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Are State-Contingent Sovereign Bonds the Solution to Avoid Government Debt Crisis?

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Summary

The idea that sovereign borrowers may issue new debt, the service of which is contingent or GDP growth (GDP linked bonds) has been increasingly discussed in recent years.

Some central banks (England, Canada and, recently, Germany and France) have taken steps to raise the awareness of stakeholders and launch a global conversation on GDP-linked bonds. The IMF participated in this debate though with extreme caution. The G20 mentioned the issue in its last Hamburg communiqué but refrained from taking side.

GDP-linked bonds offer many advantages. They would limit the issuers' debt-service obligations in time of slow or negative growth, reduce the likelihood of debt crises and defaults, avoid sharp spending cuts in order to maintain access to capital markets, and even provide some latitude for additional spending at a time when it is most needed. GDP-linked bonds would also render investors more responsible when it comes to lending money to a sovereign. In addition, investors would know in advance the terms of their bond restructuring and gain an equity-like exposure to a country. The counter-cyclical feature of GDP-linked bonds and the fact that they would alleviate the economic cost of a debt restructuring would also make them beneficial for financial stability and the broader economy.

These benefits would justify a global policy initiative to promote the idea and kickstart the market.

However, many issues remain unresolved (pricing, design, institutional framework…). The learning curve for such a new financial product might, therefore, justify a cautious and experimental approach even though the quick development of a large GDP-linked bond market would have many advantages, including liquidity and arbitrage.

Introduction

According to the rather extensive OECD definition of the stock of government debt, the non-weighted average of the latter in G7 countries rose from 92% of GDP in 2007 to 136% in 2015. This was the result of both increased fiscal deficits and the bailout of bankrupted financial institutions. This shift, as well as the sovereign debt crisis in the Eurozone, has raised concerns about the sustainability of such debt levels. As a result, the debate on sovereign bond restructuring – an issue that in previous decades had been related only to poor or emerging countries – was extended to developed countries as well.

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From a legal standpoint, the status of its sovereign debt makes it almost impossible to enforce the rights of the creditors when the borrower defaults. Therefore, sovereign debt can be analyzed as a financial instrument to which is attached the implicit idea that the borrower can adjust their financial obligations in the event of an exceptionally unfavorable situation (Grossman, 1988).

Depending on each side's willingness to reach a deal, a case-by-case negotiation may take place on the restructuring of the debt when a default occurs, and a lengthy and costly process ensues, the result of which is uncertain.

After the failure in 2003 of an IMF-sponsored scheme inspired by bankruptcy courts, the Sovereign Debt Restructuring Mechanism (SDRM), the focus turned to the clauses in the bonds that define the voting mechanisms when debt restructuring takes place (the collective action clauses or CACs). CACs were promoted by the US Treasury for dollar-denominated bond issuances by emerging countries in the US. They were also made compulsory for sovereign bond issuances in the Eurozone after 1st January 2013, when their maturity exceeds one year.

However, another avenue, which surfaced in the 1990s (Shiller, 1993), has been increasingly discussed since the mid-2000s, and especially in the last three years or so: the idea that sovereign borrowers may issue debt, the service of which is state-contingent.

The most obvious circumstance that may affect positively or negatively the ability of a given government to honor its financial commitments (outside force majeure circumstances) is a variation of the nominal GDP of a country measured in the currency of the debt, since there is a strong link between the latter, tax revenues and the ability of the government to service its debt. The discussion related to state-contingent sovereign debt has, therefore, focused on "GDP-linked bonds", although sovereign debts can be linked to other contingencies – for example, commodities prices.

The idea behind state-contingent sovereign bond is to render explicit and even automatic the implicit idea that, in some circumstances, sovereign debt might not be repaid according to the initial terms and conditions. Payments would increase if predetermined economic circumstances are more favorable than initially contemplated, and would decrease when these circumstances are less favorable. In other words, state-contingent bonds incorporate "equity-like characteristics in the debt-centric world of sovereign finance" (Park, 2015). Since governments are unable "to issue equity stock like a corporation, [they] rely almost exclusively on fixed income debt [...]. Linking debt payments to growth could help mitigate this imbalance, particularly in times of financial distress" (*ibid*).

One can expect an economic countercyclical effect when debt-related payments from a government are increased in good times. Such a countercyclical impact should also be effective in bad times. GDP-linked sovereign bonds would, in addition, reduce the risk of default from the borrowers in adverse circumstances, should these bonds represent a sufficient share of the overall debt.

Overall, GDP-linked bonds would "help insulate solvency indicators" (IMF, 2017) from large negative macroeconomic shocks. They would, first, smooth the cyclical impact of sovereign debt-related payments and, secondly, reduce the risk of a payment default, which most of the time proves costly for the creditors as well as for the borrowers' economy, fostering global financial stability by decreasing the occurrence of financial crisis.

This paper first takes stock of the ongoing debate on GDP sovereign-linked bonds, from both a historical and an intellectual perspective. Secondly, it underlines the many benefits they could provide to selected issuers, investors and the global economy. Thirdly, it lists the remaining issues that must be solved so that this idea can be made operational on a large scale. Fourthly, it advocates in favor of a coordinated initiative by large developed economies to gradually kickstart the market.

