of GDP from 2021-2025; uncapped from 2026-2040
	Grenada (2015) - CBI ³ revenue-linked payments in 2030 bond	50% (of which 25% upfront)/ 54%	Local and Foreign Currency	15	CBI revenues	• Pays out 25% of CBI proceeds between US\$15mn-50mn • Pays out 35% of CBI revenues in excess of US\$50mn	Discounted ⁴ value of total payments capped at 35% of outstanding principal value
Downside	Grenada (2015) - Hurricane clause ⁵ in 2030 bond	50% (of which 25% upfront)/ 54%	Local and Foreign Currency	13	"Modelled" Hurricane damage	• 6 month deferral if modelled loss is greater than USD 15mn, less than USD30mn • 12 month deferral if modelled loss is greater than USD 30mn	Can be triggered a maximum of 3 times

Source: Bloomberg.

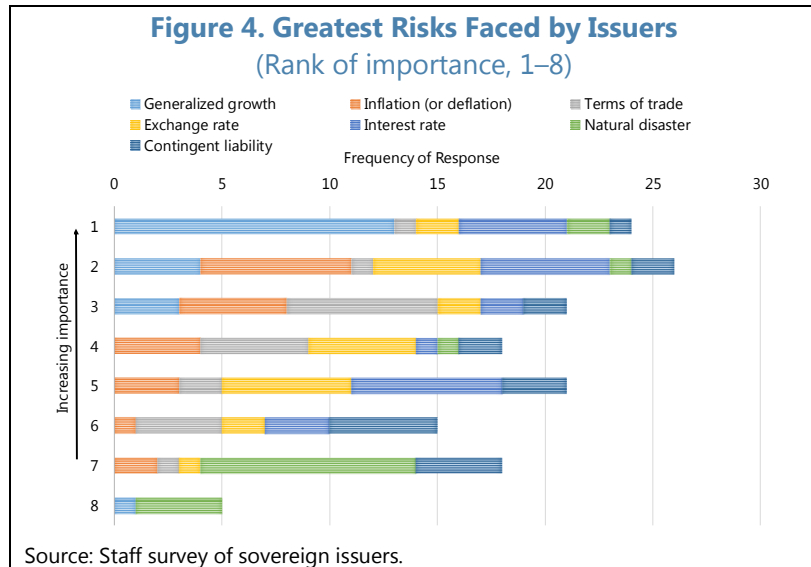
^{1/} These haircuts calculations do not account for the value of the state contingent instruments.^{2/} Sources for Haircut estimates are Trebesch et al. (2014), Zettelmeyer et al (2013) and IMF (2015, 2016).^{3/} These refer to revenues from Grenada's 'Citizenship by Investment' program.^{4/} Payments to be discounted back to May 2015 using average yield on the 2030 bond in the year in which they occur.^{5/} Similar clauses were included in restructured debts with the Import-Export Bank of Taiwan and the Paris Club

C. Feedback from Potential Issuers and Investors

20. Surveyed issuers were relatively guarded in indicating an interest in issuing SCDIs.²¹ In a survey of sovereign issuers, most reported that their current menu of conventional debt instruments was adequate, and none had plans to launch any SCDIs in the near future. They stressed that SCDIs' risk reduction benefits would need to justify their expected higher cost relative to conventional debt instruments. One of the main obstacles for market creation, according to them, was lack of a natural investor base. In addition to that, issuers highlighted that design complexity, data quality, and issues with lags could make SCDIs difficult to price. And it would be difficult to achieve a share of SCDIs in the overall portfolio to deliver a meaningful risk reduction, not least because of the danger of "cannibalizing" the market for conventional debt. It is also worth noting that there were some differences between institutions within countries. In general, debt management offices tended to be more skeptical, while central banks were more open to the idea of SCDIs. This could be due to the fact that the former are more focused on more immediate cost-risk considerations and technical constraints to issuance; while the latter are more cognizant of the potential macroeconomic and system-wide benefits.

²¹The list of countries covered by the survey included 20 AEs and 8 EMDCs. These findings were corroborated in discussions with sovereigns, including the participants of the workshops on GDP-linked bonds (April 2016), Bretton Woods Committee workshop on GDP-linked bonds (October 2016), Paris Club Debt Forum (November 2016), as well as surveys of sovereign issuers (mainly debt managers) conducted in September–November 2016.

21. Some sovereigns, however, did see a role for SCDIs. A number of respondents indicated that, in part because they can hedge market risks, their balance sheets are most vulnerable to a generalized growth shock (see Figure 4). While some countries employed fiscal stabilization funds to mitigate shocks, this option may not be available/sufficient for other countries. Furthermore, a few central banks have highlighted a role for SCDIs in de-risking sovereign balance sheets. Some respondents also believed that creating a well-defined instrument design would facilitate quantification of risk premia on SCDIs, indicating such premia could be 20–30 bps over a conventional nominal bond of similar maturity/currency.



22. Feedback from investors was more heterogeneous, but overall, suggested relatively greater openness to the idea of well-designed SCDIs.²² Some investors felt SCDIs could offer a means to complete markets, earn higher yields in a low interest rate environment, and gain exposure to otherwise-closed risk segments. Others felt that the governance issues and other uncertainties preclude investment. Almost all highlighted the importance of simplicity, standardization of design, and clarity of legal and regulatory treatment for a liquid market to emerge. Although, recognizing that there was no one-size-fits-all SCDI, investors did express some specific preferences, which are summarized below:

- *Continuous adjustment vs. one-off instruments.* Fixed income investors generally favor GDP- or commodity-linked bond-style instruments over one-off-adjustment instruments, where returns are linked to a discrete event. However, reinsurers expressed a strong interest in hurricane clauses in bond contracts for small states vulnerable to natural disasters. Some fixed income investors were more concerned about “coupon irregularity” and would be willing to take a loss in principal or extended duration. In any case, it would be difficult for the trigger conditions to cover all circumstances in which relief might be needed. A *credible* commitment to exercise only when required might have a similar effect, but establishing such credibility would be

²²Outreach to potential investors in SCDIs was launched in April 2016. Discussions were held with a range of investors including asset managers, investment banks, hedge funds, banks, insurance, and pension funds, in the U.S., U.K., and continental Europe. Discussions were also held with credit rating agencies. The focus was on instruments linked to macroeconomic variables, such as GDP, and commodity-linked instruments, as well as instruments with triggers for standstill on payments and/or maturity extension options. Earlier surveys including IMF/EMTA 2004, ZEW 2004, EMTA 2012, BoE 2015 mainly focused on GDP- and/or growth-indexed bonds and a narrower range of potential issuers.

difficult, and this approach could be counterproductive if, as a result, the extensions were taken as a negative signal by investors.

