



February 9, 2017

STAFF NOTE FOR THE G20: STATE-CONTINGENT DEBT INSTRUMENTS FOR SOVEREIGNS

Analysis suggests that well-designed state-contingent debt instruments (SCDIs) may bring benefits to sovereigns, investors, and the global financial system. SCDIs can help sovereigns preserve policy space in bad times, complementing other self-insurance and risk-sharing tools. In addition, SCDIs can enable sovereigns to diversify their investor base away from banks, and may enhance financial markets by strengthening incentives for more accurate pricing of sovereign risk, and generating market-based expectations of key macroeconomic variables, such as GDP growth. More ambitiously, if SCDIs account for a large share of public debt, they may reduce the risk of sovereign debt crises.

Nonetheless, SCDIs also face substantial challenges. Investors may need strong incentives to take on such additional exposures towards sovereigns, especially when SCDIs are novel. Fears of adverse selection, moral hazard, data manipulation, and uncertainty over future economic behavior may constrain the insurability of the relevant risks. Other complications include risk migration to the private sector, pro-cyclical demand, cannibalization of conventional instruments, and political economy difficulties.

In light of these considerations, this note presents analysis on SCDIs that could suit different types of sovereigns, and their acceptability to different types of investors. The focus is on three broad benchmark designs around which liquid markets could emerge: (i) a “linker” design, where the principal is tied to the state variable which, if it is nominal GDP, would stabilize the debt/GDP ratio; (ii) a “floater” design, with fixed principal but a varying coupon (tied, for example, to real GDP growth) that delivers some liquidity and (cumulatively) solvency relief; and (iii) an “extendible” design, where a pre-defined event triggers a debt reprofiling, to provide financing relief to sovereigns facing a liquidity crunch, due to a large shock (such as a “sudden stop”, or a natural disaster).

Official sector support for the wider use of SCDIs may be needed to overcome start-up challenges. Possible policy measures could include: coordinated issuance by a group of advanced and/or emerging market sovereigns; use of state-contingent features in official development loans; an intermediary/underwriting function by MDBs to reduce costs for sovereigns; assistance to the private sector in developing model contracts and development of “how-to-issue” guidance notes for the proposed benchmark designs (including in restructurings); technical assistance to statistical authorities and debt managers; and appropriate treatment of SCDIs in debt sustainability analysis and fiscal rules.

CONTENTS¹

INTRODUCTION	3
THE CASE FOR SCDIs	4
COSTS AND POTENTIAL COMPLICATIONS	6
MARKET DEVELOPMENT	7
ROLE OF THE OFFICIAL SECTOR	12
References	14
ANNEXES	
I. Past Experience with Sovereign State-Contingent Instruments	15
II. Survey of Potential Issuers and Investors	18

¹This note was prepared by N. Novikova (coordinator), M. Anthony, N. Balta, T. Best, C. Dielmann, C. Isern, R. Moussa, S. Nadeem, A. Pienkowski, M. Saenz, C. Serra and S. Tambunlertchai (all SPR); M. Papaioannou, A. Guscina, S. Malik and E. Togo (all MCM); G. Pinto (LEG); and J. Kim (RES). It was supervised by S. Ali Abbas, Mark Flanagan, D. Hardy and Yan Liu, under the overall direction of Sean Hagan, Hugh Bredenkamp, Peter Dattels, and Jonathan D. Ostry.

INTRODUCTION

1. A state-contingent debt instrument (SCDI) is a debt instrument with payoffs that are contractually linked to a state variable or trigger event—we focus on those that seek to alleviate pressure on sovereign indebtedness and/or financing needs in a bad state of the world. SCDIs can be designed in a number of ways: debt payments (interest and/or principal) could be made a continuous function of a variable like GDP or a commodity price; or could undergo a one-time adjustment if a certain pre-defined event occurs (e.g., extendible bonds, or “hurricane clauses” in standard bond contracts). State-contingent *financial* instruments, more generally, such as insurance and derivative contracts, and instruments that can be adjusted with a high degree of discretion, such as callable bonds, are discussed only insofar as they shed light on features of SCDIs.²

2. The idea of sovereign 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 a push for growth-indexed bonds in 2004 (in the context of the Argentina restructuring), but there was not sufficient support among issuers, investors, and G-8 leaders at the time. In 2011, the Fund encouraged greater use of SCFIs (with a focus on commodity hedging) to help manage volatility in 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, only been issued during debt restructurings (as “sweeteners”).

3. Over the last few years, there has been renewed interest in SCDIs.³ 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 emerging 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 low interest rate environment is propitious to the launch of new investment products.

4. The structure of this note is as follows. The next two sections analyze the benefits, costs, and complications associated with SCDIs. We then examine considerations for market development and discuss what sort of SCFI might suit in different circumstances; possible demand from different investor classes; and key regulatory and legal issues. The discussion is organized around possible benchmark instrument designs. The final section discusses the potential role of the official sector in promoting wider use of these instruments.

