

DESA Working Paper No. 21

ST/ESA/2006/DWP/21

April 2006

GDP-Indexed Bonds: Making It Happen*Stephany Griffith-Jones and Krishnan Sharma*

Abstract

There has been increasing interest in exploring financial instruments that could limit the cyclical vulnerabilities of developing countries and reduce the likelihood of defaults and debt crises. GDP-indexed bonds fall into this category and may also generate a wider range of benefits for issuer countries, investors and the global financial system. The authors also examine the concerns and obstacles relating to the introduction of this instrument, suggesting that some may be exaggerated while others could be overcome. The paper calls for international public action to help develop markets for GDP-linked bonds and proposes a number of actions, some of which would require collaboration between Governments, multilateral development banks and the private sector.

JEL Classification: F21 (International Investment; Long-Term Capital Movements), F30 (International Finance: General), G15 (International Financial Markets).

Keywords: GDP-indexed bonds, cyclical vulnerabilities, issuers, investors, public good, international public action.

Stephany Griffith-Jones is a Professorial Fellow at the Institute of Development Studies, University of Sussex. At the time of writing, she was a Principal Officer at the Department of Economic and Social Affairs.

Krishnan Sharma is an Economic Affairs Officer and the Focal Point for Business Engagement in the Financing for Development Office, Department of Economic and Social Affairs.

Comments should be addressed by email to the authors at S.Griffith-Jones@ids.ac.uk or Sharmak@un.org.

Contents

GDP-Indexed Bonds: Making It Happen	1
The benefits of GDP-indexed bonds	2
Gains for borrowing countries	2
Gains for investors	3
Broader benefits to the global economy and financial system.....	3
Recent experience with GDP-indexed bonds: the case of Argentina.....	4
Features of the Argentine GDP warrant.....	4
Concerns, issues and obstacles	6
Some general issues and concerns	6
Investors' concerns.....	7
Different potential investors.....	11
Issuer interest	11
Additional suggestions for overcoming obstacles	12
Policy implications and next steps	13
References.....	15

UN/DESA Working Papers are preliminary documents circulated in a limited number of copies and posted on the DESA website at <http://www.un.org/esa/desa/papers> to stimulate discussion and critical comment. The views and opinions expressed herein are those of the author and do not necessarily reflect those of the United Nations Secretariat. The designations and terminology employed may not conform to United Nations practice and do not imply the expression of any opinion whatsoever on the part of the Organization.

Copy editor: *June Chesney*

Typesetter: *Valerian Monteiro*

United Nations
Department of Economic and Social Affairs
2 United Nations Plaza, Room DC2-1428
New York, N.Y. 10017, USA
Tel: (1-212) 963-4761 • Fax: (1-212) 963-4444
e-mail: esa@un.org
<http://www.un.org/esa/desa/papers>

GDP-Indexed Bonds: Making It Happen

Stephany Griffith-Jones and Krishnan Sharma¹

The introduction of GDP-indexed bonds could have a number of positive effects for developing countries, investors and the international financial system alike. The proposal for such an instrument is not new, a first wave of interest in indexing debt to GDP having emerged in the 1980s, propounded by economists such as Williamson. In more recent years, development of this concept has been encouraged by the work of economists such as Shiller (1993; 2005a),² Borensztein and Mauro (2004) and Forbes (Council of Economic Advisers, 2004). While the idea of GDP-indexed debt has so far been implemented only to a limited extent,³ it received new impetus after the wave of financial and debt crises in a number of emerging markets in the 1990s. There has been a revival of interest in instruments that could reduce developing countries' cyclical vulnerability. In particular, GDP-indexed bonds have attracted discussion recently, since a variant of this instrument is playing a role in the Argentine debt restructuring.

How would such an instrument work? In the simplest terms, it would imply a bond that promised to pay an interest coupon based on the issuing country's rate of growth. For example, assume a country with a trend growth rate of 3 per cent a year and an ability to borrow on plain vanilla terms at 7 per cent a year. Such a country might issue bonds that pay 1 per cent above or below 7 per cent for every one percent that its growth rate exceeded or fell short of 3 per cent. Of course, the country will also pay an insurance premium, which most experts expect to be small (as discussed in greater detail below). Whether the coupon yield needs to vary symmetrically, in line with the gap between actual and trend growth, on both the upside and the downside is an open question. Given the requirement for many institutional investors to hold assets that pay a positive interest rate, there may also be a need for a floor beyond which the coupon rate cannot fall.