- *One-sided vs. two sided adjustment and caps/floors.* Fixed income investors expressed clear demand for instruments offering upside, especially given the low-interest rate environment. These and other investors also asked for a floor for the downside adjustment. Some investors were supportive of the sovereign retaining some of the upside (via caps), including because this could mitigate moral hazard and political economy difficulties. Clients (like pension funds) may put limits on bonds with variable returns when giving mandates to asset managers. And some investors (with rigid mandates) could be precluded outright from investing if the principal were not protected by a floor. Some counterparts suggested that an instrument with substantial downside risk would be treated as equity and have to offer a comparably high yield. Yet, reinsurers saw downside-only instruments as fully consistent with their business models.
- *Data integrity and choice of state variable/trigger.* Indexing to a macroeconomic variable such as GDP could give rise to concerns regarding data reliability, statistical transparency, revisions, redefinitions, model risk, and to political economy concerns (such as adverse selection and ex post commitment). Some investors suggested a major issuer go first in order to build confidence. For sovereigns, where data integrity could be an issue, investors stressed the importance of penalties in the event a data quality test was failed. Investors were comfortable with a link to commodity prices, but noted that this would limit the universe of issuers.
- *Detachability.* Views differed on the need and desirability of derivative instruments accompanying the underlying bond. Some preferred having the upfront option to customize the amount of risks they were taking. Others recognized that derivatives markets would automatically follow once the bond market was established (akin to the emergence of inflation-indexed swaps following inflation-linked bonds).
- *Legal and regulatory treatment.* Investors did not expect SCDIs to receive more favorable legal or regulatory treatment than conventional debt instruments. Discussions with market participants indicate a preference for not giving SCDIs seniority relative to other conventional debt instruments. Also, they felt it was essential that the activation of a state-contingent clause should not be treated as a “credit event.” Investors in EM debt also had some preference for denomination/settlement in a major currency and issuance under New York or English Law to mitigate legal risk.

CONSIDERATIONS FOR MARKET DEVELOPMENT

The previous section helps us better understand the key barriers to SCDI market development, as well as the concerns of potential issuers and investors. This section looks at how careful instrument design, informed by a sharper understanding of investor and issuer preferences, and supported by robust contracts and institutions, might help overcome these barriers.

23. The discussion thus far enables us to distil some key requirements for the development of self-sustaining SCDI market development:

- (i) **Identifying natural issuers and investors.** Issuers that have a sustained demand for protection against macro-financial risks need to be matched with investors willing and able to bear this risk. Matching these natural counterparts will ensure that there is a sufficiently large ongoing volume of SCDI issuance to make it worthwhile for market participants to analyze relevant information and develop market practices (e.g., issue ratings, include in indices).
- (ii) **A few simple benchmark instrument designs around which liquid markets can emerge.** The menu of SCDI designs must be broad enough to allow a range of sovereigns to hedge the principal risk(s) they face (e.g., GDP risk, sudden stops, large exogenous terms of trade, or natural catastrophe shock) but also take into account investors' preferences, in particular for simplicity, and for state variables/triggers to be as immune as possible from manipulation risks and perverse incentives. At the same time, liquidity is both a consequence and a driver of scale, which is needed to lower costs for both issuers and investors. Thus, there are large advantages to keeping to just a few benchmark designs. As discussed in the next section, there may be a case for the IFIs, including the Fund, to provide some guidance in this space.
- (iii) **Robust institutions and contracts.** Strong institutions, both statistical and debt management, are needed to secure investor confidence in the new product. Similarly, robust contracts can help to address data integrity/manipulation/revision risks, mitigate moral hazard and adverse selection problems, and take account of the likely treatment under existing regulation. Again, technical support from IFIs could be helpful in this context.
- (iv) **Appropriate regulation and market treatment.** Appropriate regulatory treatment is necessary to properly reflect the risk-mitigation benefits of SCDIs for the sovereign, prevent excessive amounts of risk migrating from the public to private sector, and reduce operational "load" for investors e.g., administrative and financing costs, but also capital requirements. Whether SCDIs are given credit ratings and are deemed 'index eligible' is also likely to be important for market demand.

The rest of this section examines these four considerations in turn.

A. Potential Issuers and Natural Investors

Potential Issuers

24. Sovereigns differ in their characteristics and vulnerabilities, and thus in the likely net benefits to them from various SCDI designs.²³ Many advanced economy sovereigns are vulnerable to domestic demand shocks. Accordingly, they could benefit from the ‘generalized’ insurance and countercyclical properties embedded in instruments such as GDP-linked bonds, so long as problems associated with adverse selection and moral hazard are not too severe. Within this broad group:

- *Euro-area members* have relatively elevated debt levels and have experienced volatile interest rate-growth differentials (Table 4), in part because of constraints on the ability of common monetary policy to respond to domestic business cycles. GDP-linked debt that protects individual sovereigns against such cyclical movements could help address these issues, complementing available instruments to preserve policy space in bad times. Blanchard and others (2016) illustrate that GDP-linked bonds could substantially reduce uncertainty around debt/GDP ratios for euro area countries with high debt and a negative correlation between interest rates and growth. However, such countries are also likely to be most susceptible to issues such as adverse selection. On the other hand, access to a larger international investor base within the union (that naturally allows for cross-border risk-sharing), and the existence of supranational euro area statistical agencies (that mitigates concerns around data manipulation) would strengthen the case for issuance by euro area sovereigns.
- *Small-open economies* generally have lower debt levels and face fewer constraints on monetary policy. However, some members of this group are highly exposed to external shocks and have less access to deep and liquid domestic debt markets. In such cases, additional insurance against growth or financing shocks, through SCDI issuance to non-residents, may be beneficial.
- *Reserve currency issuers* have experienced a relatively stable interest rate-growth differential and liquid domestic debt currency markets,²⁴ which can experience ‘flight-to-quality’ inflows in time of stress. More broadly, these countries can mimic the effects of SCDIs using their existing policy levers. Accordingly, there is a less compelling case for SCDI issuance in these countries.²⁵

25. Although a large and heterogeneous group, most emerging markets and low-income countries are exposed to substantial, but largely exogenous, shocks. While domestic policies are an important driver of growth performance over long horizons, exogenous (but still largely idiosyncratic) factors tend to be the key determinants of growth in the short and medium term. Unlike

²³Annex VI provides full details of the countries in each group and a more detailed summary of their characteristics.

²⁴This group includes Canada, Japan, Switzerland, the United Kingdom, and the United States.