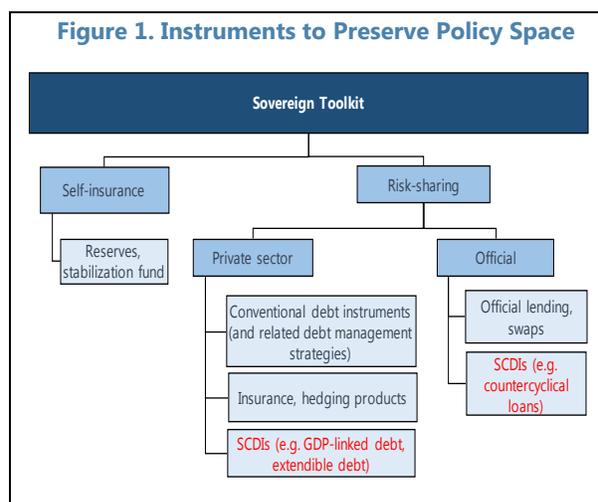
²Similarly, while floating rate bonds and inflation-linked bonds (“linkers”) also bear state-contingent returns, they are not a focus of this note as they are not designed to necessarily alleviate liquidity and/or solvency pressures on the sovereign (even if in some contexts they do). Still, the note discusses relevant lessons—obtaining from their experience.

³See, for example, Blanchard (2016), Kim and Ostry (2017), Bank of England (2016) and Bank of England (2013), Bundesbank (2016), Commonwealth Secretariat (2016), Reserve Bank of Australia (2016).

THE CASE FOR SCDIS

5. SCDIs may complement existing instruments for preserving policy space in bad times.

Sovereigns require policy space (e.g., fiscal, monetary, financial) to undertake measures that can help mitigate the economic impact of adverse shocks. The sovereign toolkit to preserve this space comprises self-insurance and risk-sharing devices (e.g., outright insurance, swap lines) – see Figure 1. SCDIs are a type of risk-sharing instrument and a case for adding them to the toolkit can be made insofar as self-insurance is seen as vulnerable to political pressures in good times, and constitutes an expensive and globally inefficient way to meet a country’s insurance needs; and—as discussed below—other risk-sharing instruments leave important gaps in risk coverage.



6. In particular, SCDIs can complement other risk-sharing instruments. Strategies involving fixed rate, floating rate and inflation-linked bonds can help deliver stable and low-cost funding for sovereigns across many states of the world. However, not all sovereigns have established domestic bond markets or fully reliable access to international bond markets. Moreover, unlike SCDIs, conventional instruments are not designed to guard against large negative shocks to repayment capacity or external liquidity crises. Foreign currency or commodity hedges and insurance against natural disasters are also commonly used by sovereigns, but these are subject to counterparty risk and offer protection over relatively short periods of time. By contrast, SCDIs, as financing instruments, could potentially help sovereigns tap into a broader investor base with longer horizons. They can also provide more timely relief than, for example, bilateral swap lines (to which smaller economies may not have immediate access); and multilateral financing (which can take time to arrange).

7. More broadly, SCDIs can make financial markets more complete, and strengthen the international financial system. Most of these benefits arise from substantial cross-border holding of SCDIs, but some of the informational gains could be achieved with domestic SCDIs, and even at small levels of issuance. Specifically, SCDIs can:

- facilitate the discovery of market-based macro-economic expectations (e.g., on real GDP growth) which could aid planning and risk-management by government and businesses whose fortunes are tied to developments in the broader economy.
- promote more accurate pricing of sovereign risk by encouraging investors to look more closely at the fundamentals of the issuing sovereign. Thus, they can reduce over-borrowing in the system.

- provide risk-diversification benefits for international investors. For example, in the case of GDP-linked bonds, estimated correlations between individual country growth rates and returns on benchmark equity indices appear to be low.⁴
- offer a “natural hedge” for investors with long-term liabilities/spending obligations linked to earnings growth. Sovereigns can usefully tap into such natural investors to generate domestic or cross-border risk-sharing, and diversify the funding base for public debt away from domestic banks (thus weakening the bank-sovereign links).
- can increase the effectiveness of the countercyclical policy response, for instance, by reducing crowding out effects associated with government borrowing.
- help to bridge debtor-creditor differences in sovereign debt restructuring contexts, thus facilitating crisis resolution.

