

## **GDP-Linked Bonds: A proposal worth looking into<sup>1</sup>**

*Riccardo Barbieri Hermitte*  
*Chief Economist*  
*Treasury Department*  
*Ministry of Economy and Finance*  
*Italy*

A recent survey of OECD sovereign debt managers revealed a good deal of skepticism vis-à-vis GDP-linked bonds (GLBs), with respect to both technical issues and perceived lack of investor interest. Issuers worry that weak demand for these securities would entail hefty risk premia, thus making these instruments too expensive. In addition, the menu of government securities currently offered by Euro area countries is already quite broad, comprising not only bills and fixed-rate bonds, but also domestic and Euro-area inflation linkers and, in some cases, floating rate notes, not to mention various types of bills and bonds targeted to retail investors. Debt managers worry about the consequences on market liquidity of broadening the menu of government securities on offer at a time of reduced gross issuance (and, for some time to come, central-bank buying). Other oft-mentioned objections to GLBs, and more broadly state-contingent sovereign debt instruments, include practical complications relating to data integrity and revisions, moral hazard and adverse selection<sup>2</sup>.

However, there is no denying that, from the standpoint of sovereign issuers, GLBs would have superior defensive characteristics in the event of sharp recessions compared to conventional fixed-rate securities, as their redemption price would adjust to GDP developments. In a theoretical case in which all of a country's public debt was indexed to GDP, the public debt-to-GDP ratio would be fully hedged against unforeseen changes in nominal GDP growth, including sharp recessions such as the one engendered by the global financial crisis of late 2008.

GLBs have been the subject of renewed interest in academic and policy circles of late. Most contributions focus on the tradeoff between increased resilience to economic shocks offered by these securities and the risk premia that are likely to be demanded by investors, and hence the additional cost of funding likely to be borne by issuers. There is also broad recognition that, except for cases in which GLBs are introduced in the context of debt restructuring, it would take years, if not decades, of consistent issuance before the share of GLBs in total government debt became large enough to significantly improve the resilience of public debt to adverse economic shocks.

---

<sup>1</sup> The views expressed in this note are personal and do not represent the official position of the Italian Treasury.

<sup>2</sup> See the Executive Board Assessment in IMF (2017)

Meanwhile, work on more practical aspects of GLBs has been carried out by the Bank of England and a group of investors and has led to numerous versions of the so-called London Term Sheet (LTS)<sup>3</sup>. In my brief remarks I shall focus on the aspects that are likely to determine the practical feasibility of GLBs, arguing that they would be a viable proposition if approached as a long-term initiative, but clearly are not a near-term fix for high-debt countries.

### **Technical features of GLBs and related markets**

In line with the LTS, I assume that a GDP-linker would be a security whose principal and coupon payments are indexed to the growth rate of nominal GDP compared to a base year. The issuer would set a base for the semi-annual (or annual) coupon. The coupon paid at time  $t$  would be equal to the ratio of the nominal GDP index at time  $t$  and at time  $t_0$  (issuance), multiplied by the base coupon. The redemption price would be equal to the notional times the ratio of nominal GDP at time  $T$  (maturity) and  $t_0$ . On each given trading session over the life of the GLB, a nominal GDP growth breakeven could be calculated from the market price of the security, similarly to what happens in the case of inflation linkers.

It can be assumed that if it were announced that issuance of GLBs would be large and sustained over time, that would lead to the development of trading in GDP swaps, as has been the case for inflation linkers. The availability of GDP swaps would create interesting cross-country trading opportunities. Investors may wish to position not only in GDP breakevens, but also to put on positions versus equity indices. On the supply side, if spreads were attractive, corporate issuers too may become interested in issuing GDP-linked bonds. Nothing would prevent an issuer from a given country to issue a Euro-area GDP linker or an instrument linked to the GDP of another country if the cost was attractive once swapped into an interest rate exposure or if the issuer sought that GDP exposure. In fact, an export-oriented company could issue a GLB indexed to the nominal GDP data of a basket of countries to which it was exposed.