1. Although the experience is limited and seldom relevant, the idea that contingent sovereign bonds could help to better manage sovereign debt is now widely discussed and promoted by some key stakeholders

1.1. Actual experience with state-contingent sovereign debt is very limited

Whereas inflation-indexed bonds have taken off (see Box 1), recent history offers few examples of the inclusion of state-contingent clauses in debt instruments issued by sovereigns in peacetime, and these took place only in the context of restructuring already distressed debt instruments.

Box 1 – Inflation-indexed bonds

Inflation-indexed bonds are bonds where the principal is indexed to inflation or deflation. They are thus designed to hedge the inflation risk of a bond. The first known inflation-indexed bond was issued by the Massachusetts Bay Company in 1780 but the usual history of the actual creation of indexed bonds starts in the 20th century. Irving Fisher, most notably, advocated this financial instrument, and the company he co-founded, the Rand-Kardex Co., first issued inflation-indexed bonds in 1925 (Shiller, 2005b). Inflation-indexed bonds took off only after WW2, though at a slow pace. Finland introduced them in 1945, Israel and Iceland in 1955, Brazil in 1964, Chile in 1966, Columbia in 1967, Argentina in 1972, the United Kingdom in 1975, Australia in 1985, Mexico in 1989, Canada in 1991, Sweden in 1994, New Zealand in 1995, the United States in 1997, and France in 1998 (*ibid*). The market started to develop in the beginning of the 21st century, to reach USD 3000bn in 2016.

Perhaps the most discussed one is the 1953 London agreement on German external debt restructuring. Western creditors were willing to reduce West Germany's external financial liabilities in the context of the Cold War. These liabilities mostly resulted from, first, Germany's obligations after the many restructurings of the WW1 reparations initially imposed by the Versailles Treaty, and, second, the post-WW2 bilateral loans from the US. German external financial obligations were reduced by around 50% of what was owed. In addition, the agreement made payments conditional on Germany generating a trade surplus and on these payments being limited, at the most, to 3% of German export receipts. Finally, it stipulated that part of the financial obligations would only be due should German reunification (then hypothetical) occur[1].

Starting in the 1970s, commodities-linked bonds were seen as a way to adjust the risk borne by the governments of commodities-exporting countries. Hence, Mexico indexed some bonds repayments to oil prices during the 1970s and later on. In the early 1990s, Mexico, Uruguay, Venezuela and Nigeria issued some Brady bonds[2] with value recovery rights (VRR) that were structured to pay higher returns when the price of certain commodities was sufficiently high (Inter-American Development Bank, 2007, Ch. 5, Box 5.1).

The first GDP-linked financial products only appeared in the 1990s. These issuances, however, took place in the context of debt restructuring, only for the upside, and subject to a cap with multiple criteria to be met in order to trigger payments (Bank of England 2015). They were, therefore, akin to better-fortune clauses or "sweeteners" in the context of sovereign debt restructurings – and with no downside protection for the issuer (ICMA, 2016).

(1) See Guinnane T. W. (2015) for a description and discussion of the 1953 London Debt Agreement.

(2) The Brady Plan, introduced in early 1989, offered a comprehensive debt-restructuring package for the commercial bank debt of defaulting countries that included exchanging of the old debt against new discounted bonds, the Brady bonds.

In 1994, Bulgaria, as part of its Brady restructuring, issued bonds that could be bought back by the government when growth exceeded a certain threshold. However, the bonds did not specify what measure of GDP should be used to calculate the threshold or whether it was nominal or real GDP that was to be considered (Griffith-Jones & Sharma, 2009). Costa Rica and Bosnia & Herzegovina issued similar instruments that were "not carefully designed" (Council of Economic Advisors, 2004).

More recently,[3] the 2005 Argentina debt restructuring, which aimed to exchange USD 82bn in bonds on which the country had defaulted in 2001, included GDP-linked securities (warrants). More GDP-linked securities were issued as part of the 2010 restructuring for creditors who had rejected the 2005 offering (Griffith-Jones, 2013).

Initially, the GDP-linked warrants were viewed by Argentina's creditors, as well as by the financial markets, as having little value (Griffith-Jones and Sharma, 2009), so they represented little gain for the country. However, thanks to its booming growth in the following years, the warrants substantially outperformed expectations and their prices soared.

In February 2012, Greece issued GDP-linked securities as part of its large-scale debt reduction and restructuring, complemented by a new money package from the European Union and the IMF. In total, EUR 172bn of Greek private debt was swapped in the deal, and participating holders received detachable GDP-linked securities (Griffith-Jones, 2013).

In both cases, Argentina and Greece, payment based on growth in a given year would be made the following year (Griffith-Jones, 2013).

In 2015, the restructuring of Ukraine's sovereign debt included "value recovery instruments" (VRIs), linked to the country's future GDP growth (Park, 2015). That same year, on February 2nd, Greek Finance Minister Yanis Varoufakis famously proposed swapping European rescue loans to Greece with bonds indexed to nominal economic growth.[4]

1.2. State-contingent bonds have emerged as a possible sovereign debt-management tool in the wake of the financial crisis

The debt crises of the 1980s triggered the first wave of interest in linking debt payments to GDP, exports or commodity prices, to lessen the damage caused by any future crises. The Council of Economic Advisers (2004) mentions, for example, the works of Lessard and Williamson (1985), Krugman (1988), and Froot, Scharfstein and Stein (1989).