8. Should sovereign SCDI issuance expand to constitute a substantial share of public debt, this could reduce the probability of sovereign debt crises. A number of recent papers 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.⁵ Staff’s own preliminary simulations appear to confirm these benefits. Specifically, simulations with GDP-linked bonds (with principal and coupon both linked to the nominal GDP level), using the methodology in Ostry et al (2010), suggest that, if GDP-linked debt represents a significant share (over 50 percent) of a debt portfolio, fiscal space could be increased by 10-55pp of GDP, depending on assumptions about growth uncertainty and the characteristics of the economy. However, the marginal impact of GDP-linked SCDIs on fiscal space is diminishing in their share of debt. These results should be viewed with caution because they abstract from novelty/liquidity premia, which as discussed below, could be significant in the transition phase; and the fact that large-scale SCDI issuance—which reduces the sovereign’s skin in the game—could lead investors to demand a substantial insurance premium.⁶

⁴Staff’s preliminary CAPM analysis suggests that the premium required by investors for GDP volatility risk could be in the range of 20–40 bp for a typical economy (similar to the results of Bowman and Naylor, 2009).

⁵See Barr and others (2014), Blanchard and others (2016), Kim and Ostry (2017).

⁶As a rule of thumb, premiums on conventional insurance carry a “load” (costs of administration and financing) of around 30 percent on top of the actuarial rate. There is some evidence that inflation-linked debt is significantly more expensive for the issuer than conventional debt, at least in a low inflation environment.

COSTS AND POTENTIAL COMPLICATIONS

9. A number of complications associated with SCDIs require careful consideration, although there are important mitigating factors as well.

- *High novelty and liquidity premia demanded by investors during transition* (i.e., when SCDIs are finding their place in sovereigns' debt portfolios). Novelty premia would be high if, inter alia, the design is more complex, and there are questions about data integrity (as are likely with nominal GDP data). Investors would need to expend resources to adapt systems and to do research into the behavior of the relevant state variable and the appropriate capital allocation. Similarly, liquidity premia would be expected to be high initially, but should fall with a build-up in supply (although it would not likely disappear). Standardization, robust contract design, and coordinated issuance by a number of sovereigns, can substantially reduce these premia over time. Also, it may be advantageous to build on existing models (such as those for inflation-indexed bonds or bonds with adjustable maturity).
- *Political economy difficulties and/or myopia on the part of issuers*. Policymakers may prefer to undertake policy adjustment, or self-insure using more tangible/visible foreign exchange reserves. The issuance of SCDIs may not be supported by policymakers with short horizons for assessing costs and benefits. This problem could potentially be attenuated insofar as SCDIs are incorporated into the sovereigns' debt management and sustainability frameworks (which maintain a longer-term horizon).
- *Moral hazard and adverse selection*. The possibility of enjoying reduced funding costs, or obtaining funding automatically during bad states, may reduce the incentives for countries to keep vulnerabilities at bay. Furthermore, investors may suspect that countries facing the worst risks will be most eager to issue SCDIs, and correspondingly demand high compensation. There are two mitigating factors: (i) SCDIs are not expected to replace the entire stock of conventional debt, so the sovereign retains a substantial upside from, say growth-boosting reforms; and (ii) politicians would generally have an incentive to boost growth, and avoid financing/balance of payments crises. At the same time, these risks should be less severe for instruments where the trigger is exogenous, and can be verified in the short-term.
- *Incentives for data manipulation and constraints on servicing SCDIs in good times*. Policymakers may have strong incentives to spend cyclical revenues in good times and may—in the extreme—end up renegeing on their SCDI commitments or resort to data manipulation. Even without these incentives, sovereigns may be uncomfortable with the idea, ex-ante, of sharing the upside risk from higher growth, if it is seen as the primary vehicle for reducing the debt burden. In bad times, the authorities have incentives to report severe damages. Especially for an SCDI based on a macroeconomic state variable, external verification of a realization and the imposition of penalties for misreporting may be impractical. This said, the use of caps and floors on the payoffs could potentially attenuate some of these incentive problems.
- *Excessive risk migration to private sector*. Procyclical deleveraging and aggregate demand contraction may be larger than if private creditors had held conventional sovereign debt. The extent to which these risks materialize depends, however, on who holds these instruments and

on how the risks are regulated. If international and institutional investors, rather than domestic banks, are the dominant investors, the risk of extreme procyclical behavior may be less for small to medium-sized countries subject mainly to idiosyncratic shocks.

- *Pro-cyclical demand.* Insofar as investor expectations of the state variable are highly pro-cyclical, demand could rise in good times, and dry up in bad times (complicating rollover of maturing instruments). This concern—which applies at least as much to conventional debt—would likely be smaller for long-maturity SCDIs where investors are less sensitive to short-term cyclical variations.
- *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 dispense with the need to monitor 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.
- *Adverse pricing effects on conventional debt.* Although SCDI issuance should in theory *reduce* the default risk premium—and hence yields—on other debt, the reverse can obtain if SCDIs erode the liquidity of existing instruments, or are perceived as more senior than conventional debt instruments.