²⁵A case for SCDIs in these cases could be made if it was felt that productive spending was below desired levels due to the combination of high debt and uncertain macroeconomic returns from that spending; or because subnational governments and private businesses could significantly benefit from market-based expectations of growth.

advanced economies, these countries are particularly vulnerable to balance of payments shocks that are associated with capital outflows and large exchange rate depreciations.²⁶ It is useful to distinguish between the following groups:

- *Commodity exporters* and *small states* tend to experience high growth and primary balance volatility given their exposure to potentially substantial external exogenous shocks (Table 4). The more they are exposed to, respectively, commodity price shocks and natural disasters, the greater the potential benefit from instruments (such as commodity-linked bonds and extendibles triggered by natural disaster) that can provide a hedge against these exposures.²⁷ The fact that the primary driver of these sovereigns' repayment capacity is a variable that is externally verifiable (e.g., commodity price index and independent natural disaster damage estimates) can also address investor concerns around data integrity and moral hazard, and thus make premia on these instruments more manageable.

Table 4. Characteristics of Potential Issuers¹

Country groups	Debt/GDP (Total Debt in USD tn) ²	Gross Financing Needs (% of GDP) ³	Standard deviations ⁴				memo: debt in foreign currency (%) ⁵
			Change in debt/GDP (pp)	Real interest rate-growth differential	Primary Balance (% of GDP)	Exchange rate depreciation (%, vs USD)	
AEs	72 (45.8)	11	4.5	3.9	2.7	...	6
Euro-area members	81 (10.5)	11	5.0	4.4	2.7	...	5
Small open economies	42 (2.0)	5	3.8	3.9	2.8	...	11
Reserve currency issuers	116 (33.2)	21	4.3	2.2	2.5	...	2
EMDCs	50 (12.1)	10	10.2	7.2	4.1	13.5	55
Commodity exporters	35 (1.0)	6	9.8	15.5	7.3	11.3	35
Small States	61 (<0.1)	13	8.9	5.2	5.8	6.6	63
Local Currency issuers	52 (9.3)	13	5.5	4.4	2.4	12.8	16
Other EMs	54 (1.3)	10	7.9	5.8	2.1	22.0	60
Other LICs	48 (0.5)	9	14.7	5.8	3.1	13.9	71

Sources: World Economic Outlook database; and Fund staff calculations.

¹ Figures for each group are simple averages.

² End-2015 debt.

³ Average of 2016 data and projections for 2017.

⁴ Standard deviations calculated using annual data for 2000-15.

⁵ Based on end-2015 debt (where available).

- *EMs that have made substantial progress in reducing reliance on foreign currency debt* (see Annex V) generally have lower debt-to-GDP volatility than other developing economies. Accordingly, the best strategy for these countries may be to continue deepening their long-term local

²⁶The median currency depreciation around sovereign stress episodes is 32 percent in emerging and low-income countries, compared to 2 percent in advanced economies.

²⁷Symmetrically, some countries whose dependence on imported commodities is high may also benefit from such a link, for example in the form of extendibles triggered by a large rise in commodity prices.

currency fixed rate debt markets. However, some of these countries bear characteristics that are similar to those of small open advanced economies; specifically, their close integration into international trade and financial markets makes them vulnerable to external shocks. As such, they could potentially benefit from some SCDIs, notably local currency GDP-linked bonds, particularly if issued to non-resident investors.

- *Other EMs without established local currency bond markets* tend to have volatile debt often driven by exchange rate shocks. For many of these economies, macroeconomic policy tools are limited in relation to the size of shocks they face and the authorities cannot rapidly and economically obtain market financing for adjustment. Official sector support (including emergency IFI support) is clearly an option for such economies, but this can take time to arrange. SCDIs that maintain external private creditor exposure in the face of an external shock, and/or share losses with such creditors, may reduce the need for official sector support, or where it is needed, could facilitate access thereto. The lack of development in local currency debt markets could prevent the issuance of such SCDIs (or conventional instruments) in local currency, but foreign currency SCDIs (especially extendibles or growth-indexed FX-denominated bonds) may still prove useful. Additionally, in EMs that are looking to transition towards local currency fixed rate debt, SCDIs linked to nominal GDP (or a proxy) could perhaps offer an alternative to inflation-linked debt—which has played an important role in previous transitions (see Annex V)—with the key relative advantage being that the GDP-linked bond would afford some protection against adverse real GDP shocks.
- *Similarly, LICs with shallow local currency debt markets (and that are not commodity exporters or small states)* are also vulnerable to large exogenous shocks, and have only intermittent and precarious external market access. While they face volatile debt and interest rate-growth differentials, increasing their integration into global capital markets via conventional FX bonds (like Eurobonds) may be a prerequisite to developing complementary SCDIs at affordable cost. Initially, these countries could benefit particularly from greater inclusion of state-contingent features in official (bilateral and multilateral) lending. Moral-hazard concerns, especially around data linked to national economic statistics, are acute in many LICs and would pose a challenge to market-based instruments, but extendible designs linked to externally verifiable triggers may be feasible in some cases.

Natural Investors

26. SCDIs could potentially attract a broad range of investors. In general, yield-seeking investors may be attracted to SCDIs insofar as they offer higher returns relative to other available assets, provided that they can bear the additional risk. At least four groups of potential *natural* investors can be identified:

- *“Natural hedge” investors.* As discussed in the section exploring the economic case for SCDIs, instruments such as nominal GDP-linked bonds can generate a return that protects both the investors’ absolute and relative purchasing power. Accordingly, such instruments could be particularly appealing for pension funds that are expected, either explicitly or implicitly, to

deliver such protection to savers.²⁸ At present, it is possible for these pension funds to hedge against inflation (through inflation linked bonds) and track the return on capital (through equities). However, nominal GDP-linked bonds would more directly track average wage movements (through the labor component of GDP). Pension funds are a potentially massive investor base, with assets at US\$38 trillion (almost two-third of end-2016 global public debt of US\$58 trillion).²⁹ Individual investors saving for long-term needs (e.g., college education funds, rental costs) could also be a source of direct retail demand. Similarly, countries and corporations that are net importers or users of commodities could be natural investors in commodity-linked bonds issued by commodity-exporting sovereigns.

