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GDP-indexed Bonds: A Way Forward

Gregory Makoff

Key Points

- Global financial policy makers are studying GDP-indexed bonds as a possible financing tool to reduce the likelihood of governments defaulting on their debt following an economic shock.
- Proponents argue in favour of the large-scale issuance of such loss-absorbing liabilities to stabilize debt/GDP ratios, while skeptics suggest that such debt would be very expensive to issue — especially as there is no proven market for the securities.
- A test issuance of GDP-indexed bonds is needed to determine whether they would be an attractive addition to sovereign debt portfolios; policy makers may want to increase attention to the budget-stabilizing benefits of GDP-indexed bonds as well as ancillary benefits.
- Further technical work is required to support a test issuance of the bonds.

Introduction

While GDP-indexed sovereign bonds are an old idea (Kamstra and Shiller 2009; Borensztein et al. 2004), the discussion of them has recently heated up in global financial policy circles: the Group of Twenty (G20 Finance Ministers and Central Bank Governors 2016) and Bundesbank President Jens Weidmann (2016) has suggested “if cleverly designed, [GDP-indexed bonds] could play a part in reducing the risk of sovereign default.” Proponents suggest that countries should start issuing bonds in this format in the near future.

Economists and central banks are driving this effort: leading debt theorists Olivier Blanchard and Paolo Mauro have argued for the large-scale issuance of GDP-indexed bonds in advanced economies, in particular among euro-area members (Blanchard, Mauro and Acalin 2016), and the Bank of England and the Bank of Canada have published papers in this area (Benford et al. 2016; Brooke et al. 2013). The problem is that the idea is being met with skepticism from sovereign debt managers, who scoff at the idea because of the lack of an obvious investor base and the risk that the lifetime cost of servicing GDP-indexed bonds would be much higher than conventional alternatives.

The goal of this policy brief, therefore, is to find a way forward that incorporates the insights of economists and the doubts of debt managers. First, it presents arguments

About the Author

Gregory Makoff has been a CIGI senior fellow with the Global Economy Program since February 2015. At CIGI, Gregory's research focuses on issues in sovereign debt management, including the management of sovereign debt crises. From 1993 through 2014 Gregory was a professional at Salomon Brothers/Citigroup specializing in debt advisory, liability management and derivatives for sovereign borrowers, corporations and financial institutions. His sovereign advisory assignments have varied widely and have included helping the Republic of Colombia establish its debt management team in the mid-1990s, assisting the Republic of the Philippines in carrying out debt reprofiling transactions in both its local and international markets, and serving as adviser to the government of Jamaica in its 2010 and 2013 domestic debt restructurings. He has worked extensively in Latin America, the Caribbean, Asia, Europe, Eastern Europe and Africa, and recently worked for one year at the US Department of the Treasury as a senior policy adviser. Gregory holds a Ph.D. in physics from the University of Chicago and a B.Sc. from the Massachusetts Institute of Technology in both physics and political science. Gregory is also a CFA® charterholder.

to support the issuance of GDP-indexed bonds that do not require large-scale issuance to be successful. Second, it raises the idea that policy makers should push for a test issuance of such bonds to generate hard data about their pricing and trading before deciding on the ultimate scale of their usage. The brief also addresses instrument design considerations, alternative approaches for introducing the bonds into the market and areas that deserve further study.

Building Up the Case for the Issuance of GDP-indexed Bonds

From a macroeconomic perspective, the idea of using GDP-indexed bonds in sovereign debt portfolios is quite easy to understand. GDP-indexed bonds could be structured so that if GDP falls by 25 percent, their nominal amount falls by 25 percent (and, conversely, if GDP rises by 25 percent, so does the debt).¹ The idea is for governments to issue a large percentage of their debt stock in this format, for example, 25 percent, 50 percent or 75 percent to hedge against the possibility that economic shocks drive down a country's GDP sufficiently that its elevated debt/GDP ratio triggers a financial collapse. With this said, arguments can also be made that GDP-indexed bonds could be used to stabilize government finances through conventional economic cycles. Both Robert J. Shiller, in his 1993 work *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks* (Shiller 1993), and Michael Pettis, in his 2001 work *The Volatility Machine: Emerging Economics and the Threat of Financial Collapse*, make convincing arguments in support of efforts to build up markets in macroeconomic hedging tools. These aspirations are sound.