MARKET DEVELOPMENT

Conditions for market creation

10. Establishment of efficient SCDI markets would most likely require certain conditions to be met. These conditions reflect the past experience with SCDIs (Box 1 and Annex I), drawing on an ongoing survey of issuers and investors (Annex II). They include:

- *scope for mutually beneficial exchange between the issuing government and investors*, where the former either receives effective insurance or investor-base diversification, while the latter derive income diversification or natural hedge benefits (say, due to matching liabilities);
- *sufficiently large and ongoing volume of issuance*, so that it is worthwhile for market participants to gather and analyze relevant information, issue ratings, include SCDIs in indices etc.;
- *efficient benchmark designs*, with credible state variable/trigger variables and clear payment adjustment mechanisms, all sufficiently standardized to facilitate price discovery and deliver scale/market liquidity;⁷

⁷More liquid market would also encourage development of related derivative products.

- *clear legal and regulatory treatment*, to keep the “load” of operational and ancillary costs below promised welfare gains, and impart clarity on how SCDIs would be treated relative to other debt instruments (both in normal times and in restructurings); and
- *a lead-issuer (or coordinated issuance)* to overcome first-mover problems.

Box 1. Selected Examples of Financial Instruments with State-Contingent Features

Uruguay’s notes indexed to nominal wages (2014+). These were launched in 2014 on the request of pension funds seeking to hedge their long-term liabilities tied to nominal wages. The government has continued to issue these instruments, albeit in limited volumes, and has just recently announced plans to deepen the market by submitting legislation to create a new daily accounting unit that would track changes to the nominal wage index.

GDP warrants in the Argentine debt restructuring (2005). This example highlights the importance of contract design, especially indexation lags, and links to highly persistent state variables. The Argentine warrant had to contend with both issues; the link to the level of GDP necessitated ongoing payments for growth in the early years after issuance—which proved politically very difficult—while the indexation lag led to high payments even in years when the economy was in recession (BoE 2016). The Argentine experience thus holds important lessons for designing SCDIs (including for normal time issuance)—and some of these were reflected in more recent restructurings (e.g., Ukraine 2015).

Inflation-linked bonds (ILB) in advanced economies (1990s). This is a case where clear political will (especially in the U.S.) and reinforcing compatible incentives for both issuers and investors helped to kick-start the market. First, issuers got an instrument that ex-ante appeared cheaper than conventional debt and provided some protection from refinancing risk, while investors secured inflation protection which matched well portfolios of investors with “real” long-term liabilities. These gains were available because the instruments were incentive-compatible for the sovereign, which can also provide this form of insurance to investors relatively cheaply because it has a natural hedge. Second, the availability of credible inflation data bolstered the confidence that investors placed in these products, notwithstanding any incentives that might have existed to under-report inflation. Third, the emergence of a simple standardized design around the “Canadian-model” helped boost further issuance and supported improved market liquidity and the development of inflation derivatives in the early 2000s.

Sources of supply and demand

11. From the perspective of potential issuers, gains from SCDIs, and the most appropriate type of instrument, are likely to differ across sovereigns. While many countries may benefit from the countercyclical properties of SCDIs, the latter would be particularly helpful in cases where policy space is limited due to a weak sovereign balance sheet, lack of access to other risk-sharing tools (like established bond markets or bilateral swap lines), and/or constraints on monetary policy (as in members of currency unions). GDP-linked bonds are most likely to be appropriate in cases where exposure to generalized macro shocks is high and its impact on capacity to pay is well-captured by GDP.⁸ Emerging and frontier countries that face dual (fiscal and balance of payments) crises are more likely to benefit from extendible maturity bonds that help maintain external private creditor exposure and alleviate FX liquidity constraints. Finally, commodity price-linked bonds, or natural

⁸However, SCDIs may be especially expensive for countries that are heavily exposed to global (and therefore non-diversifiable) shocks, and those suffering large permanent and structural shocks, which are hard to price.

disaster clauses (as in Grenada), would provide targeted insurance for countries highly exposed to such risks. Countries with less developed financial markets and fewer instruments traded on international markets are likely to benefit most from completing markets. Insofar as SCDIs can promote more accurate pricing of sovereign risk, countries with a tendency toward pro-cyclical policies or sustained government over-borrowing could benefit, albeit at the cost of paying an explicit premium.

12. A range of potential investors would likely be interested, especially in various designs of GDP-linked bonds: (i) *domestic retail investors* facing costs in the future (e.g., rent, children’s education) that are growing faster than inflation; (ii) *domestic (or currency union) pension funds and insurance companies* with an implicit obligation to deliver a return to their final beneficiaries no less than the cumulative earnings/GDP growth of the economy; (iii) *global institutional investors (both fixed income and equity)* looking for international risk-diversification and “GDP play” opportunities; (iv) *purely yield-driven investors* with high risk appetite (or portions of investment portfolios dedicated to higher risk assets) that may be a source of market liquidity; (v) *Islamic financial investors* with demand for Sharia-compliant products, such as commodity-linked bonds;⁹ and (vi) *official bilateral lenders* that are able to tolerate variable returns or changes in the maturity term under certain conditions).¹⁰ Bonds with the possibility of an extendable maturity would likely be of interest mainly to investors with limited exposure to liquidity risk, but with a strong need to preserve value, such as pension funds and insurance funds, and those familiar with investing in infrastructure financing and other instruments with variable maturity.