### **The importance of international standards and of a concerted effort among issuers**

GLBs could potentially be a useful instrument for debt management and a sovereign risk-reduction tool, especially if a relatively large number of Euro area and, better still, advanced economies adopted them. Isolated initiatives by individual EU member states would probably meet with limited success. At a minimum, a pan-European initiative would seem necessary, as issuance and secondary market trading volumes would be significantly larger and investors would value the possibility of achieving greater cross-country portfolio diversification. Although correlations between GDP growth rates of EU member states (and advanced economies) are high, the possibility of diversifying idiosyncratic risks would boost the appeal of GLBs and thus ultimately reduce issuer-specific risk premia.

Standardized features for GDP-linkers should also be agreed among sovereign issuers in order to minimize liquidity and novelty premia.

---

<sup>3</sup> ICMA (2017)

### **A long-term debt instrument with a long-term issuance program**

GDP-linked bonds should be long-dated, e.g. ten years and above. This is because of the likely investor base, the equity-like nature of the instrument and the technical features of the bonds, notably the lagged indexation that may have to be adopted given the delay with which final GDP data are released by national statistical offices and Eurostat. Investors would thus take a view about long-term trends. Upward and downward revisions to preliminary official estimates of nominal GDP would be more likely to balance out over a long period of time – an important consideration given that for the sake of timeliness coupon payments would be based on preliminary GDP estimates.<sup>4</sup>

A long maturity would also entail a higher financial duration of GLBs. As is the case for inflation linkers, high duration would offset or mitigate the risk of sharp falls in market prices of GLBs driven by changing GDP growth prospects. On the other hand, the price of a short-dated GLB would be more responsive to a sudden worsening in the economic prospects of a given country. With a higher duration, the drop in interest rates would offset the impact of changing GDP expectations on the price of the bond.

Issuance of GLBs should be large enough to ensure that, say over a period of ten years, their share of outstanding debt had a meaningful impact on the overall debt-to-GDP ratio and on default risk.

### **Which countries would benefit from GLB issuance?**

As far as pricing is concerned, issuing GDP-linked bonds would be highly attractive for countries whose growth prospects are currently viewed favorably by economic forecasters and investors, and less attractive for the perceived growth laggards.

Indeed, if growth surprised on the upside issuers would end up paying higher ex post interest on GDP linkers compared with fixed-rate bonds; conversely, they would save on interest payments if nominal GDP growth disappointed original market expectations. Likewise, the redemption value of the bond would rise compared to the level implied by the issue price if nominal GDP outperformed expectations; it would fall below it if growth were stronger than expected at issuance.

The defensive characteristics of GDP-linked bonds should thus be appealing not only for highly indebted countries, but also for issuers who currently enjoy low debt-to-GDP ratios. It is only the perceived urgency of hedging government debt against a sharp downturn in economic activity that may differ between the two types of countries.

### **‘Sick men’ may become success stories**

Countries’ economic fortunes, and perceptions and expectations thereof, may change over time. Today Germany is rightly viewed as a highly successful country, but in the early 2000s it was dubbed the ‘sick man of Europe.’ An issuance program of GLBs should thus have a long-term horizon, regardless of temporary swings in growth sentiment.

---

<sup>4</sup> In EU countries, annual GDP data typically become ‘final’ after two years, frequently leading to significant revisions to the quarterly series. If one assumes that the final annual data are the ‘true’ level of GDP, the quarterly estimates that are available say, four months after the end of a quarter, should still be viewed as preliminary, which can lead to significant errors. It is thus important to balance out these errors over time (if one assumes that the estimation method does not suffer from systematic errors).