(3) BOE Workshop 2015. Borensztein (2004) and Park (2016) refer to the New Singapore Shares (NSS) issued by the government of Singapore in 2001. Each NSS paid a fixed three percent return, plus a dividend based on the country's GDP growth rate, if positive, for the prior year. However, NSS were only issued to eligible citizens of Singapore and could not be sold, redeemed or traded.

(4) The use of GDP-linked instruments in the restructuring of Argentine, Greece and Ukraine debt is presented in more detail in Appendix 1

In the mid-1990s, there was another wave of interest following Robert Schiller's proposal (1993) to create "macro markets" for perpetual claims on a fraction of a country's GDP. This discussion expanded to include the idea of using growth-indexed bonds in developed countries, subject to fiscal constraints, such as the Eurozone (Obsfeld, 1998).

After the series of emerging market crises in the late 1990s and early 2000s, the debate on the reform of the international financial architecture led to renewed support for mechanisms such as growth-indexed bonds to reduce country vulnerabilities (see for example: Haldane 1999 and Caballero 2002).

However, before the 2007-2009 financial crises and the Eurozone crisis, this debate was only a minor one within a wider discussion on sovereign default, largely initiated by a number of academic papers drawing attention to the costs associated with a case-by-case approach to this problem (see: Rogoff and Zettelmeyer, 2002; Sturzenegger and Zettelmeyer, 2006; Panizza, Sturzenegger and Zettelmeyer, 2009). This discussion first focused mostly on a global statutory solution, inspired by the bankruptcy courts, the Sovereign Debt Restructuring Mechanism (or SDRM), that the IMF promoted after the 2001 Argentina debt crisis. The SDRM failed to be adopted in 2003. The discussion then moved to contractual clauses to be introduced in bonds to restrict the ability of minority creditors to obstruct the restructuring process: the so-called "collective action clauses" (CACs). CACs were introduced in the bond issuances of emerging countries, starting in the mid-2000s, with the support of the US Treasury. They were made compulsory for new issues in the Eurozone in 2012. More recently, the lengthy litigation between the Argentine government and vulture funds in the US fostered interest in the redefinition of the traditional pari passu (equal treatment) clause to avoid abusive interpretations. In August 2014, the International Capital Markets Association (ICMA) issued, with the support of the IMF, new standard clauses for pari passu and CACs to be introduced in future sovereign bond issues. However, ICMA standards are for reference only. They are not compulsory for any market participant.

Although it was not the central focus of the debt-restructuring policy debate in 2002–2003, GDP-linked bonds were nevertheless discussed in academic and policy circles. In 2004, Borensztein and Mauro published in Economic Policy a paper (Borensztein and Mauro, 2004) based on earlier work at the IMF (Borensztein and Mauro, 2002), arguing that GDP-indexed bonds could provide substantial benefits in reducing the likelihood of default and allowing issuers to avoid pro-cyclical fiscal policies. They also advocated a public intervention that would kickstart the market. Their ideas were further disseminated in a note of the US Council of Economic Advisers (CEA, 2004). In 2005, the UN convened an expert group to brainstorm GDP-indexed bonds (mentioned in Griffith-Jones and Sharma, 2009), and the message was further popularized in an op-ed that Schiller wrote in the Indian press (Schiller, 2005a). In the wake of the restructuring of Argentinean debt, subsequent papers dealt with the technicalities of GDP-linked bonds: contract design and pricing (Miyajima, 2006; Ruban, 2008).

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The 2008–2009 crisis resulted in a steep increase in government debt in developed countries. It also fostered discussion on the moral hazard enjoyed by investors in securities issued by systemic banks and governments, especially when the latter were partially or totally bailed out by other governments and/or international financial institutions, as was the case for Greece.

In early 2012, elaborating on his 1993 book, Schiller published a short text in the *Harvard Business Review* proposing that governments issue "shares" that pay a dividend equal to a trillionth of the GDP of the issuing country (Shiller, 2012).

It is, however, the Bank of England and the Bank of Canada what have been instrumental in this recent wave of interest in what they sometimes label as "sovereign CoCos" by analogy to the contingent convertible financial instruments (or CoCos) that were introduced to facilitate the bail-in of systemic banks in case of stress. Economists from both central banks published a succession of working papers (Brooke, 2013; Barr, 2014; Benford, 2016) and the institutions themselves issued their own contributions (Bank of England, 2015, Bank of England with contribution by Bank of Canada 2016). These contributions cannot be considered so far as official positions but leave no doubt as regards to the strong interest of the two monetary authorities in GDP-linked bonds.

In parallel, contributions to the policy debate by academics have multiplied (Griffith-Jones, 2013; Panizza, 2013; Blanchard, 2016; Park, 2016).

For the first time, the issue was raised in the framework of G20 discussions during the Chinese presidency (December 2015–November 2016). Following the recommendation of the "G20 International Financial Architecture Working Group" (2016), the Communiqué of the G20 Finance Ministers and Central Bank Governors Meeting (Chengdu, China, July 24, 2016) called for "further analysis of the technicalities, opportunities, and challenges of state-contingent debt instruments, including GDP-linked bonds, and asks the IMF, working with interested members, to report back on these issues to G20 Finance Ministers and Central Bank Governors in 2017". However, the recommendation of the IFA working group – that the G20 support "recent efforts, notably in developing countries,

to implement contingent debt instruments or features, in particular with regards to natural disasters" – was discarded by the finance ministers.