The present paper draws on an extensive survey of the literature, interviews with financial market participants and the discussions in an expert group meeting (comprising market participants, government officials and representatives from multilateral organizations) held at United Nations Headquarters in New York on October 25, 2005 (United Nations, 2005a).⁴

The paper is structured as follows: the next two sections outline the benefits and recent experience with GDP-indexed bonds, respectively; the following section looks at the concerns, obstacles and issues from the viewpoint of investors and issuers; and the final section suggests constructive next steps.

-
- 1 The authors would like to thank Jose Antonio Ocampo, Jomo K. S., Oscar de Rojas and Alexandre Trepelkov for providing the opportunity to undertake this work. They also gratefully acknowledge the comments and advice provided by Randall Dodd, Shari Spiegel, Inge Kaul and Pedro Conceicao.
 - 2 Shiller proposed to create 'macro markets' for GDP-linked securities, which were to be perpetual claims on a fraction of a country's GDP.
 - 3 Some small countries, such as Bulgaria, Costa Rica and Bosnia and Herzegovina, have issued bonds as part of their Brady restructurings that included clauses or warrants which increased their payments if GDP reached a certain level.
 - 4 See also <http://www.un.org/esa/ffd/BackgroundPaper.doc>.

The benefits of GDP-indexed bonds

The benefits of GDP-indexed bonds can be divided into (i) gains for borrowing countries, (ii) gains for investors and (iii) broader benefits to the global economy and financial system.

Gains for borrowing countries

GDP-indexed bonds can be said to be beneficial for all countries, but especially for emerging markets. They provide two major benefits for emerging economy borrowers:

- Firstly, they stabilize Government spending and limit the pro-cyclicality of fiscal pressures by necessitating smaller interest payments at times of slower growth—providing space for higher spending or lower taxes—and vice versa. This runs counter to the actual experience of emerging economies, which are often forced to undertake fiscal retrenchment during periods of slow growth in order to maintain access to international capital markets (Ocampo, 2003). In this sense, growth-indexed bonds can also be said to disproportionately benefit the poor by reducing the need to cut social spending when growth slows. They could also curb excessively expansionary fiscal policy in times of rapid growth.
- Secondly, by allowing debt-service ratios to fall in times of slow or negative growth, the likelihood of defaults and debt crises is reduced. Crises are extremely costly, both in terms of growth and production, and in financial terms (Eichengreen, 2004; Griffith-Jones and Gottschalk, 2006). The extent of this benefit is of course determined by the share of debt that is indexed to GDP.

Simulations show that the gains for emerging economy borrowers can be substantial. Research by Borensztein and Mauro (2004) shows that, if half of Mexico's total government debt had consisted of GDP-indexed bonds, it would have saved about 1.6 per cent of GDP in interest payments during the Tequila crisis in 1995. These additional resources would have provided the Government with space to avoid sharp spending cuts and would have maybe even provided some leeway for additional spending that may have mitigated some of the worst effects of the crisis.

Those emerging market economies experiencing volatile growth and high levels of indebtedness (such as Brazil and Turkey) should find this instrument attractive to issue. However, one problem might be that the countries that may benefit most from these instruments may also find it difficult to issue them at reasonable premiums, owing to markets' questioning their economic and policy fundamentals. If GDP-indexed bonds are to be widely used, it would therefore be better if they were issued first by countries with greater credibility. Two such groups of countries were identified in the expert group meeting. The first comprised developed countries that may have an interest in issuing GDP-indexed bonds, for example the European Economic and Monetary Union (EMU) countries. The second group may be developing countries (such as Mexico or Chile), whose fundamentals are attractive to markets. The instrument may also be of interest to those countries that are considering liberalizing further restrictions on overseas capital flows in order to attract greater volumes of private finance (such as India). For such countries, GDP-indexed bonds may be an attractive instrument that manages their risk as they gradually liberalize the capital account of their balance of payments (United Nations, 2005a).

GDP-indexed bonds may also provide benefits for the industrialized countries, especially in Europe. They may be particularly attractive for EMU countries, given the argument that the Stability and Growth Pact (SGP) tends to render their fiscal policies pro-cyclical. These could include countries where

pensions are indexed against GDP growth, such as Italy. Moreover, these countries may find it easier to issue and sell these bonds to investors because of their more comprehensive and reliable statistics on GDP and its components.