From Italy's point of view, for instance, pricing is the key concern at the current juncture given that the consensus view on Italy's long-term productivity growth, and more broadly nominal GDP growth, is quite cautious. On the other hand, Germany may not see a need to introduce a new debt instrument given the solid growth, sound public finances and ultra-low bond yields it is currently enjoying. However, Germany would benefit from the positive assessment of its growth prospects among investors, economists and international organizations.

The European Commission's assessment of Germany's long-term real growth prospects (a 1.2 percent average growth rate for the 2020-2040 period) is lower than its estimate of potential growth in 2018-2019 (1.9 percent)<sup>5</sup>. Even so, it would still yield a nominal growth projection of at least 3 percent.<sup>6</sup>

The nominal GDP growth breakeven at which Germany would issue a hypothetical twenty-year GLB would also depend on the risk premium demanded by investors. But say the bond was issued at a breakeven of 3 percent: Germany's federal government would then only be worse-off compared to issuing a fixed-rate Bund if nominal growth in the following twenty years exceeded 3 percent. (Germany's average nominal GDP growth rate since the inception of the euro, 1999-2017, has been 2.6 percent.)

All in all, given the long-term nature of issuance programs, high-debt countries should be willing to incur an initially higher risk premium for the sake of improving their resilience, while low-debt, faster growing countries should take advantage of the relatively high GDP breakeven at which they likely would issue GLBs. The *ex post* cost of funding via GLBs would only exceed that of conventional fixed-rate bonds if nominal GDP growth exceeded current expectations.

### **A source of moral hazard or a stimulus to reforms?**

Given that the key variable for GLB pricing at the time of issuance is *expectations* about long-term nominal GDP growth, sovereign GLB issuers would have a strong incentive to announce and implement credible growth-enhancing reforms.

Critics argue that GLBs would create moral hazard because they reduce the risk of explosive trends in a country's public debt-to-GDP ratio in the event of a confidence crisis caused by irresponsible fiscal policies. The reform argument would seem to strengthen their critique by adding an additional incentive for governments to go for growth, including via ample doses of fiscal stimulus.

However, this argument overlooks the fact that fixed-rate bonds would remain the main tool of government debt financing even for active GLB issuers. Provided issuance programs were properly calibrated with a mix of conventional and GDP-linked bonds, they would set the right incentives for governments to pursue economic reforms and responsible fiscal policies.

---

<sup>5</sup> For long-term forecast see European Commission (2018); for the 2018-2019 forecast European Commission (2017).

<sup>6</sup> The introduction of GLBs would provide a strong stimulus to research on long-term GDP growth forecasting. The most common approach is to use a production-function method to estimate long-term real GDP growth and add to it an inflation (or GDP deflator) forecast broadly consistent with the central bank's inflation target. The average growth rate of Germany's GDP deflator in the 1999-2017 was 2.1 percent. A prudential forecast of Germany's nominal GDP growth in the 2020-2040 period would thus be 3.2 percent (1.2 real plus 2.0 deflator growth).

## **The way forward**

Preliminary work has already been carried out in order to assess potential investor interest and the absorption capacity of global markets with respect to sizable issuance programs. This work should be further extended, involving all the main categories of investors, not only pension funds and mutual fund managers, but also sovereign wealth funds, official reserve managers and hedge funds.

A number of technical issues must also be resolved, including:

- Standardization of securities and indexation method (Term Sheet);
- Standardization of statistics for GDP-linked bonds in coordination with Eurostat;
- Minimum issuance as a share of gross funding programs.

The significant differences in terms of debt-to-GDP ratios and borrowing requirements among the Euro area countries would complicate the coordination of a large-scale issuance program, not least in terms of issuance volumes. Countries that issue larger amounts in absolute terms and relative to their annual issuance programs would probably end up paying higher premia. However, a concerted program would also engender active trading and arbitrage in 'growth breakevens,' which would help compress such premia.

As far as the quality and reliability of GDP statistics are concerned, investors would probably trust the independence of European statistical offices, supervised by Eurostat, and of those of other advanced economies.