The G20 Leaders' Communiqué published after the Hangzhou Summit (September 4 and 5, 2016) does not address the issue directly. The leaders only underlined "the importance of promoting sound and sustainable financing practices", commited to "continue to improve debt restructuring processes" and supported "the continued effort to incorporate the enhanced contractual clauses into sovereign bonds". Though not specific, this language may include growth-indexed bonds.

In December 2016, the president of the Bundesbank expressed interest in GDP-linked bonds in the speech he made at the opening of the G20 German presidency (Bundesbank, 2016).

The Bank of France convened a workshop on this very issue in March 2017, with representatives from academia, the official sector and investors. The only potential issuer came from Tunisia.

The communiqué of the G20 Finance Ministers and Central Bank Governors meeting in Baden-Baden, Germany (17-18 March 2017) shows similar caution, just mentioning a "Compass for GDP-linked bonds" (2017) which provides "an overview of important aspects of this instrument". The "Compass" itself is much more substantial. Though hastily drafted, this document encompasses most issues associated with GDP-linked bonds in a pragmatic and policy-oriented view.

The G20 Hamburg Action Plan attached to the G20 Leaders' Declaration following their meeting in Hamburg, Germany, on 8 July 2017, includes a reference to GDP-linked bonds that shows some interest: "The Compass for GDP-linked Bonds provides an overview of important aspects of this instrument and serves as a good starting point for further work on state-contingent debt instruments by interested sovereigns."

2. GDP-linked bonds offer obvious financial and economic benefits

GDP-linked bonds offer benefits not only for the parties, the issuer and the investors but also for the broader economy through the positive externalities they generate.

2.1. For the issuer

The immediate advantage of GDP-linked bonds for borrowers is that they limit debt service obligations in time of slow or negative growth. This results in reducing the likelihood of debt crises and defaults, and may help to avoid sharp spending cuts in order to maintain access to capital markets. It may even provide leeway for additional spending when it is most needed (Griffith-Jones and Sharma, 2009). Borensztein and Mauro (2004) calculated, for example, that, had half of Mexico's total government debt consisted of GDP-indexed bonds, this would have saved about 1.6% of GDP in interest payments during the 1994–1995 financial crisis.

Similarly to the improvement of the debt equity ratio of a company, the equity-like feature of GDP-linked bonds could improve the solvency of the sovereign borrowers and "translate into lower risk premia for conventional debt" (Compass, 2017; Cabrillac, 2017).

2.2. For investors

The most obvious advantage that growth-indexed bonds may provide to investors is that they include in advance the terms of their own restructuring and therefore lower the likely cost of such a restructuring by reducing the risk of a financial crisis (Griffith-Jones and Sharma, 2009).

Investors may also gain an equity-like exposure to a country and a new opportunity for risk diversification. However, such diversification may occur only to the extent that growth experienced by the different issuers is not correlated[5] and that investors are willing to implement actual portfolio diversification.

Finally, in so far as devaluation leads to inflation, bonds indexed on the nominal GDP can be considered as a hedge against inflation. For example, Cabrillac *et al.* (2017) have calculated that, for middle-income countries, in more than 80% of cases, the holder of GDP-linked bonds in local currency would have had gains in USD over the long term (1996–2015).

2.3. For financial stability and the broader economy

The most obvious economic benefit of GDP-linked bonds is their counter-cyclical feature: all other things being equal, they restrain the procyclical impact of debt payments. During economic downturns, they provide the issuer with debt and cashflow relief. They also allow the investor to participate in the fruits of an economic upturn by receiving a higher coupon and principal payments in times of strong GDP growth (ICMA, 2016). Hence, GDP-linked bonds help to smooth the impact of debt payment on the economic cycle.

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In the case of a severe and sustained downturn, GDP-linked bonds would help to reduce the risk of default of the sovereign borrower. These defaults are disruptive and costly, as shown by an abundant economic literature (Oechsli, 1981; Rogoff and Zettelmeyer 2002; Sturzenegger and Zettelmeyer, 2006; Bolton and Jeanne, 2011; Sturzenegger and Zettelmeyer, 2007; Panizza, Sturzenegger and Zettelmeyer, 2009; Borensztein and Panizza, 2009; Wright, 2011; Zettelmeyer *et al.*, 2011; Zettelmeyer, 2013).

(5) Barr (2014) notes that correlation between growth performances in advanced economies has increased.

In addition to "avoiding [such] disruptions arising from formal defaults" (Griffith-Jones, 2009), growth-indexed bonds would reduce the pressure for official bailouts of borrowers and the associated moral-hazard risk (Brooke, 2013). From a more technical point of view, it is likely that GDP-linked bonds would also incentivize longer-term lending, which decreases the risk of liquidity crises (Brooke, 2013). If widely distributed in a well-balanced portfolio, they could be used as "vehicles for international risk sharing" (Griffith-Jones, 2009).

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3. However, unresolved issues hamper the development of GDP-linked bonds

Because of a lack of experience, it would be premature to try to figure out in detail the problems arising from wide recourse to GDP-linked bonds and the associated costs. However, it is possible to list technical, financial and economic issues that should be accounted for.

3.1. Technical issues:

GDP data

Deliberately tampering with GDP growth data for the sake of diminishing debt service seems unlikely. As underlined by Griffith-Jones (2009), the disadvantages of such behavior would outweigh the advantages. Griffith-Jones (2009) further considers that deflating nominal GDP is "a fairly standard procedure" and notes that the problem has already been overcome for inflation-indexed bonds. In addition, the UN and IMF check for consistency in national accounts. The London Term Sheet that (ICMA, 2016) provides for several layers and safeguards to specifically cope with this issue.