Gains for investors

Investors are likely to receive two main benefits from the introduction of this instrument:

- Firstly, they would provide an opportunity for investors to take a position on countries' future growth prospects, i.e., they would offer investors an equity-like exposure to a country. Though this is possible to some degree through stock markets, these are often not representative of the economy as a whole. In this respect, they should also provide a diversification opportunity. One way in which this instrument would provide diversification benefits is by providing an opportunity for investors in countries/regions with low growth rates to have a stake in countries/regions with higher growth rates (United Nations, 2005a). Moreover, since growth rates across emerging markets tend to be fairly uncorrelated, a portfolio including GDP-indexed bonds for several of these economies would have the benefits of diversification, thus increasing the return/risk ratio.
- Secondly, investors would benefit from a lower frequency of defaults and financial crises, which often result in costly litigation/renegotiation and sometimes in outright large losses.

Of course, it is important to differentiate between the various categories of investors (see below for a more detailed discussion). Some types of investors may find this instrument more attractive than others. For example, it has been argued that pension funds in some countries could find this instrument appealing. In some countries, such as Italy for example, private pension funds benchmark their returns against the public pension system, which is indexed to the growth of GDP. Thus, an instrument whose return is linked to domestic growth would be attractive for such pension funds. Similarly, there is also the issue of whether domestic pension funds in emerging markets may be interested in purchasing growth-indexed securities issued by their Governments (especially if there is a local currency variant). At the expert group meeting, an investor suggested a potential interest among pension funds in developing countries such as, for example, Mexico and Chile (United Nations, 2005a).

Broader benefits to the global economy and financial system

On a broader level, GDP-indexed bonds can be viewed as desirable vehicles for international risk-sharing⁵ and as a way of avoiding the disruptions arising from formal default. They can be said to have the characteristics of a public good in that they generate systemic benefits over and above those accruing to individual investors and countries. For example, by reducing the likelihood of a default by the borrowing country, these instruments would benefit not just their holders but also the broader categories of investors including those who hold plain vanilla bonds. In addition, improvements in GDP reporting necessitated by the introduction of growth-linked bonds should also benefit the wider universe of investors. Similarly, the benefits for countries of a lesser likelihood of financial crises extend to those that may be affected by contagion and also the advanced economies and multilateral institutions that may have to finance bail-out packages. As elaborated below, these externalities provide an additional compelling explanation of why it is not sufficient to expect markets to develop these instruments on their own; rather there exists a justification for the international community to pool resources and coordinate their actions to achieve such an end.

5 Several studies show that there are large unrealized gains from international risk-sharing (Borensztein and Mauro, 2004).

Recent experience with GDP-indexed bonds: the case of Argentina

While GDP-indexed bonds have not yet been issued on a large scale, a number of countries (such as Bulgaria, Costa Rica and Bosnia and Herzegovina) have issued them as part of their Brady restructurings.⁶ However, in general these instruments were not well designed and had mixed success. For instance, in Bulgaria, the bonds were callable, which allowed the Government to buy back these bonds when growth exceeded the nominated threshold, rather than pay an additional premium. Moreover, the bonds did not specify what measure of GDP should be used to calculate the threshold and, even more seriously, whether nominal or real GDP should be used (Council of Economic Advisers, 2004). Given these design problems, past experience with GDP-indexed bonds does not provide much information as to how they would perform if their structure were better thought out.

The possibility of a market being created for GDP-indexed bonds of emerging markets may have been significantly enhanced by the introduction of a GDP-linked warrant into the Argentine debt-restructuring package.

Initially, Argentina's creditors (and the financial markets more generally) seemed to disregard the offer by the Argentine Government of the GDP warrant and/or argued that it had little value.⁷ However, the position of creditors in the middle of a negotiation can probably be best understood in the context of bargaining or game theory! It is in their interest to downplay the value of any offer by the debtor, especially in the context of a tough negotiation, such as the Argentine one. However, according to some observers, more creditors may have participated in the Argentine debt restructuring because of the offer of the warrants; thus, on the margin, the warrants may have helped the successful outcome of the Argentine offer. Recently, as a result of the efforts of some investment houses and—above all—of very rapid growth in the Argentine economy, which increases the potential value of these warrants (see below), interest in Argentine GDP warrants has increased significantly and their price has been rising.⁸

If Argentina continues to grow quite rapidly on average and is therefore required to service the warrants at a fairly significant amount, this may turn out to be somewhat costly for Argentina in terms of higher debt servicing (though this will occur only in times of fairly high growth, when it can be argued that the country can presumably “afford” a higher debt servicing). However, though potentially costly for Argentina, such a scenario could significantly help create a GDP-linked bond market. To the extent that the instrument of GDP-linked bonds is a desirable financial innovation, of benefit to debtors and creditors, Argentina would have done the international community a favour by issuing these warrants and servicing them.