The problem is that governments primarily fund themselves in fixed-rate format. A survey of the funding structure of leading countries by the Bank for International Settlements (BIS) (see Table 1)

¹ Please see www.icmagroup.org/assets/documents/Resources/Open-docs/Payment_structure_301116.pdf for the structure proposed in the ongoing International Capital Markets Association (ICMA)-coordinated effort to develop a term sheet.

Table 1: Central Government Debt Securities Markets among Selected Members of the Organisation for Economic Co-operation and Development

Central Government Debt Securities Markets by Instrument and Maturity							
	Amounts outstanding, in billions of US dollars					Average maturity, in years	
	Total	Fixed rate	Floating rate	Inflation-linked	Exchange rate-linked	Original maturity	Remaining maturity
	Q4 15	Q4 15	Q4 15	Q4 15	Q4 15	Q4 15	Q4 15
All countries	19,882.5	16,693.7	729.1	2,376.1	83.5	—	—
Argentina	81.9	6.5	18.3	13.4	43.7	11.9	8.2
Australia	287.2	266.1	0.0	21.2	0.0	9.7	6.1
Belgium	359.7	344.9	8.5	0.0	6.3	—	—
Brazil	651.1	250.9	163.0	232.7	4.6	—	4.4
Brazil							
Canada	350.4	320.5	0.0	29.9	0.0	—	6.5
Chile	31.1	9.4	—	21.7	—	16.6	11.5
Chinese Taipei	167.1	167.1	—	—	—	15.4	9.7
Colombia	0.0	45.1	18.3	—	—	11.8	6.3
Czech Republic	50.4	39.2	11.2	0.0	0.0	10.5	5.0
Germany	1,301.3	1,159.5	32.4	83.0	26.4	12.0	6.6
Hong Kong SAR	13.0	9.1	0.0	3.9	0.0	5.4	2.8
Hungary	43.1	33.8	6.7	2.7	—	7.6	3.6
India	—	—	—	—	—	—	—
Indonesia	103.6	95.2	7.3	0.0	1.0	13.9	9.3
Israel	128.8	64.0	11.2	52.6	1.1	13.6	6.8
Korea	482.9	476.0	—	6.8	—	10.7	7.2
Malaysia	136.8	136.8	0.0	0.0	0.0	8.6	5.4
Mexico	294.5	151.9	72.0	70.6	0.0	—	7.8
Peru	14.0	13.1	0.0	0.8	0.0	17.1	12.6
Philippines	76.7	75.0	1.2	—	0.5	13.0	9.2
Poland	131.6	98.6	31.0	2.0	0.0	8.4	4.3
Russia	50.0	47.8	—	2.1	0.0	10.8	7.3
Saudi Arabia	37.9	37.9	0.0	—	0.0	—	4.8
Singapore	68.7	68.7	0.0	0.0	0.0	11.8	6.2
South Africa	98.2	72.5	0.0	25.7	—	22.8	15.7
Spain	850.7	818.7	9.4	22.6	0.0	10.8	6.3
Thailand	0.1	0.1	0.0	0.0	0.0	16.4	10.6
Turkey	151.4	88.2	29.0	34.2	0.0	7.2	4.5
United Kingdom	2,179.3	1,615.3	0.0	564.0	0.0	—	15.8
United States	11,677.5	10,181.6	328.0	1,167.9	0.0	—	5.6

Source: BIS (2016, 161).

shows that most countries issue the vast majority of their bonds on a fixed-rate basis. Even inflation-indexed bonds now only comprise (on average) about 10 percent of government funding portfolios, and this segment of the market took decades to develop. It would be very optimistic of proponents to expect that a large market in GDP-indexed bonds will develop rapidly. Debt managers would inevitably argue that if governments try to quickly pump out high volumes of these new-fangled bonds, supply would vastly outstrip demand, and pricing would be terrible. Both the macroeconomics of debt sustainability and the microeconomics of supply and demand for securities need to be taken into account in forming a policy.

As a result, global policy makers find themselves in a sort of trap: supporting the economists might lead to an expensive funding mistake, while siding with the debt practitioners carries the risk that a country might default for lack of hedging tools. One possible way to break this logjam is to pressure both sides to find common ground: economists could be asked to build up the economic case for the utility of the small-scale use of these bonds in smoothing a government's finances through economic cycles to justify their use in debt portfolios, even if the large-scale use required to hedge default risk turns out not to be practical; and debt managers could be asked to work with investors and underwriters to build the case that these instruments should be added to existing debt and/or equity investment portfolios. With this said, there is nothing like hard data to inform a major decision, so policy makers would be wise to promote the idea of a test issuance of a few billion US dollars of GDP-indexed bonds to help prove or disprove the arguments being made about price efficiency and market capacity.