More complex challenges are posed by GDP revisions and methodological changes, and were dealt with by the earliest works on GDP-linked bonds. The CEA (2004) deemed that "the key is to specify ex-ante in the debt contract a clear method for dealing with revisions", while Borensztein and Mauro (2004) recommended ignoring data revisions after a certain date, a solution that ICMA (2016) and the G20 Compass for GDP-linked bonds (2017) follow.

How will rating agencies and prudential supervisors treat GDP-linked bonds?

Should significant issuances of GDP-linked bonds take place, how would they be treated by rating agencies and prudential supervisors? Even beyond the technicalities, this is likely to prove complex and tricky. Settling such issue would inevitably take time and lead to an iterative process. Indeed, to start with, there is no history to rely on and the de facto GDP-linked bonds' seniority mentioned below has not been put to the test.

Will GDP-linked bonds benefit from de facto seniority?

The respective status of GDP-linked bonds and fixed-income debt is a complex question. According to the presentation of the London Term Sheet (ICMA 2016), "The net practical effect of [the GDP-linked bonds'] economic characteristics and legal features is to create an instrument which is more likely to continue to perform and remain in the markets in times when the sovereign finds itself in a challenging economic situation". That is, GDP-linked bonds would be serviced even though a sovereign would default on the rest of its debt. If such a situation occurred, it would be equivalent to "giving the GDP bond a practical seniority over other sovereign borrowings, which should facilitate growth in the market for the instruments" (*ibid*). However, such a conclusion supposes the absence of cross-default between fixed-rate and GDP-linked bonds. This is what ICMA and the Bank of England propose in their London Term Sheet (the latter limits cross-defaults to other GDP-linked bonds from the same issuer) (ICMA 2016). The acceptability of this limitation to cross-defaults by the investors in existing or future fixed-rate debt remains uncertain. Moreover, the equity-like feature of GDP-linked bonds would justify the related debt service payment coming second to payments owed on fixed-income debt.

3.2. Financial issues:

Will GDP-linked bonds be refinanced at maturity in time of economic stress?

One key issue in sovereign debt management is the refinancing of bonds (or loans) when they reach maturity. The current promoter of GDP-linked bonds deems that "long term investors have an economic incentive to refinance maturing bonds even during a severe downturn as they gain to benefit from a swifter economic recovery" (ICMA, 2016). The reasoning behind this assertion is, presumably, similar to the one where equity investors buy shares of a company when the price is low and they anticipate a rebound. If one thinks of GDP-linked bonds in terms of "GDP shares", then, for cyclical economies, it is in the investors' interest to buy close to the low point of the cycle. This should be an incentive for the investor to refinance an expiring GDP-linked bond. The risk for the investor is higher when the growth path is more uncertain.

GDP-linked bonds could bear a negative stigma

As with any debt instrument that encompasses the conditions of its own restructuring, investors might associate GDP-linked

bonds with issuers who anticipate poor repayment capacity and who are willing to hedge against such risk. Reciprocally, issuers might be reluctant to issue such instruments for fear that the latter would signal economic and financial weaknesses. The fear of stigma makes countries similarly reluctant to borrow from the IMF, despite the development of contingent facilities.

3.3. Economic issues:

The impact of GDP-linked bonds on investors' behavior

The impact of growth-indexed bonds on investors' behavior remains highly uncertain. Coeuré (2016) warns: "Loss-absorbing instruments, while protecting taxpayers and providing the right incentives to investors, might lead to unexpected distributive consequences depending on which investors are ultimately holding these instruments".

When bonds are ultimately owned by retail investors, the changes in income flows might have a pro-cyclical impact on their spending and partially ruin the countercyclical impact of sovereign debt service expected to result from GDP-linked bonds.

When GDP-linked bonds are held by financial intermediaries (insurance companies, pension funds...), the latter might encounter problems since, most of the time, their liabilities are not linked to GDP. This may result in little appetite for such an instrument.

In addition, as mentioned in the 2017 IMF policy paper, "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" (IMF 2017).

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Possible reduction of the already shrinking stock of safe assets

Highly liquid, global safe assets are in high demand thanks in part to regulatory restrictions, quantitative easing policies and a rise in risk aversion. At the same time, the deterioration of public finances in western countries has limited the supply of these assets. A reduction of the supply of the latter might result from a significant recourse to GDP-linked bonds by the best issuers, should state-contingent debt not be considered as safe assets by investors.

4. Kickstarting the market through a coordinated policy initiative would be indispensable

For the past three or four years, the idea of linking sovereign bonds to GDP has been supported by studies emanating from central banks (Banks of Canada and England), then by rather low-profile initiatives in policymaking frameworks, most notably the G20. However, this idea has not been tested yet. Not only are there still several issues to be solved before it might materialize, but fear of stigma and the uncertainty inevitably attached to novelty make the spontaneous kickstarting of a market quite unlikely. A coordinated policy initiative would, therefore, be necessary for GDP-linked bonds to develop significantly.

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4.1. Why has the market not developed yet?

The question is whether there is equilibrium with a premium for such bonds that would be attractive to both governments and investors. The answer is not straightforward.