The issue of GDP data revisions is complicated: there is clearly a trade-off between timeliness of the GDP index used to calculate coupons and the extent of subsequent revisions to the GDP data. Quarterly GDP data are typically subject to significant revisions. However, if feedback from issuers and investors indicated that coupons should be semi-annual and that the indexation lag should be relatively short, one would have to use quarterly instead of annual GDP data – for instance relying on the third revision of the data, which is normally released between 85 and 120 days after the end of a given quarter, to compute the relevant GDP index. For instance, a bond that, pays a semi-annual coupon on or after 31 May 2018 could be indexed to the Q4 2017 nominal GDP number. For the purpose of GDP-linked bonds, that would henceforth remain the official GDP figure for Q4 2017. The statistical office should thus publish a dedicated nominal GDP series that did not incorporate subsequent revisions to the national accounts.

## **Conclusions**

GLBs could improve the resilience of the public finances to economic downturns and improve public debt sustainability. The insurance against economic downturns provided by GLBs would be particularly relevant for Euro area countries given the sharp rise in public debt-to-GDP ratios in 2009-2015 and the monetary and fiscal setup of monetary union (ECB independence and transnational status, as well as the no-bailout clause).

GLBs should preferably be long-term securities, for reasons that range from neutrality with respect to GDP revisions to the desirability of high duration.

Although OECD issuers have so far given the GLB proposal a cold reception, further preparatory work on commonly agreed standards for the securities and the statistics involved is thus warranted, in my view. A concerted EU effort, preferably in cooperation with other advanced economies, seems necessary for a successful introduction of GLBs. The interest that the European Commission has taken in the subject is thus welcome.

That said, it is important to realize that the attainment of greater resilience via GLBs would take years given relatively low debt-rollover ratios and borrowing requirements in most Euro area countries and given that issuance of fixed-rate securities would continue in parallel. Only in the undesirable scenario of debt restructuring would a country be able to rapidly achieve a high share of GLBs over total outstanding debt.

While Say's Law (supply creates its own demand) may well apply to this case, gauging potential investor is the key priority at this stage in the process. The oft-heard argument that GLBs would already exist if there was sufficient investor interest does not hold water: only if a large and regular issuer started offering the new instrument would the GLB market and accompanying derivatives develop, thus compressing risk, liquidity and novelty premia. But if we found out that interest on the part of investors was limited or nonexistent, the project should be probably put on hold.

Finally, academic economists will keep probing the question of risk premia on GLBs with increasingly complex models, and that is certainly useful. For market practitioners, though, the proof of the pudding remains in the eating.

## References

Benford J, Best T, Joy M (2016), Sovereign GDP-linked Bonds, Financial Stability Paper No.39, Bank of England, September 2016.

Blanchard O, Mauro P, Acalin J (2016), The Case for Growth-Indexed Bonds in Advanced Economies Today, Peterson Institute for International Economics, Policy Brief 16-2, February 2016.

Borensztein E, Mauro P (2004), The Case for GDP-indexed bonds, Economic Policy, Vol.19, Issue 38, 1 April 2004.

Carnot N, Pamies Sumner S (2017), GDP-Linked Bonds: Some Simulations on EU Countries, European Commission Discussion Paper 073, December 2017.

European Commission (2017), European Economic Forecast, Autumn 2017, Institutional Paper 063, November 2017.

European Commission (2018), The 2018 Ageing Report: Underlying Assumptions and Projection Methodologies, European Economy 2018.

ICMA (2017), Introduction to the London Term Sheet for a GDP-linked Bond, 14 March 2017.

IMF (2017), State-Contingent Debt Instruments for Sovereigns, IMF Policy Paper, May 2017.

Kopf C (2017), The Case for GDP-linked Securities, Presentation at BMCG meeting, 7 February 2017.

Manna M (2017), A Formal Introduction to GDP-indexed Bonds, mimeo, 13 October 2017.