Features of the Argentine GDP warrant

The GDP-linked unit (or warrant) is attached to every restructured Argentine bond; its payments are linked to the growth of the economy. Payments will be made if the following three conditions are met simultaneously in any particular year between 2006 and 2035:

6 These included clauses or warrants that increased payments if GDP reached a certain threshold (Council of Economic Advisers, 2004).

7 Source: interview.

8 See, for example, Credit Suisse First Boston (CSFB) Emerging Markets Sovereign Strategy, 22 September 2005

- Real GDP must be at a higher level than the base GDP.
- Real growth of GDP versus the previous year must be greater than the growth implied by base GDP (from 2015 the base growth rate is flat at 3 per cent; before then, somewhat higher growth rates are assumed).
- The total payment cap has not been reached; this payment cap is denominated in the currency of the warrant. This maximum amount will not exceed US\$ 0.48 per unit of currency of the warrant.

When the three conditions are met, the Government will pay 5 per cent of the difference between the actual growth and the base case growth of GDP during the relevant year. Given the lags in publishing GDP data, the payment relating to GDP performance in a given year is not actually paid until 15 December of the following year. The warrant is not callable, that is to say, even if the Argentine Government buys back the debt, it still has to serve the warrant.⁹

The warrant will be detached from the underlying bonds (bonds which result from the debt restructuring) 180 days after the issue date (at the end of November 2005) and will have an individual trading price after that. As a consequence, the Argentine warrant can be defined as a detachable option. However, at the time of writing (late September 2005), there is a WIFI (“when if”) market developing for these warrants. (Currently in the forward market, the US dollar warrants are trading at around 4.7 per cent, higher than their initial price.)

The fact that Argentina is currently growing very rapidly (with investment banks projecting growth at 7.5 per cent or more for 2005, and 5 per cent for 2006) puts it well above the baseline growth (of less than 4.5 per cent for 2004 and just over 3.5 per cent for 2006). High early growth increases the value of the warrant because it puts the level of GDP above the baseline early, thereby increasing the chance that one of the conditions will continue to be met in the future, as the level of GDP is more likely to stay above the baseline; more immediately, early payments have more value, due to high discount rates for future payments.¹⁰

Currently, the market for warrant forwards is not very liquid, with an estimated scale of around US\$ 5 billion, which is relatively small in relation to the total level of warrants that will be issued. Reportedly, these warrant forwards are mainly traded by hedge funds and index funds, though they could be very attractive for pension funds, given their potential upside.

At the time of writing, there are different hypotheses about how the transformation of forward trading into trading of the warrant (in late November 2005) will affect the market’s liquidity and price. Some analysts believe demand may be limited, owing to the possible perceived complexity of the instrument. Others believe that there will be significant new buyers—those who are currently unable to buy forwards.

There are also different views on whether the measurement of future real GDP could be problematic. Several analysts argue that investors are not at all concerned about this subject. Others argue that there are possible risks in underestimating GDP; these concerns are particularly linked to the GDP

9 Source: interview.

10 It is calculated that if Argentina grows at the rates forecast for 2005 and 2006, more than 20 per cent of the current market price of the warrant would be recovered with payments for just those two years. Source: interview.

deflator. However, overall it seems increasingly difficult to manipulate GDP data, given that a number of international institutions (including the United Nations and the International Monetary Fund (IMF)) are checking for consistency of data and improving national and international standards for measuring GDP (United Nations, 2005a). Moreover, the standards and codes policies of the IMF include improvements in data and data reporting, which should help address any remaining data problems.

There are some problems in the way the Argentine warrants were designed, which can offer lessons for the design of similar instruments—or of GDP-linked bonds—in the future. One such problem, highlighted by investors at the recent experts' meeting, was their apparent relative complexity (United Nations, 2005a). This may have contributed to the significant initial underpricing of the warrants; however, there was also an apparent failure by market participants to grasp the potential value of these warrants at the time they were incorporated into the debt-restructuring package. A second problem is that the design could reportedly lead to fairly large debt-servicing payments, at a time when the Argentine economy would be growing at a rate only slightly above the baseline growth, if—as market participants understand—payment on the warrant is calculated as 5 per cent of the difference between actual GDP and baseline GDP. Simpler, clearer and more careful construction of such instruments therefore seems essential. Further research is required on the latter point, which could best be carried out jointly by academics, issuers and investors.