According to Blanchard (2016), the absence of market suggests that today the implicit premium required by potential investors to buy the new instruments is too high for governments to find them desirable to issue. Such a premium may price the novelty and liquidity risks of new instruments. Investors may demand high compensation for fear of adverse selection among issuers. In the words of the IMF, "investors may suspect that countries facing the worst macroeconomic outlook/risks will be most eager to issue state contingent debt instruments for sovereigns" (IMF, 2017).

However, it may well be that issuers are reluctant to have recourse to GDP-linked bonds. One hypothesis is that debt managers and finance ministers often have a short-term horizon, whereas the welfare gains of GDP-linked bonds are likely to accrue over two or more political cycles (Bank of England, 2015).

Should the decision to issue growth-indexed bonds be made, in principle, then comes the question as to when to introduce them? Though further thought needs to be given to this issue, Blanchard *et al.* (2016) have an interesting take. They underline that the "decrease in the upper tail of the distribution from the introduction of growth-indexed bonds is unimportant when the level of debt is low to start with, and irrelevant when the level of debt is already too high", and conclude that "growth-indexed bonds are potentially most useful when the debt ratio is high, but not catastrophically high" – which, they deem, is the case of most advanced economies, with debt ratios often close

to 100%. Blanchard et *al.* run simulations that show that the reduction of the upper tail can make a substantial difference in that case (Blanchard, 2016).

However, the countries that might benefit most from these instruments may find it difficult to issue these bonds at a reasonable cost. This is an argument in favor of exemplarity (see below).

4.2. Are GDP-linked bonds suitable for all sovereign issuers?

In the first instance, one may divide the sovereign issuers into three broad categories: developed, emerging, and developing countries:

- The market for developed countries' sovereign debt in domestic currencies is already a large and liquid one. Most of these countries publish reliable data, issued according to international standards. The volatility of their nominal GDP growth is somewhat limited, despite recent episodes of severe recession. In this respect, developed countries are the best candidates for issuing GDP-linked bonds. However, the same countries may be less incentivized to do so. Their debt is considered as a "safe asset"; that is, the risk of default is deemed to be null. Their incentive to pay a premium to limit debt-service obligations in time of slow or negative growth might be limited. Conversely, the interest for investors of holding GDP-linked bonds issued by prime issuers instead of plain vanilla bonds would be linked strongly to the size of the premium.
- Emerging countries with a reliable statistical apparatus, an existing market for sovereign debt issued in local currencies, and volatile nominal GDP growth are the most likely candidates for issuing GDP-linked bonds. However, there might be an appetite for such bonds only to the extent that the risk associated with the issuer is high enough to raise concerns
- Most developing countries would probably not be able to issue GDP-linked bonds denominated in local currencies in the market. However, such a solution can be contemplated when it comes to a loan granted by national or multinational development agencies.

4.3. A coordinated initiative of major developed issuers, in coordination with the IMF, is necessary

So far, the idea of GDP-linked bonds has raised interest but enjoyed limited support from significant issuers in the sovereign bond markets. The balance of advantages (especially the avoidance of default and the positive externalities on global financial stability) over disadvantages of this financial instrument may legitimize a public initiative to kickstart the market in order to make it larger, more diversified and more liquid than it would otherwise be. As Griffith-Jones (2009) emphasized, there might be the need for a critical mass and for standardization and simplicity in order to establish a range of exactly comparable GDP-linked bonds issued by different countries that would enable investors to make comparisons, undertake arbitrage and facilitate price discovery.

Should the development of GDP-linked bonds be deemed necessary but not result from the initiatives of the market players themselves, three possible paths might be explored.

The first one is exemplarity – the issuance by developed countries with a good signature as an example to be followed. It may, indeed, be the case that "the market has not developed in part because there are few incentives to be the first to move. Being one of the initiators in this type of market implies taking risks and undergoing a learning process that many agents are not incentivized to do".[6] If reputable issuers take the lead and share the learning process, then it might be easier for issuers that do not enjoy the same prestige to follow. As the recent G20 Compass for GDP-linked Bonds (2017) put it, "issuance of GDP-linked bonds by several interested sovereigns may benefit market development by overcoming problems of adverse selection".

so far, the idea of GDP-linked bonds has raised interest but enjoyed limited support from significant issuers in the sovereign bond markets

So far, only central banks of developed countries have expressed interest, most likely because recourse to GDP-linked bonds would enhance financial stability thanks to the automatic restructuring mechanism they embed. The Bank of Canada together with the Bank of England, on the one hand, and the Bundesbank and the Banque de France, both part of the Eurosystem, on the other, are now participating in the public debate on GDP-linked bonds. Benoît Coeuré, a member of the board of the European Central Bank, expressed reservations (Coeuré, 2016) but the ECB has not expressed an official view. To the best of our knowledge, the US Federal Reserve Board has remained silent on the issue. The big debt issuers themselves (the treasuries) were involved in international discussions related to GDP-linked bonds, most notably the one that led to the "Compass for GDP-linked Bonds" (2017), but have not taken position publicly. Treasuries would probably be reluctant to pay a premium for GDP-linked bonds over plain vanilla debt.