- *Portfolio diversification investors.* These are typically large (often global) balance sheet investors that can withstand temporary shocks to returns from any individual asset. SCDIs could improve the risk-adjusted return of their fixed income portfolios due to diversification benefits. Large global mutual funds, sovereign wealth funds, and reinsurers would fall in this category. They may have stronger appetite for exposure to smaller economies whose macroeconomic fundamentals (and therefore the state variable) are weakly correlated to returns in major AE markets, although investment mandates may limit investments in sub-investment grade or non-hard currency assets. Some of these investors may also be relatively protected from liquidity risk and thus be candidates to invest in extendibles.
- *Islamic financial investors.* Because Sharia law bars fixed interest and principal payments, Islamic financial investors could serve as a source of demand for certain types of SCDIs (like Sharia-compliant commodity-linked bonds). The case for issuing GDP- or revenue-linked bonds as possible Sharia-compliant instruments was put forward by senior Fund officials in the late 1990s, but could not garner the support of Islamic scholars (who cited lack of collateral as a key problem). That said, Islamic finance practitioners have developed expertise in a range of commodity-linked transactions, albeit largely in a non-risk-sharing space, which could be tapped into to generate demand for sovereign bonds whose payoffs are linked to specific commodity revenue streams. The balance sheet size of the entire Islamic finance sector is currently estimated at about US\$2 trillion, of which about US\$110 billion takes the form of sovereign Sukuks and about US\$50 billion quasi-sovereign Sukuks (International Islamic Financial Market, 2016).
- *Insurers and reinsurers of tail risks.* These agents specialize at assessing insurable tail risks, particularly low-frequency, high-impact events such as natural disasters (hurricane, flood, drought etc.). Moreover, a substantial insurance-linked securities market for such risks, worth US\$25.9 billion at end-2015, already exists. This investor group could be particularly suited for

²⁸In Uruguay's pension system, upon retirement, pensioners receive an annuity linked to a nominal wage index (the IMSN). In order to match these liabilities, a demand for assets linked to this index emerged; and this was filled by issuance of a wage-linked SCDI by the Uruguay government.

²⁹The insurance industry (with assets of US\$27 trillion) may have a similar interest in SCDIs.

holding some forms of SCDIs, such as extendibles, with discrete trigger events linked to an independently verifiable catastrophe.

- *Official sector lenders.* These countries and institutions already provide substantial development and budget support financing for developing economies (Paris Club claims amount to over US\$300bn). Such lenders have long horizons and can tolerate variable returns or a temporary suspension of returns in the event of, say, a reprofiling.

B. Benchmark Instruments

27. Given potential supply and demand sources, the emergence of liquid SCDIs will likely require some standardization across instruments. With interested issuers and investors, episodic issuance based on designs that are tailored to their needs may well continue in the coming years. However, these will not lead to the emergence of relatively deep and liquid markets, which can reduce costs for issuers and investors and prompt further market expansion. To achieve these benefits, the bulk of demand and supply will need to be focused on a few SCDI benchmark designs (Table 5).

28. Staff’s analysis, consistent with the findings in previous sections, suggests merit in focusing on three benchmark SCDI designs. These designs span the broad spectrum of existing debt instruments, and have the potential to cater to the preferences of a range of sovereigns and investors. It is important to note that—at this stage of analysis—it is appropriate to discuss a number of state variables/triggers that could work with these designs. In this context, Box 6 details some options for state variables/triggers that are outside issuer control but still closely correlated to the issuer’s repayment capacity, including commodity price indices, natural disaster damage estimates, merchandise exports, trading-partner GDP, and domestic or international bond spreads. Once the pros and cons of these alternative state variables are well understood, issuers and investors will likely need to settle on a subset of these to achieve standardization objectives. The three benchmark designs are:

29. “Linker”: principal (and coupon) linked to level of state variable. These instruments have equity-like features that seek to stabilize the debt burden in the face of generalized macroeconomic shocks. They are akin to inflation-linked bonds in that both the coupon and the principal are directly linked to the level of the state variable. An obvious example of this design is the local currency nominal GDP-linked bond proposed in the London termsheet.³⁰ But the bonds could also be linked to other indices such as commodity prices, real GDP, or equities. In a currency-union context, the state variable could also be more narrowly defined around the domestic business cycle component of GDP (insofar as currency union-wide business cycle shocks can be addressed via monetary policy). These instruments have also been associated with perpetuity bonds (no maturity date), as advocated

³⁰It is important to note that, as a result of financial market arbitrage conditions, the issuance yield on this instrument is invariant to expected nominal GDP growth (except in so far as changes in growth expectations have implications for the interest rate on conventional bonds). For a given coupon, a higher expected nominal growth rate will lead to a higher issuance price for the bond (or if issued at par, the coupon will be lower).

by Shiller (1993, 2003). This would avoid potential pricing volatility as the Linker approaches its maturity date.

- Protection:** These instruments provide protection against ‘tail-events’ that could lead to default, and thus provide more borrowing space for counter-cyclical policies. With nominal GDP as the state variable, the structure implies that first round effects of shocks to nominal GDP will leave the debt-to-GDP ratio unchanged. In this regard, the main action in these instruments is on the principal; the coupon would not move much from year to year (so little direct liquidity relief). With commodity-linked bonds, the high volatility of the indices may require smoothing the underlying indices. The use of caps and floors more generally can help limit the size of insurance demanded/provided. This may be helpful in the early stages of issuance—allowing Linkers to provide protection against ‘normal’ growth risks, while tail-risk events are handled through different strategies.
- Limitations:** Linkers are not, however, suitable for all countries. Data integrity could be an issue for nominal GDP, especially for EMs and LICs, both in terms of “revisions,” which can be large and frequent, and “manipulation risk,” given governments’ control of statistics and their ability to manipulate the less-familiar GDP deflator. Caps and floors would help satisfy mandates of certain fixed-income investors; and preserve some upside for sovereigns. A real (rather than nominal) GDP link may be more appropriate for EMs and LICs, both because incentives to manipulate real GDP down may be less; and also because of the negative correlation between real GDP and the deflator observed in stress episodes in these countries, which could lead to pro-cyclically high payouts on nominal GDP-linked bonds (see text table).

Text Table. Real GDP vs. Deflator during Bad Times

Average % change * in	Advanced Economies	Emerging Markets	Low Income Countries
Real GDP	-6.4%	-4.5%	-5.6%
GDP deflator	-0.4%	16.1%	16.5%
CPI	3.8%	15.4%	15.1%

* Group average of the percentage change in the index value of real GDP, GDP deflator and CPI, respectively, between t and $t+1$, where t is the year in which a sovereign stress episode occurs and where the index = 100 in year t . The sovereign stress episodes in AMs and EMs are those identified in Arbalaez and Sobrinho (forthcoming), and in LICs are those identified in the review of the LIC Debt Sustainability Framework (forthcoming). Results are based on a subset of stress episodes where real GDP growth was negative.