Concerns, issues and obstacles

We referred above to the benefits of GDP-indexed bonds for countries and investors as well as to the system-wide externalities that they are likely to generate. At the same time, there are issues and concerns not only at a general level but also, more specifically, at the level of both the investor and the issuer. These are dealt with below.

Some general issues and concerns

One potential problem is moral hazard: it has been argued that, by increasing debt repayments in the case where GDP growth is higher than normal, such bonds might reduce debtors' incentives to grow. This concern is exaggerated, as it is hard to imagine that politicians would ever want to limit growth. Moreover, it implies that this instrument is applicable for those countries that have the requisite policy credibility, strong institutions and established systems of public accountability for economic performance.

There is also the issue of whether GDP is a good variable against which to index these instruments. Commodity-linked bonds can also play a role in reducing country vulnerabilities and stabilizing budgets and have the advantage—over indexing to GDP—that the sovereign has usually no control over commodity prices. Indexing to commodity prices has a longer and more established history. It also has existing derivatives to help in pricing and the linking of payments is easier because commodity prices are widely known and their reporting does not lag by months. However, countries whose economies are substantially linked to changes in commodity prices tend to be low income (and unlikely to be able to issue GDP-linked bonds in any case). By contrast, many emerging markets have diversified production and exports and have no natural commodity price to link to bond payments. Linking bond payments to GDP would in comparison allow countries to insure against a wider range of risks. Other alternative variables against which to index may be exports or industrial production.¹¹ However, GDP is the most comprehen-

11 It has been pointed out that, for some developing countries, export and industrial production data might be more reliable than GDP figures (Borenzstein and Mauro, 2004).

sive and widely accepted measure of a country's national income, and it is crucial to have a standard variable against which the bonds of different countries are indexed.¹²

Finally, if the benefits of GDP-indexed bonds can be significant, as suggested above, why have financial markets not yet adopted them? One point to stress at the outset is that, as mentioned above, the system-wide benefits provided by these instruments is greater than those realized by individual investors. Hence, there are externalities that do not enter into the considerations of individual financial institutions.

Other factors that dissuade beneficial financial innovation from taking place include the fact that the markets for new and complex instruments may be illiquid and are difficult for investors to price. There is therefore a need for a concerted effort to achieve and ensure critical mass so as to attain market liquidity. Related to this are coordination problems, resulting from a large number of borrowers having to issue a new instrument in order for investors to be able to diversify risk. Other obstacles include the "novelty" premium charged by investors for new products they are uncertain about (that may serve to dissuade issuers) and the need to ensure standardization to ensure that all instruments have similar features and payment standards (which is especially important for creating a liquid secondary market).

Investors' concerns

In this section, we discuss potential obstacles (real and perceived) to a wider introduction of GDP-indexed bonds and examine these obstacles and the ways in which they could be overcome.

To understand the main obstacles, we rely on the existing literature,¹³ on interviews with investors and other market actors,¹⁴ and on discussions in the expert group meeting held at the United Nations in October 2005 (United Nations, 2005a).

The three main concerns identified were:

- Uncertainty about potential misreporting of GDP data.
- Uncertainty about sufficient liquidity of GDP-linked bonds.
- Concerns regarding the difficulties in pricing GDP-linked bonds.

These, and other concerns, are discussed below.

Accurate reporting of GDP growth data

Not only is this a relatively important concern for market participants and investors, it is also one which international institutions and national Governments can do much to overcome.

The concern can be decomposed into (a) inaccuracies in measurement of relevant variables, such as nominal GDP and the GDP deflator; and (b) deliberate tampering by debtor country authorities with a view to lowering debt servicing.

12 Of course, in some cases, GNP may be a better measure of welfare and, where appropriate and feasible, could also be considered as a benchmark.

13 See, in particular, Borzenstein and Mauro (2004), Council of Economic Advisors (2004) and Williamson (2005).

14 For this, we used both our own interviews and the survey study of market participants' attitudes conducted by IMF researchers, in collaboration with the Trade Association for the Emerging Markets (EMTA) and the Emerging Markets Creditors Association (EMCA) (see Borzenstein and Mauro, 2004).