Beyond the direct financial impact on a government's finances, a country could further justify a test issuance of GDP-indexed bonds based on the following ancillary benefits:

Secondary market trading of GDP-indexed bonds would create a direct measure of market growth expectations: As growth expectations are an important driver of investment activity, it should be useful for monetary authorities, government policy makers, companies and investors to have a mechanism to measure market growth expectations in real time.

Issuance of GDP-indexed bonds could stimulate development of a GDP swaps and futures market:

The issuance of GDP-indexed bonds by a government could play an important role in jump-starting a derivatives market in GDP-indexed financial contracts. Cyclical companies (such as auto manufacturers) and state and local borrowers (who are constrained by balanced budget statutes and therefore engage in highly pro-cyclical investment programs) (Government Accountability Office [GAO] 2011, table 2) would benefit greatly from the availability of tools to smooth their finances through economic cycles.

Issuance of GDP-indexed bonds by central governments could stimulate the growth of a market for their issuance by sub-sovereign and corporate borrowers:

As noted above, cyclical companies and state and local borrowers would naturally be attracted to the GDP hedging market, although new cash issuance of GDP-indexed bonds by borrowers other than central governments might be quite a challenge during normal circumstances. However, in distressed circumstances, it could be useful for such entities to issue GDP-indexed bonds because the indexation of the debt would benefit both debtors and creditors by lowering the chance that a restructuring deal would be undermined after closing by economic shocks that cannot otherwise be controlled.

The Design of GDP-indexed Bonds: Indexation and Collective Action Features

If policy makers decide to push forward with the issuance of GDP-indexed bonds, a number of design issues will come to the fore. Most importantly, an issuer would need to decide whether to issue bonds indexed to "real" or "nominal" GDP, and whether coupons and/or principal should be subject to indexation.

Choice of Index

Theoretically, countries have four formats to choose from when issuing a new bond: fixed-rate, inflation-linked, real GDP-indexed, and nominal

GDP-indexed. Each of these choices offers a distinctly different economic exposure to future outcomes for growth and inflation and, therefore, one cannot argue — on macroeconomic grounds alone — that one approach is superior to the others. In fact, a government might be well-served by issuing at least some amount in each of the four formats to provide a “complete” market to itself and investors. Since the choice of instrument would depend on the facts and circumstances of each individual government, it would be best to encourage the development of GDP-indexed bonds tied to both real and nominal GDP: a one-size-fits-all approach would not be recommended.

Structure and Valuation of Principal-indexed and Coupon-indexed Bonds

Here is how the cash flows for coupon-indexed and principal-indexed bonds would work per \$100 of bonds issued:

- the annual interest rate of the coupon-indexed bonds would be set at the GDP growth rate for the period, plus a fixed margin while the final principal payment at maturity would be \$100; in contrast,
- the annual cash flows of principal-indexed bonds would likely be some small percentage, such as 0.5 percent, of the outstanding principal amount of the bonds, while the principal amount would accrete from \$100 up to a final balloon payment at maturity to reflect the aggregate growth in GDP during the life of the bond.

The difference between these two indexation mechanisms implies a significant difference in how these instruments would work to hedge a government’s finances: coupon-indexed bonds would work as a cash flow hedge because annual interest cost will go up or down with economic growth, while the principal-indexed bonds would serve primarily as a balance sheet hedge because most of the cash flow will be in the form of the final principal payment that would go up and down with economic growth. Furthermore, the choice of indexation mechanism could substantially alter investor demand for these types of instruments because it would affect the timing of cash flows and the volatility of the price of the instruments in the secondary market. The main concern here is that it may be harder to find a large following for principal-indexed bonds because many investors prefer instruments with principal protection

and because secondary market prices should be more sensitive to changes in GDP expectations.

Collective Action Clauses in GDP-indexed bonds

Some (ICMA 2017) have suggested that any international bonds whose principal varies with GDP outcomes should vote separately from other international bonds in a sovereign debt restructuring. The rationale is that the automatic reduction in principal associated with GDP declines should exempt owners from being subject to the same haircuts as other creditors, should a restructuring be required.² The problem is that the proposal for separate voting would undermine the entire benefit of the 2014 agreement on the new ICMA collective action clauses (CACs) (Makoff and Kahn 2015), which is the elimination of the power of holdouts through the use of a single aggregated voting process. Given the overriding importance of simplifying sovereign debt restructurings, policy makers should universally reject this (and any other) proposal to carve out new securities from the single voting mechanism. Helpfully, coupon-indexed bonds, as discussed above, could naturally be included in the single voting mechanism because the par amount of these new bonds would be fixed at \$100 (like most other bonds) and because the aggregated voting mechanism apportions consideration to bondholders based on par amount of bonds owned, without adjustment for differences in coupon (other than for accrued and unpaid interest).