The second possible path would be for an international organization to take the lead. One can again imagine two possibilities. The first is that this organization would coordinate the issuance of GDP-linked bonds from different countries. If the G20, IMF and BIS can play a role in promoting GDP-linked bonds, it seems highly unlikely that large bond issuers would tie their hands to a scheme that would be initiated and run by an international organization, in the absence of a formal mandate. The second possibility is that access to

(6) See Wikipedia, GDP-linked bond.

all or some IMF financial facilities would be conditional on the issuance of new GDP-linked bonds or on the remaining debt held by investors being swapped with GDP-linked bond. Such a scheme would certainly contribute to limiting the moral hazard attached to IMF financing and help the development of GDP-linked bonds. However, it would primarily deal with the refinancing of the existing debt and would, therefore, be closer to the solutions that have already been developed by Greece, Russia and Ukraine rather than a decisive step towards the development of a large market.

Finally, the IMF mentions the possibility that a currency union (inevitably the Eurozone) launches a coordinated issuance of state-contingent sovereign debt in order to promote greater risk-sharing (IMF, 2017).

Conclusion

Since the financial crisis of 2008–2009 and the triggering of the Eurozone debt crisis in 2010, policymakers have explored many avenues to restrict moral hazard in the financial system and the risks for the latter of the high level of private and public indebtedness. Most initiatives have dealt with financial intermediaries, mostly banks. They cover the soundness, strength and liquidity of these intermediaries and strive to limit the need for public intervention in the event of crisis through a mix of insurance, investors' bail-in and orderly resolution procedures.

These steps may not be sufficient to prevent the need for a government bailout of the financial system, should a major crisis occur, and of course can do nothing against the rise of government debt that has other grounds than the bailout of financial institutions.

Yet, despite the current high level of government debt in most developed countries and the mounting risk of major and costly government debt crises, little has been done to render investors more responsible and to limit the impact of economic stress on the ability of a sovereign to repay its debt.

One important avenue to do so is to develop GDP-linked bonds. If adequately designed and priced, these debt instruments can align investors' and borrowers' incentives and give an "equity-like" exposure to the issuing countries. In the past three years or so, the Banks of England and Canada, recently joined by the Bundesbank and Bank of France, have taken steps to raise the awareness of stakeholders and launch a global conversation on GDP-linked bonds. The IMF participated in this debate through a policy paper that is extremely cautious, with some IMF directors expressing outright reluctance. The G20 mentioned the issue and the discussion in its last Hamburg communiqué but refrained from taking side.

GDP-linked bonds offer many advantages for the issuer: the limitation of debt-service obligations in time of slow or negative growth, the resulting reduction in the likelihood of debt crises and defaults, the ability to avoid sharp spending cuts in order to maintain access to capital markets, and even some latitude for additional spending at a time when it is most needed. They are also advantageous for the investors, who would know in advance the terms of their bond restructuring and gain an equity-like exposure to a country. Most importantly, GDP-linked bonds would be beneficial for financial stability and the broader economy thanks mostly to their counter-cyclical feature and the fact that they would alleviate the economic cost of a debt restructuring.

the likely benefits of GDP-linked bonds would undoubtedly justify a global policy initiative by developed countries to promote the idea and kickstart the market

However, a number of recent studies and initiatives have fallen short of answering the many issues that remain unresolved concerning possibly wide recourse to GDP-linked bonds (pricing, design, institutional framework, *etc)*.

The likely benefits of GDP-linked bonds would undoubtedly justify a global policy initiative by developed countries to promote the idea and kickstart the market. There would also be many advantages to the quick development of a large market, including liquidity and arbitrage. However, the learning curve for such a new financial product might justify a more cautious and experimental approach.

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Appendix 1 – GDP-linked securities in recent debt restructuring: the cases of Argentina, Greece and Ukraine

Since 2005, three major debt restructurings have included the issuance of detachable GDP-linked securities (*warrants*) aimed at sharing with investors, who had to accept large haircuts, the benefits of a faster-than-expected economic upturn. Argentina issued such securities in 2005 and 2010, Greece in 2012 and Ukraine in 2015. These securities are detachable from the restructured bonds and freely tradable.

Argentina

In 2005 and again in 2010, Argentina issued a GDP-linked instrument as part of a debt restructuring following its 2001 default. The annual dividends of the instrument can allow the investor to recoup up to 48% of the notional principal of the instrument provided that Argentina's GDP growth exceeds certain benchmarks over 30 years. The warrant is not callable. Even if the government buys back the debt, it has to service the warrant. Payments are made if the following three conditions are met simultaneously in any particular year between 2006 and 2035: (i) real GDP is higher than the base GDP, (ii) real growth of GDP is greater than the growth implied by base GDP, and (iii) the total payment cap has not been reached. When conditions are met, the payments equal 5% of real GDP in excess of the reference level (Anthony 2017). A plan to buy back the warrant announced in 2016 was later abandoned.

Greece

In 2012, Greece issued GDP-linked warrants as part of its debt-restructuring package. Payments on Greek warrants are made if the following two conditions are met: (i) economic growth exceeds a certain threshold (from 2014 to 2020, the baseline growth rate varies from 2.2% to 2.9%; from 2020 to 2041, the threshold is fixed at 2%), and (ii) the annual payments do not exceed 1% of the face value of the outstanding new bonds. Starting in 2023, the face value of the warrant progressively declines (see Zettelmeyer, 2013).

Ukraine

In 2015, the Ukrainian government agreed on debt-restructuring terms with foreign creditors. These encompass a 20% nominal haircut, a four-year maturity extension and the issuance of value recovery instruments (VRIs).