Possible benchmarks designs

13. Staff has examined various instrument designs and suggests focusing on three that are likely to command broad investor confidence and may help achieve market liquidity (Table 1):

- i. **“Linker”:** *principal (and coupon) linked to level of state variable* (e.g., nominal GDP “level”) *akin to inflation-linked bonds*.¹¹ This more equity-like instrument would seek to stabilize the debt-to-GDP ratio in the face of generalized macroeconomic shocks. This could reduce the risk that tail-events lead to default, and thus provide more borrowing space for counter-cyclical policies. The main action in these instruments is on the principal; the coupon would not move much from year to year (so no direct liquidity relief). Data integrity, however, will be a key issue in EMDCs, both in terms of “revisions”, which can be large and frequent, and “manipulation risk”, given governments’ control of statistics and ability to fudge the less-familiar GDP deflator.

⁹Assuming that other conditions for Sharia-compliance are met.

¹⁰The French development agency (AFD) already offers loans with an adjustable grace period, tied to export outcomes.

¹¹The “London term-sheet”, proposed by a working group led by the Bank of England, provides an example of such an instrument. Please follow the links for further details of the proposal: [Term Sheet](#), [Overview](#) and [Payment Structure](#).

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 where the correlation between real GDP and deflator is negative.

- ii. **“Floater”:** *fixed principal, with coupon linked to change in state variable* (e.g., real GDP “growth”) *akin to floating rate bonds.*¹² These instruments are more debt-like, but they may be less effective in stabilizing the debt ratio than the “linkers” described above. For issuers with “original sin” characteristics, the bonds will need to be denominated/payable in “hard currency”, although the coupon would still likely reflect the variation in *local currency* real GDP growth. A coupon floor at zero and a cap that preserves reasonable upside for the sovereign would be needed; in a low-interest rate environment, a principal cap below par would enable coupon rates to be set at a level high enough to generate a substantial effect. 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. Data integrity and manipulation risks are likely to be less acute, as incentives to under-report real GDP growth on a sustained basis are minimal.
- iii. **“Extendible”:** *coupon-preserving maturity extension, at issuer discretion or upon trigger.* By pushing out maturities (or imposing debt service standstills), extendible bonds can generate “financing” for a country facing a sudden adverse shock to liquidity, and thus prevent liquidity problems from translating into a full-blown/costly debt crisis. The adjustment mechanism could, for example, involve a 1–3-year extension of the principal. The extension could happen at the issuer’s discretion (perhaps with a penalty), or could be linked to a trigger. Examples of triggers could include: a specified rise in yields on internationally-traded long-term bonds; a percentage decline in commodity prices or exports (as used in AFD countercyclical loans); or, for disaster-prone countries, a catastrophe of a certain intensity, as in the Grenada hurricane clause.^{13 14} Concerns about data manipulation and perverse behavior would likely be less important, as the trigger would be calibrated to anticipate a very large adverse shock (i.e., the government would not have the incentive to engineer such an eventuality). These issues would be slight for triggers cast in terms of commodity prices or hurricane intensity as these are reported/determined internationally and beyond the control of a single government. Market acceptability may be greater, if the maturity extension were accompanied by an increase in the coupon.

¹²Follows the Mauro-Borzenstein (2004) design.

¹³The “Hurricane clause” included in Grenada’s 2015 exchange bond allows for a deferral of debt service payments in the event of an externally verified hurricane. Staff’s simulations show that this clause may provide a temporary cash flow relief of up to 2.6 percent of GDP over a 1-year period, although this gets reversed in the following year.

¹⁴See Brooke and others 2013, Buitier 1999 for other proposals on the trigger mechanisms.

Table 1. Three Possible Benchmark Designs for SCDIs

Benchmark/ Features	(i) “Linker” e.g., GDP-linked bond	(ii) “Floater” e.g., growth-indexed bond	(iii) “Extendible” e.g., hurricane clauses
Currency	Local currency	Local or foreign currency	Local or foreign currency
State/trigger variable	Level of nominal (or real) GDP	Real GDP growth rate	Discrete events: issuer discretion; financial market or economic indicators breaching a pre-defined benchmark; hurricane of specified intensity etc.
Adjustment mechanism	Principal linked to GDP; coupon also varies somewhat, as it is a fixed percentage of this principal	Coupon linked to the growth of GDP, but with a floor of zero. Principle is fixed. Coupon would vary a lot	Pre-defined extension of the principal payment by 1-3 years. Possible increase in coupon if triggered
Tenor	>=5 years	>=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 EMDCs with limited access to capital markets	EMDCs and frontier markets with limited access to capital markets; countries vulnerable to natural disasters
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)