As regards general inaccuracies referred to in point (a), it can be legitimately argued that national income accounting is by now a fairly standard procedure. Existing deficiencies in statistical agencies could be overcome or ameliorated by technical assistance from international institutions. Given current efforts to increase transparency and improve the quality of statistics, this is an area in which the international community could clearly help. Furthermore, clear definitions of relevant variables could be carefully addressed in the bond contract. It is encouraging that many borrowing countries, including emerging ones, overcame similar concerns about the measurement of inflation, resulting in the successful issuance of inflation-indexed bonds.

As we will discuss below, an option to ensure even greater accuracy and independence of data would be for an outside agency (e.g., an international institution) to certify or even verify the accuracy of the calculations.

The second concern, that of deliberate tampering with GDP data to reduce debt-service payments, seems quite unlikely. Furthermore, the idea that Governments would deliberately reduce growth to service less debt seems absurd, as Williamson (2005) points out. It is indeed high GDP growth, rather than low growth, which is considered a success politically and which helps in a major way in getting Governments re-elected; higher growth also encourages higher investment by both domestic and foreign investors, again a desirable outcome for any politician. Finally, underreporting growth would increase the cost of issuing new debt, an undesirable effect for any Government. Therefore, the incentives for a deliberate underreporting of growth would seem to be very weak. In any case, measures to improve GDP statistics, increase the independence of the statistical agency and/or increase the role of outside agencies should give an extra level of confidence to investors. These may therefore be important to introduce if GDP-linked bonds are to be successful. Finally, any residual inaccuracies in reporting would in any case be far less than those reflected in the valuation of equities.

An even more technical problem is how to deal with GDP revisions and possible methodological changes. It is interesting that such revisions have been reported to be smaller in emerging markets than in developed countries (Council of Economic Advisers, 2004). Furthermore, over the long period during which a bond will be serviced, yearly revisions of GDP might actually even themselves out, thereby having a relatively small impact on a cumulative basis.

The existing literature proposes clear ways in which remaining concerns on data revisions could be overcome. The key is to specify *ex ante* in the debt contract a clear method for dealing with revisions (Borzenstein and Mauro, 2004). The easiest way seems to be to ignore data revisions after a certain date; the coupon payment would be made at a fixed date (set so that enough time would have passed for quite precise statistics to be available). If there was a major change in methodology of data calculation, Governments could be required to keep separate GDP series calculated with the old methodology until the bonds mature. The alternative solution could be that an outside agency would agree that the changes would not affect bond payments, as in the case of United Kingdom inflation-indexed bonds (Council of Economic Advisers, 2004).

The fact that revisions and methodological changes could be clearly handled, if clearly specified in the bond contract, allows us to eliminate this obstacle. However, the issue needs to be dealt with, and the drafting of sample contracts (see below) seems a clear way forward.

Sufficient liquidity and scale

The other major concern of investors and market participants is that of uncertainty about future liquidity of GDP-indexed bonds. This clearly relates to the scale of transactions. As Borzenstein and Mauro (2004) clearly put it, “It would be difficult to develop a market for this type of bond in a gradual way.” Sufficient liquidity is not only important for investors, so that these instruments can be actively traded, but also for issuers, as higher liquidity could reduce the required risk premium. Greater liquidity would help reduce the “novelty premium”, which a first issuer may face. A high premium over that for a standard bond instrument could discourage countries from issuing GDP-linked bonds.

Indeed, small initial issues by individual countries would not be very attractive, especially as they would not significantly reduce the probability of a crisis. The most likely way in which such a market can be created is through the successful introduction of GDP-linked bonds in a major debt restructuring. This is why the growing interest in the Argentine warrant, which has a very significant scale, offers great potential for the creation of such a market, especially through fostering investor interest. The hope would be that other countries would follow, perhaps with large one-off swaps, not necessarily in the context of debt-servicing difficulties.

An even more attractive possibility for the development of a GDP-linked bond market is that several Governments (preferably both developed and emerging) start issuing these bonds more or less simultaneously. Support and encouragement from international organizations—such as the IMF, the regional development banks and/or the United Nations—could be very helpful in overcoming coordination problems (for further discussion, see below).