Table 5. Three Possible Benchmark Designs for SCDIs

Benchmark/ Features	(i) “Linker”	(ii) “Floater”	(iii) “Extendible”
Currency	Local currency	Local or foreign currency	Local or foreign currency
Example of state/trigger variable	Level of nominal GDP, level of a commodity price index	Real GDP growth rate, commodity price change, or a ‘proxy’ variable such as trading partners’ real GDP growth	Discrete triggers linked to: large adverse movements in external demand, commodity prices, goods exports, financial market indices, or to natural or public health disasters
Adjustment mechanism	Principal linked to GDP. Coupon varies somewhat, as it is a fixed percentage of this principal. Principal may also have to be floored to suit the preferences of some investors.	Coupon linked to the growth of GDP, but with a floor of zero. Principal is fixed. Coupon may vary a lot, but could be capped.	Pre-defined extension of the principal payment by 1–3 years. Possible increase in coupon if triggered
Tenor	>=5 years, including perpetuity bond	>=5 years	Varies depending on the trigger and extension period
Main purpose	Stabilizes debt/GDP over the economic cycle and in tail events. Supports counter-cyclical policies and reduces default risk	Provides debt service relief during recessions, but does not assure a stable debt ratio as principal is fixed	Provides substantial liquidity support during times of distress. No direct impact on the debt level
Target issuers	Primarily AEs and EMs with established local currency markets	All economies, but especially EMs with limited access to capital markets	EMs with limited access to capital markets; countries vulnerable to natural disasters; commodity exporters
Target investors	Domestic pension funds and long-term investors; foreign investors	Mainly foreign investors seeking yield	Investors with little liquidity risk; yield and diversification investors; insurers and reinsurers (esp. for disaster insurance)

30. “Floater”: fixed principal, with coupon linked to change in state variable. Floaters have less equity like characteristics than the Linker, as the principal is fixed and only the coupon varies with the state variable. For example, in Borensztein and Mauro’s (2004) design of a growth-indexed bond, the coupon is tied to real GDP growth. A coupon floor of zero would be needed, but the floor could be set higher, depending on the context. Although data manipulation concerns are likely to be less severe with real (than nominal) GDP, investors may prefer a proxy for real GDP growth that is beyond government control. Staff’s analysis suggests that trading partner real GDP growth could provide such a proxy. The bonds could be denominated and payable in both local or “hard currency”, while the coupon would reflect the variation in *local currency* real GDP growth.³¹ The

³¹In a low-interest rate environment, a final principal repayment below par would enable coupon rates to be set at a level high enough to generate substantial relief when growth is low (see Mauro, 2016). A non-negative minimum coupon floor is likely to be needed, as negative coupons would be practically infeasible. And a maximum ceiling may also be desirable to ensure coupons do not rise too much in the event of a sudden surge in growth.

bonds could also be linked to commodity or equity price changes, with appropriate caps and floors to reflect the higher volatility of these indices.

- **Protection:** Since the coupon rate is linked to real GDP, debt service costs could fall substantially during recessions, providing much needed space. During prolonged recessions, near zero interest on these bonds can accumulate into a substantial improvement in debt sustainability. These instruments could be useful to all economies, but EMs which struggle to issue debt in local currency may find these especially useful. These economies tend to be more prone to sudden stops, requiring liquidity relief, rather than deep solvency issues.
- **Limitations:** Relative to the Linker, there are fewer risks to the investor.³² Data integrity and manipulation risks are likely to be less acute as incentives to under-report real GDP growth on a sustained basis are less. However, because the principal remains unchanged (both in terms of amount and maturity), and could even rise if denominated in foreign currency, the protection provided by these instruments is more limited. These instruments are less useful when interest expenditure for the sovereign is relatively small. For AEs, interest payments represent only around 5 percent of revenues; however, for EMs and LICs this share is almost double (and can be as high as 30 percent), suggesting that floaters may be more suitable for this group.

³²This is a result of the necessity for a (non-negative) coupon floor, which would limit the relief provided in large recessions.

Box 6. Possible SCDI State Variables/Triggers outside Government Control

- SCDIs are intended to stabilize government solvency or financing in the face of shocks. As such, the most natural state variable would be government expenditures or revenues (e.g., Barro 1995). However, for these variables, moral hazard concerns may be insurmountable given that they are under the direct control of government policy. While GDP could serve as a more acceptable proxy in countries where independent statistical authorities underpin data credibility, it may not be appropriate for some EMDCs that lack such established credibility. In such countries it may be useful to consider state variables that could be produced without relying on data collected or produced by the issuer's own authorities.¹ There may even be a role for the Fund or other international bodies in collecting or compiling these statistics. Options for trigger variables whose construction are outside the control of the issuer include:
 - *Commodity prices*: Such prices are easily observed and verifiable, and exogenous for smaller exporters and importers, which minimizes the risk of manipulation or moral hazard. Relevant for countries that are highly reliant on either exporting or importing commodities. Given the high correlation of GDP and commodity prices in many commodity exporters, these bonds could deliver similar benefits to GDP-linked bonds.² Examples for an extendible design might include a maturity extension that triggers upon a 20 percent oil price decline over 6 months (corresponding to the 10th percentile of all price changes).
 - *Natural disasters*: Due to the discrete nature of these events, this would be only appropriate for an extendible design. Relief could be tied to the occurrence (and intensity) of natural disasters. External estimates of damage would be a natural choice. The external organization producing such estimates would also need an incentive to behave credibly. For example, in the case of Grenada's hurricane clause, the state variable, i.e., the CCRIF damage estimate is linked to an insurance payout. Established international statistical agencies would also have an incentive to maintain their existing credibility. Summers (2015) has proposed a similar approach for pandemics.
 - *Merchandise exports*: These are easily observed and can be externally calculated when measured from the importers' side (possibly published by the Fund based on DOTS data). Relevant for small open economies countries where revenues from merchandise exports represent the principle source of foreign exchange.³ An extendible design might trigger upon a drop in merchandise exports revenues below a benchmark. For example, some AFD official loans extend in maturity if goods exports fall below 95 percent of their average over the past 5 years.
 - *External demand (trading partner GDP)*: The trading partner GDP-index could be provided externally by an independent international organization, such as the Fund. This variable would also be relevant for economies in which services represent a substantial share of exports. For example, for G20 economies, the median correlation of real GDP growth with trading partner-weighted real GDP growth is 0.765, while the equivalent median correlation for nominal GDP growth is 0.66.⁴
 - *Domestic financial market shock*: Discrete trigger instruments might be linked to domestic bond or CDS spreads.⁵ Domestic spreads could be collected from private financial data providers, and any incentive for governments to manipulate prices might be mitigated if a durable increase was required for an instrument to trigger. For example, the IMF debt sustainability framework for market access countries, uses a spread of 600 bps or more relative to market benchmarks as an indicator of high risks. However, any financial market-based trigger could risk exacerbating market volatility in stress episodes.

Box 6. Possible SCDI State Variables/Triggers outside Government Control (concluded)

- *Global or regional financial market shock.* Alternatively, SCDIs might be linked to a global or regional index such as EMBI. An approach based on regional or global indices would not be prone to manipulation and would capture an exogenous shocks faced by a group of economies.⁶ However, it runs the risk of not providing relief against country-specific shocks. Moreover, the trigger may expose investors to maturity extension in several markets simultaneously.