Regulatory and legal issues

14. Several aspects of regulatory treatment will need to be pinned down:

- *Debt vs equity.* This is especially relevant when assessing bank capital and liquidity requirements.
- *Treatment by rating agencies and use in bond indices.* This is a particular concern for GDP- and commodity-linked bonds that may not have a fixed principal. This could affect whether these instruments are “index eligible” and can, therefore, be covered by the investment mandates of some firms. The response could be to initially roll out SCDIs with principal floors.
- *Assessment of fiscal risks.* Insofar as SCDIs make a sovereign’s debt structure more resilient, there would appear to be a case to grant them more favorable regulatory treatment, e.g., in

supranational fiscal rules (as in the Euro Area); and in debt sustainability analyses conducted by the Fund.

- *Tax treatment.* Insofar as SCDIs offer higher coupon income to an investor (which will be taxed) in exchange for the possibility of incurring a loss on the principal, sovereigns will need to ensure that tax treatment does not unintentionally favor or disfavor SCDIs. A separate issue is whether the potential broader benefits SCDIs imply for *conventional* debt holders and the international financial system warrant a more favorable tax treatment.

15. At this stage, any attempt to ring-fence SCDIs from conventional debt through an *ex ante* separate CAC pool could lead to a perception of *de facto* seniority of such instruments.

This would go against market feedback,¹⁵ and could raise inter-creditor equity concerns in a restructuring context. It should 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.

ROLE OF THE OFFICIAL SECTOR

16. Insofar as SCDIs boost the resilience of the international monetary system, there would be a case for global policymakers to support wider SCDI issuance. There are a number of initiatives that could be explored.

- *Guidance to sovereign issuers on the benefits and potential costs of SCDIs, and on design issues.* The role of SCDIs in supporting domestic and international policy objectives—especially in times of distress—can be complicated for potential issuers. Similarly, creditors also need to make the difficult assessment of how the state variable in such instruments will influence other forms of risk (credit risk, exchange rate risk, correlation risk, etc.). Institutions such as IFIs and think-tanks can help sovereigns assess the potential costs and benefits, and provide guidance on optimal design.
- *Technical assistance, in particular for statistical agencies and debt management offices.* IFIs, in particular the IMF, would be well placed to provide tailored country advice to improve capacity to issue SCDIs. Reliable and accurate statistics on key state variables used in benchmark SCDIs are important for both the debtor (to ensure that they provide a reliable hedge) and the creditor (to ensure they are not manipulated).
- *State-contingent features in IFIs’ development lending, underwriting and guarantees.* AFD countercyclical loans provide an example of official development financing with state-contingent

¹⁵Market participants have raised concerns about some of the legal features of the London term-sheet, 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.

lending. These initiatives could be broadened and established across more instrument types, depending on country-specific risks. Underwriting or guarantees by development institutions may support the issuance of SCDIs in cases where countries cannot afford such instruments, despite recognizing the significant benefits associated with them. Sovereign guarantee products are already widely used.

- *Coordinated issuance by a number of advanced and emerging markets.* Such action may help to address first-mover reticence, and reduce ‘novelty’ and ‘liquidity’ premia associated with the initial use of SCDIs.
- *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). This process has already begun for GDP-linked bonds and hurricane clauses.¹⁶
- *Accounting for the SCDIs’ impact in debt sustainability analyses and fiscal rules.* As mentioned above, risk-mitigating features and state-dependent costs of SCDIs may be explicitly modeled for the purposes of the IMF’s DSAs, as well as in the assessment of the degree of ‘fiscal space’ available to a sovereign. Similarly, the calibration of fiscal rules may need to be adjusted to give credit to sovereigns with higher shares of SCDIs.

17. Possible next steps to promote SCDI markets could be as follows:

- Detailed discussion with competent authorities, including around the regulatory treatment of SCDIs, e.g., capital charges, risk-weights, fiscal rules etc.
- Continued technical work on contractual features of various designs.
- Further consultations with debt managers and market participants with a view to developing practical guidance for potential issuers (including in restructuring contexts).
- More careful consideration of first-mover options.

¹⁶Some 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.