The VRI is in the form of a real GDP growth warrant, providing potential upside to holders from 2021 to 2040 under the following terms: (i) no payments if real GDP growth is below 3%, (ii) 15% of the value of GDP growth between 3-4%, and 40% of the value of GDP growth above 4%, and (iv) total payments capped at 1% of GDP from 2021 until 2025, and no payments unless nominal GDP is higher than USD 125.4bn (Ministry of Finance of Ukraine, 2015). The VRIs provide special mechanisms for investor protection, including put options for certain covenant breaches, independent sources of GDP data, and arbitration for payment disputes. The VRIs include cross-series collective action clauses, making them easier to modify and restructure, if necessary.

Appendix 2 – The design of GDP-linked bonds

Beyond ideas and concepts, the actual design of GDP-linked bonds is critical in ensuring that the financial instrument fits its purpose – that is, alleviating the burden of interest payments and principal reimbursement at a time of economic hardship.

Schiller (1995, 2005a, 2012) advocated what may be the purest form of "GDP shares" for more than 20 years. However, his idea has met little echo in policy circles.

During the first decade of the 21st century, most proposals referred to a real GDP growth index, perhaps reflecting the idea that inflation was stable, at least in western countries. For example, Borensztein (2002 and 2004) favored an instrument indexed on the real growth rate of the issuer's GDP. Griffith-Jones *et al.* (2009) proposed to refer to the deviation vis-à-vis a trend of the real GDP. They also mention the possibility of a GDP-linked bond with fixed coupon payments and delayed amortization if the real growth target is not met.

The more recent papers focus on nominal GDP that is more closely linked to government tax receipts. Brooke *et al.*, in the first Bank of Canada paper on GDP-linked bonds (2013), contemplate two mechanisms. The first consists of automatically delaying the maturity of the debt of an issuer when the latter benefits from emergency financial support from an official institution, such as the IMF. The second modality consists of an outright link between the principal of the bond and the nominal level of the GDP of the bond issuer.

Following this first foray, the proposals put forward by the Bank of England[1] favor an indexation to the nominal value of the GDP in local currency in order to align more closely the payment obligations with the ability of the debtor to pay; that is, nominal tax receipts in domestic currency, assuming that the latter is correlated with the GDP. The terms and conditions, or "term sheet", attached to the policy-paper that the Bank of England issued in late 2015 included the following provisions: the GDP-linked bonds are issued in local currency and indexed to the nominal GDP as provided by he national statistical agency or, in case of failure to do so, by the central bank or, as a last recourse, by the IMF; both the coupon and the principal are linked to the GDP. GDP-linked bonds are *pari passu* with the rest of the debt, but a default on the main debt does not trigger a default on the GDP-linked debt. GDP-linked bonds include collective action clauses.

These ideas are further detailed in the document jointly issued by the Bank of England and the International Capital Market Association (ICMA), dubbed the "London Term Sheet" (ICMA, 2016). The proposal consists of a bond that pays a semi-annual coupon and has a bullet repayment at a specified maturity date. Both the coupon and principal repayments are indexed to the level of domestic GDP at current prices, measured in domestic currency with a six-month lag. There is no later compensation for future revisions to GDP data. If reliable GDP statistics are unavailable in a timely manner, the debtor is entitled to a penalty and early redemption (ICMA, 2016).

In a recent policy paper (IMF 2017), the IMF studies the pros and the cons of three possible designs: "linkers" bonds, with principal and coupon linked to the level of a given variable; "floaters" variable rate bonds, with a fixed principal, and coupon linked to changes in the variable; and "extendibles", which push out the maturity of a bond if a predefined trigger is breached. The IMF deems that "linkers" would be best for advanced economies and emerging markets with established local currency markets; floaters would be suitable for all economies but especially emerging markets with limited access to capital markets, and extendibles would suit emerging markets with limited access to capital markets.

(1) The relevant material is available on the Bank of England website (http://www.bankofengland.co.uk/research/Pages/conferences/301115.aspx).

Appendix 3 – The pricing of GDP-linked bonds

When compared to the other, existing sovereign bonds, GDP-linked bonds may be priced differently depending on three factors:

- the availability and quality of GDP growth forecasts (Griffith-Jones & Sharma, 2009)
- the structure of the instrument (the simpler the structure of the instrument, the easier it is to price)
- the premium that investors are demanding

While the first and second depend on the issuer and the instrument it chooses to issue, it is already possible to conjecture on the last one. Drawing on Blanchard (2016), one may distinguish three different types of risks likely to influence such a premium: the default risk, the novelty risk, and the liquidity risk. The first may contribute to reducing the cost of debt of a given issuer, while the second and third may increase the premium requested by investors compared to classic bonds. Each risk can be mitigated mostly through large-scale issuances and standardization (see Table 1, below).

Table 1 – Categories of risks likely to influence the risk premium of sovereign GDP-linked bonds

Risk	Risk mitigation
Default risk	Introducing GDP-linked bonds will result in "lower default risk [which] means a lower premium on public debt in general" (Blanchard, 2016) for both growth-indexed bonds and standard bonds
Novelty risk	Standardization Independent statistical agencies that produce reliable data (Blanchard, 2016)
Liquidity risk	Sufficiently large-scale issuances right from the start Standardization that can facilitate scale and portfolio diversification (Blanchard, 2016)

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