¹Previous proposals include a 3-year maturity extension in the event of IMF assistance (Brooke and others, 2013) or ESM program (German Council of Advisors/Bundesbank proposals). Buiter and Sibert (1999) argued for a discretionary maturity extension option, but with a penalty interest rate.

²For example, across 13 major oil exporters (Algeria, Angola, Canada, Iran, Kazakhstan, Kuwait, Mexico, Nigeria, Oman, Russia, Saudi Arabia, UAE, and Venezuela), the median correlation between the annual change in the oil price and annual nominal GDP growth since 2000 is 0.85.

³Merchandise trade represents at least 75 percent of exports for over 2/3 of the IMF membership.

⁴These correlations are calculated using annual data for the 1999-2015 period, and using trade-weights based on IMF direction of trade statistics (DOTS).

⁵Barkbu and others (2011) have argued for large increases in CDS spreads or bond yields. See also Consiglio and Zenios. (2015) and Neftci and Santos (2003).

⁶McDonald (2013).

31. “Extendible”: maturity extension linked to a pre-defined trigger. The main feature of the extendible is that it postpones the maturity of a bond when a pre-defined trigger is breached, but maintains principal and possibly coupon payments unchanged.³³ Such instruments could be issued in local or foreign currency, and the length of the extension would depend on country specific risks. The design of the extendible could take three broad forms. *First*, a pure option-based structure (where the sovereign chooses whether or not to extend) provides most flexibility to the issuer, but would be expensive, as this option would be exercised ‘opportunistically’ (see Annex VII). *Second*, an automatic trigger may, however, be overly rigid for the sovereign, with the extension being triggered when it is not needed/desired. *Third*, a ‘knock-in option’ where the sovereign has the option to extend *once* a trigger has been breached, may provide the right balance between affordability and flexibility.

- **Protection:** By pushing out maturities, an extendible can generate substantial financing for a country facing a liquidity shock.³⁴ This can prevent liquidity problems from translating into a full-blown/costly debt crisis in times of stress and low confidence. Moreover, to the extent that the maturity extension stabilizes interest payments at precrisis levels, these instruments should prevent the solvency of the sovereign deteriorating. They would be particularly useful for economies that are prone to ‘sudden stops.’

³³Annex III explores bank contingent convertible bonds.

³⁴This could take the form of an unexpected increase in gross financing needs, rationing of credit, and/or rising funding costs.

- **Limitations:** Extendible bonds provide liquidity relief, but limited solvency support. In cases where a sovereign is hit by a shock that undermines debt sustainability, this instrument provides no reduction in principal or coupon payments (but would buy time for an orderly restructuring). Furthermore, if the sovereign elected for a 'knock-in option' structure, the decision to trigger the option could adversely affect the pricing of conventional bonds, if it were interpreted as a signal of solvency risks. However, market participants may also value the extendible design if the alternative is a debt restructuring (with corresponding deadweight costs) rather than an official sector bail-out.

C. Robust Institutions and Contracts

32. Robust institutions are needed to mitigate investor concerns. Independent statistical agencies are indispensable to attenuate concerns around data integrity and payouts. While most advanced economies satisfy these conditions, some attention may be warranted in countries where statistical revisions (especially to GDP date) tend to be large. For EMs and LICs, generally, there appears to be significant scope for strengthening the capacity of statistical agencies and, in some cases, reforms that insulate such agencies from political interference. Similarly, it would be important to address any gaps in debt management capacity, especially considering the greater complexity, and associated need for transparency and robust processes, implied by SCDIs.

33. In addition, careful contract design can help reassure investors. The Bank of England, in collaboration with legal and financial market practitioners, has developed a (London) termsheet for GDP-linked bonds (Box 7), which includes a number of innovative features to address specific investor concerns. Particular considerations include:

- **Calculation of payouts for the investor.** Robust contracts can help set out a clear methodology to calculate the payouts on an SCDI and lay out contingencies where data availability or reliability concerns arise, which could substantially reduce the ability and incentive for sovereigns to misreport data.
- **Parameters governing debt service payments.** Past experience shows that when upside payments involve long and persistent lags, the political costs of these instruments rise (especially when payments extend to periods of low growth). This argues for contracts to provide for as close to real time adjustments as possible (the London termsheet suggests a lag of about six months) and caps on upside payments. The section exploring the economic case for SCDIs argued that the risks from moral hazard are likely to be limited (i.e., sovereigns are unlikely to pursue riskier policies just because they have SCDIs). However, where this is a significant concern, a payments floor would limit the relief provided by SCDIs, and hence the incentive to change behavior. Alternately, instruments that avoid large debt service threshold effects may be less prone to moral hazard as there will be fewer occasions where changing behavior at the margin could significantly impact debt.

Box 7. London Termsheet for GDP-Linked Bonds

A working group led by the Bank of England has developed a “London termsheet” for GDP-linked bonds. The Bank of England, in collaboration with a group of lawyers, investors, and trade body representatives has developed a model termsheet for GDP-linked bonds. The objective of this initiative is to stimulate debate on the finer details of how such instruments should be structured and identify potential barriers that need to be overcome. However, eventually such an initiative could be developed into a recognized and accepted contract template that could be used by market participants. Among the key provisions for discussion, the London termsheet provides the following:¹

Structure: Single domestic currency bond instrument, with coupon and principal repayments indexed to the level of GDP at current prices, over a specified period of time.

Cross-default: The GDP-linked bonds cross-default only with other GDP-linked bonds, and not with the issuer’s conventional debt.

CACs: The termsheet allows for a single-limb collective action clause whereby the GDP-linked bonds would aggregate only with other GDP-linked securities.

Data Integrity: To address potential investor concerns over data integrity, the termsheet relies for GDP data provision on the sovereign state’s statistical agency, with the central bank and possibly the World Economic Outlook (for certain issuers) as fallback options. If the GDP data is not published on time, the calculation would proceed on the assumption that GDP data have been published and GDP has increased by 10 percent. The term sheet can be used with different indexing methods, but the recommended approach is to link to chain-linked growth rates.

Put events: The termsheet provides for put options that allow the investor to demand early repayment of the obligation if: a) the issuer and/or the central bank fails to publish GDP data by the agreed date and in the manner agreed; b) an Article IV report for the issuer has not been published for two consecutive calendar years prior to any Calculation Date; c) the issuer’s subscription to the IMF’s Special Data Dissemination Standard (SDDS) ceases for any reason howsoever described; d) IMF’s Executive Board finds that the issuer fails to provide information required under Article VIII, Section 5 of the IMF’s Articles of Agreement and specified in Annex A to the IMF’s “Decision on Strengthening the Effectiveness of Article VIII, Section 5;” and e) the issuer ceases to be member of the IMF.