References

- Benford, J., Best, T., and Joy, M. (with contributions from other central banks), 2016, "Sovereign GDP-linked bonds," Bank of England Financial Stability Paper No. 39, (September 2016).
- Blanchard, O., P. Mauro, and J. Acalin, 2016, "The Case for Growth Indexed Bonds in Advanced Economies Today," Peterson Institute for International Economics, Policy Brief No. 16–2.
- Borensztein, E., and P. Mauro, 2004, "The Case for GDP-Indexed Bonds," *Economic Policy*, Vol. 19, No. 38, pp. 166–216.
- Bowman, J., and Naylor, P., 2016, "GDP-Linked Bonds," Reserve Bank of Australia Bulletin, (September Quarter 2016).
- Brooke, M., Mendes, R., Pienkowski, A., and Santor, E., 2013, "Sovereign Default and State-Contingent Debt," Bank of Canada, Discussion Paper No. 2013–3.
- Buiter, W., and Sibert, A., 1999, "UDROP: A Contribution to the New International Financial Architecture," *International Finance*, Vol. 2(2), pp. 227–47.
- Deutsche Bundesbank, 2016, "Approaches to Resolving Sovereign Debt Crises in the Euro Area," Monthly Report, (July 2016).
- International Monetary Fund, 2004, "Sovereign Debt Structure for Crisis Prevention," IMF Occasional Paper No. 237, (Washington).
- _____, 2011, "Managing Volatility in Low-Income Countries—The Role and Potential for Contingent Financial Instruments," (Washington).
- Kamstra, M., and Shiller, R., 2009, "The Case for Trills: Giving the People and their Pension Funds a Stake in the Wealth of the Nation," Cowles Foundation Discussion Paper No. 1717.
- Kim, J., and Ostry, J., 2017, "Boosting Fiscal Space: The Roles of GDP-linked Debt and Longer Maturities," mimeograph.
- Ostry, J., Ghosh, A., Kim, J., and Qureshi, M., 2010, "Fiscal Space," IMF Staff Position Note 10/11, (Washington: International Monetary Fund).
- Zoheir, E., and Tavakoli, H., 2016, "Countercyclical Financial Instruments—Building Fiscal Resilience to Exogenous Shocks," The Commonwealth Secretariat.

Annex I. Past Experience with Sovereign State-Contingent Instruments

1. **Markets for sovereign state-contingent instruments both in normal times and during restructurings have been small and specialized (see selected recent examples in Tables AI.1 and AI.2).**

- 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, and have often been discontinued after a small number of issuances. The variety of triggers included revenues, commodity prices, GDP, and exports. At the same time, sovereigns often use currency and interest rate derivatives to hedge risks in sovereign debt portfolios. In a few instances, disaster risk insurance products and contingent financing facilities with the official sector are used.
- In a restructuring context, state-contingent instruments have helped to bridge gaps between the debtor and the creditors' expectations over the future economic performance and risks. '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). In the case of Grenada (2015), the restructuring deal included instruments with both upside and downside features.

2. **Nevertheless, this past experience suggests a number of considerations relevant for further market development:**

- i. *SCDIs were normally designed to meet specific investors' interests.* Many SCDIs issued in normal times were used to expand the investor base and therefore were designed for targeted investor groups. For example, Turkey's revenue-indexed bonds were designed as instruments suitable for banks with a preference for Sharia-compliant (non-interest bearing) instruments. SCDIs have also often been non-tradeable, such as retail bonds issued by the U.K. and Portugal.
- ii. *Downside protection for the sovereign has generally been limited.* Instruments issued in normal times have generally featured return floors, while warrants issued in restructurings have been designed as upside-only instruments. The Grenada hurricane clause is a lone example of an SCDI offering explicit downside protection to the sovereign.
- iii. *Political constraints to sharing upside with investors, ex-post, may be an impediment.* Often, issuances of SCDIs have been in 'bad' times, when the sovereign can trade-off upfront relief for future upside. Mexico's 1977 oil-linked bond 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. The bond was discontinued thereafter, partly due to lack of demand.
- iv. *Indexation lags, and links to highly persistent state variables can be 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 an instrument.

The Argentine warrant had to contend with both issues; the link to the level of GDP necessitated ongoing payments for growth in the early years after issuance, while the indexation lag led to high payments in years when the economy was in recession.

- v. *Bilateral and multilateral support can encourage more consistent use of SCDIs.* Repeat use of SCDIs has been more common in situations that involve MDB or bilateral official creditors (Venezuela's Petrocaribe loans and the AFD's countercyclical policy loans). SCDIs in normal times have only been used by sovereigns with well-developed debt management offices, and international support would likely be required for some countries to handle the step-up in technical capacity required.

Table AI.1. Debt Instruments with State-Contingent Features Issued in 'Normal Times'

D	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

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

Table AI.2. State-Contingent Instruments Issued in 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	• Pays out 15% of real GDP growth between 3-4% • Pays out 40% of real GDP growth in excess of 4%	Annual cap at 1% from 2021-2025, uncapped from 2026-2040.
	Grenada (2015) - CBI³ 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 clause⁵ 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

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

Annex II. Survey of Potential Issuers and Investors

1. **In order to gauge the current market perception towards SCDIs, the Fund staff has conducted a survey of sovereign issuers and held meetings with potential investors.** The objectives of this outreach was to better understand (i) the interest in SCDIs; (ii) potential instrument design; and (iii) impediments to market development.