Kick-starting a Market in GDP-indexed Securities

This section presents four possible approaches to issuing GDP-indexed bonds into the market. To make the discussion concrete, the alternatives below include the name of example issuers for each alternative.

² The essential feature of the new ICMA CAC language introduced in 2014 is that all holders of international bonds of an issuer would vote together to approve a restructuring, subject to the condition that all bondholders would receive the same “uniform” consideration in proportion to the principal amount of their holding.

Single Country Approach: United States

If a single country volunteers to be the first to carry out an issuance of GDP-indexed bonds, the United States may be the best place to start. Growth expectations are on the rise (which implies better pricing) and the US dollar bond market is the largest and most liquid market in the world (which maximizes the chance for a high quality new issue book that includes allocation of bonds to a diversified investor base to support future growth in the market). Coupon-indexed bonds could be issued for simplicity and to maximize investor appeal. Furthermore, to maximize the information content on future growth expectations, five-, 10- and 30-year maturity bonds could be issued at the same time. The bonds could be indexed to real (rather than nominal) GDP to provide investors an opportunity to develop a distinct new economic exposure (and to avoid drawing demand away from the inflation-indexed segment).

Regional Approach: Europe

The euro area could undertake an initiative to place GDP-indexed bonds in the market as follows: the member countries could carry out a joint and several issuance of a series of bonds tied to regional GDP growth; or each member country could concurrently, but separately, issue bonds, each tied to their own GDP growth rate; or Germany could issue a bond tied to euro-area GDP while using private contracts to parse out the country-by-country portion of index payments to the other member countries. This last option would probably be the most efficient way to go from a market perspective: pricing should be better since the regional growth index should be less volatile than any single country index; one large bond would trade a lot better than the issuance of many small bonds; and Germany is probably the single most attractive issuer for investors in light of the size of the market and the credit strength of the issuer. Furthermore, the complexities of a joint or concurrent issuances, as in the first two options, would be avoided.

Regional or International Financial Institution Approach: G20 or Europe

In case policy makers have trouble finding a government willing to be the first issuer of the bonds, the International Monetary Fund, World

Bank or European Investment Bank might be encouraged to issue bonds linked to G20 or euro-area GDP. As above, private hedging contracts with the relevant countries could allow the issuing institution to achieve net funding on a conventional LIBOR (London Inter Bank Offered Rate) basis, while the associated countries would gain the benefit of the embedded GDP indexation.

A Coordinated Derivatives Market Approach: G20 or Europe

While perhaps an overly creative suggestion, policy makers could, alternatively, promote a pure derivatives market implementation. In this approach, G20 (or euro-area) countries might simultaneously offer to sell a five- or 10-year strip of GDP growth futures (each on their own growth) and/or they could jointly sell a strip of futures tied to aggregate G20 (or euro-area) growth. To be sure, there would be many regulatory issues and there is the potential for countries to take advantage of asymmetric information; however, in the spirit of looking at all the possibilities, this approach could be explored.

Further Analysis

Given the number of unresolved issues in the structuring, pricing and use of GDP-indexed bonds, further analysis is warranted. Here is a short list of open questions:

- Supply and demand for GDP-indexed bonds: How might the issuer supply curve and the investor demand curve for the securities vary as a function of the cost and structure of the bonds?
- Historical analysis: How effective would GDP-indexed bonds have been in preventing the default or restructurings of Argentina, Greece or Ecuador, and how much would successful countries such as Uruguay, Turkey and Mexico have regretted the use of such instruments if they had used them over the last 15 years?
- Designing a test issuance: Which countries are currently best positioned to issue GDP-indexed bonds in the near future, and how much pricing efficiency might be gained by indexing the bond to a region's aggregate GDP rather than to a single-country's GDP?

Since financial innovation in the past has often led to adverse outcomes, the possible unintended consequences of these bonds also deserve careful study. For example: a country might be tempted to issue principal-indexed bonds regardless of pricing efficiency because the up-front cost is low (since cash flow is moved from interest into principal accretion); or borrowers might be tempted to justify increases in debt (or slow down any planned reductions in debt) based on the argument that the new instruments increase debt capacity by lowering tail risk to economic shocks. Policy makers may want to suggest a “handle with care” approach when promoting this or any other financial engineering solution to the risks associated with excess government debt.