Governing law: English law or such other law that customarily governs the sovereign’s international debt issuances (domestic or foreign).

¹See ICMA: <http://www.icmagroup.org/resources/Sovereign-Debt-Information/>

- **Seniority relative to conventional debt.** At this stage, any attempt to ring-fence SCDIs from conventional debt (especially where both have been issued under foreign law) through an *ex ante* separate collective action clause (CAC) pool could lead to a perception of *de facto* seniority of such instruments.³⁵ This would go against market feedback received on the London termsheet,³⁶ and could raise inter-creditor equity concerns in a restructuring context. It should

³⁵SCDIs that are denominated in local currency (such as a nominal GDP-linked bond) are more likely to be issued under domestic than foreign law and, thus, considered alongside conventional local currency debt.

³⁶Market participants have raised concerns about some of the legal features of the London termsheet, in particular the choice of an *ex ante* separate voting pool for CAC purposes and limiting the cross-default clause only to other GDP-linked securities, which could be perceived as affording *de facto* seniority to these instruments. See, e.g., Makoff (2017).

be noted that the enhanced CACs endorsed by the IMF Executive Board *allow* issuers to recognize potential economic differences between debt instruments in a restructuring and to conduct separate votes for different groups of bond issuances under the single limb CACs (“sub-aggregation”). This would help achieve the same objective of an *ex ante* separate CAC pool for SCDIs, but lessen the concern about a possible signaling of seniority caused by the latter.

D. Regulatory Framework and Market Institutions

34. The current regulatory framework may disincentivize banks from holding SCDIs, but other institutional investors may face fewer constraints. In terms of bank regulation, SCDIs would almost certainly be classified as debt, rather than equity—analogous to inflation linked bonds and bank contingent convertibles (CoCos). However, these would likely be held on the trading, rather than banking books, and thus priced at mark-to-market. Although these bonds would have similar credit risk to conventional bonds, they may be subject to additional capital charges because of greater ‘market risk,’ which could disincentivize banks from holding these instruments. There would potentially be fewer regulatory constraints on insurers, pension funds, and other assets managers from holding SCDIs. Focus of regulation in this sector is on ensuring that assets and liabilities are broadly matched. And as argued above, SCDIs can play a useful role in achieving this.

35. The regulatory treatment of SCDIs will also need to guard against excessive risk accumulation on private balance sheets. This possibility is of concern mainly when investors (financial institutions or final investors) take on large exposure to their own sovereign, or to sovereigns whose performance is closely tied to global risk factors; large gross exposures that are genuinely diversified internationally or balanced by a natural hedge are of less concern. Possibly, the appropriate provision would impose a base capital charge plus a counter-cyclical requirement related to the correlation between the performance of the SCDI and other balance sheet items during stress periods.

36. In general, credit rating agencies should be able to treat SCDIs and conventional debt the same way. Typically, rating agencies evaluate the credit risk of a sovereign rather than a specific instrument. Broadly speaking, this means that all bonds (of the same currency) are given the same rating. However, agencies may decide to not rate a particular instrument where the debt service obligations are not clearly specified. For example, for Standard and Poor’s (2014), the obligation must be “credit-based and measurable.”³⁷ This may mean that certain SCDIs, such as longer-term extendibles, are not ratable. In general, however, most SCDIs, if properly designed, should be eligible for credit ratings or fall under the sovereign’s general rating. For example, U.K. inflation-linked bonds are given the same sovereign credit rating as conventional Gilts, even though there are no caps or floors on either on the principal or the coupon.

³⁷S&P also use the subscript ‘p’ to denote that the rating addresses only the repayment of principal and not any payments of interest, if the latter is not clearly defined.

37. SCDIs are unlikely to be eligible for inclusion in most existing major bond indices. Most index setters set minimum requirements on issuance volumes and market liquidity before including instruments.

38. However, large-scale issuance of SCDIs may prompt market institutions to review the way they treat such instruments. Past experience has shown that markets can adapt quickly to new financial innovations, and there is no reason to suspect that SCDI issuance would be different. For example, while some asset managers may currently be prohibited from investing in GDP-linked bonds ('Linkers') at present, investor mandates can be changed through time to accommodate such innovations. In particular, to the extent that scale emerges, new or modified indices could be developed to incorporate SCDIs. Similarly, credit rating agencies would learn to quantify the potential reduction in sovereign credit risks associated with these instruments, in the same way that they currently assess maturity and currency risk on a sovereign balance sheet.

THE WAY FORWARD

Notwithstanding their economic case and possible design options, the development of self-sustaining SCDI markets will likely depend on the size and nature of support from the international community, especially given first-mover problems. This section evaluates the future of these instruments, both in the absence and presence of international support, and identifies the types of policies that could be useful to kick-start markets.

A. Pathways to Market Development

39. Absent intervention, there will continue to be some sporadic issuance of SCDIs. It is likely that the past pattern of individual sovereigns tapping SCDIs on a one-off or targeted manner will continue, even without any major international support (although the ongoing discussions have already created some helpful awareness about possible SCDI instruments and their benefits). The obvious cases of such issuance would be:

- *Investor-targeted domestic issuance:* This would be akin to an issuer launching SCDIs to meet the hedging needs of a specific investor group, such as pension funds, retail investors, or Islamic finance investors. Uruguay's wage-indexed bonds are a live example of this.
- *Issuance by countries vulnerable to large exogenous shocks:* Commodity producers and small states have concentrated exposures to shocks that are exogenous and can be translated into a state variable outside government control. It is possible that these countries will build on existing hedging and insurance activity (and in the latter case, Grenada's 2015 bonds with hurricane clause) to issue continuous-adjustment or extendible instruments to guard against commodity price and natural disaster shocks, respectively.
- *More official bilateral loans with state-contingent features:* More developing economies could request their official bilateral creditors to include countercyclical grace periods that are tied to exports. Because a model with AFD already exists, such extension should be possible if there is agreement between the debtor and the creditor sovereigns.

- *Issuance in restructuring contexts:* It is possible that the mixed market experience thus far with upside instruments prompts sovereigns that are restructuring their debt to consider SCDIs featuring downside protection (e.g., Grenada hurricane clause, or GDP-linked bonds). The likelihood of successfully negotiating these instruments is higher in restructuring contexts, given the typical divergence of views between the sovereign and the creditor over the state of the economy, and because stigma issues (that arise in “normal time” issuance) are less of a concern.

40. However, such issuances are not very likely to lead to the creation of self-sustaining liquid markets. While a chorus of sporadic issuances of different SCDIs could help build experience and familiarity with the instrument class, it would be optimistic to expect these to translate into scale or standardization, at least over the next 5–10 years.