A. Issuers¹

2. **Responses from surveyed sovereigns have been mainly guarded, though some sovereigns did see a role for SCDIs in certain cases:**

- *None of the participants had plans to launch SCDIs in the near future for their own portfolio.* Most debt managers indicated that their current menu of conventional debt instruments (in some cases combined with non-debt SCFIs to address targeted balance sheet risks) was adequate. A few countries reported that they had tried certain types of SCDIs (e.g., revenue- or oil-linked bonds) in the past. Only one country reported that it currently had a growth-indexed bond (albeit a strictly upside instrument) in its debt portfolio.
- *A number of respondents saw potential advantages to SCDIs and the possibility of an SCDI market eventually emerging.* A number of respondents indicated that, while they use hedging to address market risks, their balance sheets remain vulnerable to a generalized growth shock. They thought that in principle SCDIs could usefully supplement existing instruments (e.g., stabilization funds) in containing this vulnerability. Some sovereigns suggested that SCDIs may be useful for issuers that face financing difficulties, including those relying on multilateral financial support. A number of debt managers saw medium to long-term prospects for selected SCDI markets to develop. Some sovereigns were discouraged mainly by the first-mover hurdle, but might be more receptive were it overcome. A few sovereigns indicated they could potentially participate in a coordinated action.
- *Some of the main obstacles for market creation, according to the issuers, were lack of clarity on a natural investor base and the potential premium associated with SCDIs.* In particular, they stressed that SCDIs' risk reduction benefits would need to justify their expected higher cost relative to conventional debt instruments. The respondents highlighted that design complexity, data quality and issues with lags could make SCDIs difficult to price. At the same time, some issuers mentioned that creating a well-defined instrument may facilitate quantification of risk premia that could potentially apply to SCDIs. Also, it would be demanding and potentially very expensive 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.

¹These 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 2016–January 2017. The list of countries covered by the survey included 19 AEs and 7 EMDCs.

B. Investors²

3. **Investor views on the attractiveness of SCDIs diverged.** 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 and standardization of design and clarity of legal and regulatory treatment for a liquid market to emerge. Investors opined on specific issues, as follows:

- *Investors are interested in “upside” risk, that is, the possibility of higher returns in good states.* An instrument that offers only “downside” risk (protection of the sovereign issuer) would be very expensive. Opinions differed on whether a cap on upside or downside adjustments would be problematic. In this connection, investors were more interested in SCDIs from countries with relatively high trend growth rates.
- *Continuous adjustment vs one-off instruments.* Investors in AM and major EM debt favored GDP- or commodity-linked bonds-style instruments over one-off-adjustment instruments (like extendible bonds) whose terms were linked to a large discrete event. However, some reinsurers expressed a strong interest in hurricane clauses in bond contracts for small states vulnerable to natural disasters. Also, some fixed income investors were more concerned about “coupon regularity” and would be willing to take a limited loss in principal or extend duration, which would seem to favor an extendible maturity structure.³
- *Choice of state variable/trigger.* Indexing to a macroeconomic variable such as GDP could give rise to many concerns regarding model risk, data reliability, statistical transparency, revisions, redefinitions, etc., and to political economy concerns (such as adverse selection and ex post commitment). Some investors stressed the importance of penalties in the event that issuers failed a data quality test. Investors were comfortable with a link to commodity prices but noted that this would limit the universe of issuers, and even those issuers could access commodity hedges. However, investors noted that these hedges were only available in tenors out to three years, as beyond that the risk became too large. This implicitly highlights the need for “floors” and “caps” in any long-term SCDI, as without these investors may find the risk too great.
- *Detachability.* Views differed on the need/desirability of derivatives instruments accompanying the underlying bond. Some preferred having the option to customize the amount/type of risks they were taking, suggesting that investors that want a certain degree of exposure to a particular sovereign do not wish to be obliged to take on other risks. Others, notably with flexible mandates, disagreed, citing the mixed experience with GDP warrants which had proven difficult to price and remained illiquid.

²Extensive outreach to potential investors in SCFIs was launched in April 2016. Discussions are being held with a range of investors including asset managers, investment banks, hedge funds, banks, insurance and pension funds, in the U.S. and elsewhere. Discussions were also held with credit rating agencies. The focus has been 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-linked bonds and a narrower range of potential issuers.

³Markets are familiar with instruments with variable maturities, such as callable bonds and some commercial paper that can be extended by a limited period.

- *Investment mandate.* Asset manager clients (like pension funds) may put limits on non-fixed income bonds 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 (even if set at somewhat below par), or if coupons became negative.
- *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 clear preference for not giving SCDIs seniority relative to other conventional debt instruments. Also, they felt it was essential that any non-payment or deferred payment resulting from the state-contingent clause should not be treated as a “credit event.” Investors in EM debt also had a preference for denomination/settlement in a major currency and issuance under New York or English Law. Rating agencies would rate all of a sovereign’s issues alike.