Conclusion

The issuance of GDP-indexed bonds by a government would provide an automatic stabilizer to its finances when subject to economic volatility. It is a good idea. But the translation of this idea into practice presents a number of challenges, including the need to find a deep pool of investors who would buy these bonds at a reasonable price. One way forward would be for one or more governments to carry out a test issuance in the next year or two, in order to provide hard data on the potential for the wide-scale use of these instruments.

If policy makers decide to go ahead with the initiative, two principal concerns would be whether

governments should issue bonds indexed to real GDP or nominal GDP, and whether coupons and/or principal should be subject to indexation. Another key decision will be whether the instruments would be issued on a stand-alone basis by a single government or as part of a coordinated effort by a group of borrowers. Given the importance of these decisions and the challenges of making the case to investors to buy the bonds, further quantitative analysis is recommended. Furthermore, policy makers should encourage a joint effort to develop the bonds that includes both economists and debt managers so that any recommendations are based on a healthy balance of macroeconomic and market considerations.

In a nutshell, opening up a market in macroeconomic hedging through GDP-indexed instruments is a great concept, but more study and some sort of test run would be needed to prove whether the concept will work in the market.

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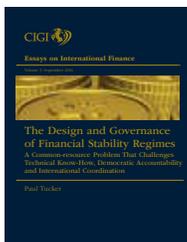
Advancing Policy Ideas and Debate



The New Global Financial Safety Net: Struggling for Coherent Governance in a Multipolar System

Essays on International Finance, Volume 4
Beatrice Weder di Mauro and Jeromin Zettelmeyer

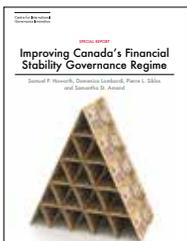
The global financial safety net has expanded from barely more than one institution — the International Monetary Fund (IMF) — to a much larger, although geographically patchy, web comprising the IMF, regional financing arrangements and central bank swap lines. This essay analyzes the issue of the incentives that this creates for sovereign borrowers and private borrowers and lenders and makes recommendations that would help to reconcile crisis lending with good incentives in the new multipolar environment.



The Design and Governance of Financial Stability Regimes

Essays on International Finance, Volume 3
Paul Tucker

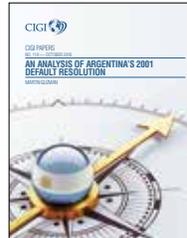
The reforms made to financial regulation regimes around the world since the 2007–2009 crisis have been simultaneously even and uneven. This essay, the third volume in CIGI's *Essays on International Finance*, argues that financial system stability is best addressed as a common-resource problem plagued by hidden actions in the form of endemic regulatory arbitrage and innovation.



Improving Canada's Financial Stability Governance Regime

Special Report
Samuel P. Howorth, Domenico Lombardi,
Pierre L. Siklos and Samantha St. Amand

An efficient and effective financial system facilitates strong economic growth. Ensuring the continued provision of financial services — that is, maintaining the stability of the financial system — is therefore key. This special report focuses on this stability objective and draws from CIGI's research of international best practice to offer suggestions on how Canada can build on the strengths of its governance regime to further bolster its financial stability policy framework.



An Analysis of Argentina's 2001 Default Resolution

CIGI Paper No. 110
Martin Guzman

Argentina's 2001 default was followed by a complex debt restructuring that included a long legal dispute with so-called vulture funds and other holdout creditors. The full resolution of the sovereign default took almost 15 years. This paper examines the whole restructuring process. It describes the strategies followed by the debtor and the bondholders, the domestic economic implications of the restructuring and the characteristics of the legal disputes. It also analyzes the implications of the default resolution for the functioning of sovereign lending markets.



Does Ukraine Receive the Western Aid It Deserves?

CIGI Policy Brief No. 92
Anders Åslund

This policy brief, based on the author's Global Policy Forum talk in Ottawa, Ontario, on September 22, 2016, suggests the West should boost Ukraine through substantial investment funding to offer the nation a reasonable chance of success.



For the Agenda of the German G20 Presidency: A Global Sovereign Debt Restructuring Regime

CIGI Policy Brief No. 85
Beatrice Weder di Mauro

The Group of Twenty (G20) has expanded the global financial safety net, but failed to align access criteria and sovereign debt restructuring requirements across its various players and layers. International crisis lending is now fragmented and lacks a consistent and credible regime for sovereign debt restructuring. The German G20 presidency is uniquely positioned to address these issues.

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