41. Accordingly, and insofar as there are potential positive system-wide externalities associated with these instruments, official sector support may be warranted. SCDIs cannot act as a substitute for pursuing prudent policies to foster macroeconomic stability. Nevertheless, where country or external conditions constrain policy, SCDIs are associated with several important benefits for global financial markets and stability: they can help complete the sovereign toolkit for preserving policy space, provide a mechanism for greater risk-sharing and diversification for both investors and debt managers, close financial market and information gaps, and improve the pricing of sovereign risk. Insofar as the risks and costs associated with SCDIs can be mitigated through careful instrument design, robust contracts, and regulation, there are likely to be nontrivial net positive externalities remaining.

42. At a first level, the international community can help by assisting market participants to develop model contracts for benchmark SCDIs, providing technical assistance, and clarifying their treatment in DSAs and fiscal rules.

- *Developing commonly agreed model contracts.* The official sector could partner with the private sector to mitigate the start-up costs associated with designing an efficient and commonly recognized contractual framework, including assisting market participants in the development of model contracts and/or other “how-to-issue” guidance notes around a set of benchmark SCDIs (both in normal times and in restructuring contexts), including for the three benchmark instruments discussed above. This process has already begun for GDP-linked bonds and hurricane clauses.³⁸
- *Technical assistance to sovereigns.* Potential issuers can find evaluating the suitability of a particular SCDI design in supporting domestic and international policy objectives—especially in times of distress—complicated. Accordingly, there is scope for IFIs, think tanks, and practitioners

³⁸Some proponents of SCDIs have compared the development of a contractual benchmark for SCDIs with the recent effort to promote enhanced CACs, where the international community has previously played a role. However, there are important differences between SCDIs and enhanced CACs. While the CACs process was market-driven and focused on a limited set of provisions that are critical to a debt restructuring, the process envisaged for SCDIs encompasses a complete contractual framework to kick-start a market for such instruments.

to continue to discuss and explain the various features of the benchmark SCDIs. The Fund, in particular, can provide guidance to country authorities considering the case for issuing SCDIs (and weighing alternative designs), as well as the staff country team evaluating this case in a particular context.³⁹ In addition, technical assistance can also focus on debt managers and statistical agencies to strengthen their capacity to handle SCDIs, including through the provision of reliable and accurate statistics on key state variables used in the benchmarks.

- *Guidance on the use of SCDIs in restructurings.* Given that investors have often actively demanded state-contingent instruments in restructurings, there is particular scope for standing guidance on design issues. Such advice can take into account the problems experienced with some previous instruments, could help sovereigns to develop instruments with greater secondary market liquidity (e.g. by using one of the benchmark designs discussed in the previous section), and perhaps more symmetric structures.
- *Treatment in DSAs and fiscal rules.* The risk-mitigating features and state-dependent costs of SCDIs could be explicitly modeled for the purpose of the IMF's DSAs. This would involve some modification of the current DSA templates, especially the shock scenario modules which are likely to capture the thrust of the benefits from such instruments. Fiscal rules could be adjusted to give credit to sovereigns with higher shares of SCDIs, though this would come at the cost of added complexity.

43. SCDI issuance could also be encouraged by leveraging official creditor balance sheets.

Official creditors, already provide large *ex-post* loan, grant, and debt relief financing to developing economies in bad states of the world. By committing to support these countries *ex-ante*, it may be possible to reduce the cost, and improve the planning/transparency, of such support for both the development partners and the sovereign. For example:

- *MDBs could underwrite and guarantee SCDIs.* This could support the issuance of SCDIs in cases where countries cannot afford such instruments on their own, despite recognizing the significant benefits associated with them. The involvement of the MDBs could provide additional credibility around design and data-related aspects, and reduce risk of payment default, lowering the premia demanded by private investors. Related to this, Annex VIII discusses experience with the use of MDBs' sovereign guarantee products.

Official creditors could expand or introduce state-contingent features in their lending. AFD countercyclical loans (which have adjustable grace period tied to exports) already provide an example of such lending in the context of official bilateral finance. Such initiatives could be adopted more systematically by the official bilateral creditor community, and broadened to other instrument types. Consideration could also be given to incorporate these features in

³⁹In this context, staff has already developed a user-friendly Excel based tool that can be used to illustrate the benefits of the three SCDI benchmarks, both in terms of impact on debt levels and gross financing needs. It is proposed that the tool be published alongside the Board paper.

lending by MDBs, given their ability to diversify risks across a large range of borrowing sovereigns.

44. More ambitiously, a large sovereign (or institution) could lead-issue to help kick-start SCDI markets. Issuance by a major sovereign is likely to command greater investor confidence and be associated with lower issuance premia. If the market is sufficiently deep, it could also help set a benchmark for pricing, rating, and regulatory treatment. If the issuer is a currency union member (or institution, such as the ESM), one option could be an instrument linked to regional GDP, with the underlying risk of individual countries shared through bilateral agreements, as suggested by Makoff (2017).

45. Finally, coordinated issuance by several sovereigns could be considered. Such action may remove first-mover reticence (especially on the part of sovereigns concerned about stigma) and reduce the novelty and liquidity premia associated with the initial use of SCDIs. This idea has been discussed in the context of a currency union as a way of promoting greater fiscal risk-sharing. However, it could also be applied to any coalition of willing sovereigns who see a mutual benefit in creating self-sustaining SCDI markets.

B. Next Steps

46. Several actionable steps to lay the groundwork to support SCDI issuance can be undertaken in the near term. Detailed discussion can be conducted with competent authorities, including around the regulatory treatment of SCDIs, e.g., capital charges, risk-weights, fiscal rules etc. Technical work on the development of contractual features of the floater and extendible designs can continue in consultation with market participants (building on the example of the London termsheet consultations around the linker design). Further engagement with debt managers and market participants is also important to develop practical guidance for potential issuers (including in restructuring contexts) and to ensure a smooth transition to a steady-state where SCDI markets are developed. Staff expects to use the June 2017 Debt Managers Forum (which the Fund will host) to initiate some of these more in-depth consultations.

ISSUES FOR DISCUSSION

Do Directors agree that SCDIs can have broad benefits for sovereigns, investors, and the international financial system?

Do Directors concur with staff's analysis of the potential complications associated with SCDIs? To what extent could these be mitigated through careful design and additional measures?

Do Directors endorse staff's representation of the experience with state-contingent instruments, including in restructuring cases, and the lessons obtained therefrom for market development?

Do Directors agree with staff's analysis of potential issuers and investors, and the three benchmark instrument designs around which liquid markets could emerge?

Do Directors concur with staff's assessment of the range of official sector support possibilities to promote SCDI market development?

Does the Board feel that official sector efforts should be supported by the Fund? If so, should efforts be concentrated on GDP-/growth-indexed bonds (mainly for advanced and emerging economies) or extendible bonds (mainly for emerging market and low-income countries)?

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