In fact, this could be a good time for launching such GDP-linked issues for the following reasons: (a) there is abundant liquidity in financial markets, and a great appetite for emerging country risk; as a result, there may be greater willingness by market actors and investors to buy somewhat different paper, thus reducing the “novelty premium”; (b) financial markets have become very innovative and have created instruments that provide antecedents for GDP-indexed bonds, such as the Economic Derivatives market created in 2002 by Goldman Sachs in the United States of America and Deutsche Bank in Europe (Shiller, 2005a);¹⁵ (c) as pointed out, growing interest in—and experience with—the Argentine warrant seems to provide a propitious climate for GDP-linked bonds.

It is interesting to note that two of the major concerns for investors discussed above—uncertainty about future liquidity in markets for these bonds and concerns about the integrity of GDP data—were less important for dedicated emerging market investors than they were for crossover investors.

Pricing

A third concern—which was particularly emphasized during the expert group meeting—is *difficulty in pricing*. GDP-linked bonds are more difficult to price than standard bonds, though they do not seem to be more difficult to price than emerging market equities or the derivatives mentioned above. Difficulties may partly relate to somewhat limited availability and the quality of market-based forecasts of GDP growth. However, the development of a growth-indexed bond market should lead to an improvement on these fronts. At the experts’ meeting, it was pointed out that the simpler the structure of the instrument, the easier it would be to price. This has proven to be the case with inflation-indexed securities such as Trea-

¹⁵ This market creates options for macroeconomic variables; though not directly tied to GDP, these macroeconomic variables have a correlation with GDP.

sury Inflation-Protected Securities (TIPS) which, despite being sceptically viewed by market participants when first introduced in the late 1990s, have been issued in large quantities and have overcome initial pricing problems (United Nations, 2005a). In this regard, there have also been many successful experiences with inflation-indexed securities in Latin America which in several aspects provide a useful precedent for GDP-linked securities.

At the experts' meeting, investors claimed that the premium at which they would expect to purchase these bonds would depend upon price discovery and the bid-offer spread. In order to overcome pricing difficulties, according to an investor, it is important to establish "comparables". i.e., there needs to be a range of exactly comparable GDP-linked bonds issued by different emerging economies. This will enable investors to make comparisons, undertake arbitrage and facilitate price discovery. Markets like to price comparability. It would be particularly valuable if countries with very good ratings, such as Mexico or Chile, were to be the first to issue these types of bonds in good times. It was also pointed out at the meeting that there were derivatives that could support the price discovery process and that multilateral development banks could undertake transactions in derivative form that would facilitate price creation.¹⁶ It was suggested that an adequate way in which to effect this would be to swap a nominal bond and GDP-indexed bonds, even for small amounts (less than \$20 million). This would establish the price for at least small amounts of bond issuance, thus providing a first benchmark for countries willing to issue bigger amounts (United Nations, 2005a).

More generally, there may be a need to help address investors' concerns about the possible complexity of pricing these instruments by lending some assistance with the development of pricing models for instruments such as GDP-linked bonds: market participants, international organizations and academic researchers could be involved in such an exercise. Some broad criteria for such pricing could also be discussed.

Investors (especially bond investors) would want to require a premium because the yield on GDP is more variable than on fixed-rate plain vanilla bonds. An important issue, therefore, is whether—particularly initially—the premium that market participants would wish to charge (over plain vanilla bonds) would not be higher than what issuers would be willing to pay. Further research is required on how this hurdle could be overcome. An important consideration to be included in the pricing is the very low correlation between growth in developed and emerging countries, which is far lower than the correlation among developed countries even in times of crises (see Griffith-Jones, Segoviano and Spratt, 2004; Shiller, 2005b). This also applies to stock market prices and bond spreads. Therefore, investing in instruments that reflect growth in emerging countries could yield considerable diversification benefits and thus lower the premium charged as a result of the variability of interest payments on GDP-linked bonds.

Other concerns

A more minor concern for investors could be the 'callability' of bonds. This would imply that, when countries grow more, they could buy back the GDP-indexed bonds, depriving investors of the upside benefits—as Bulgaria reportedly did. This issue could be easily dealt with by specifying in the bond contract that the bonds would be non-callable.

¹⁶ This would be consistent with the envisaged role (elaborated in the section on "additional suggestions for overcoming obstacles" below) for multilateral development banks to act as market-makers for GDP-indexed bonds. In this context, it can be argued that there is an important role for public institutions in creating markets that benefit development.

Different potential investors

An important issue to consider is the type of investors that are or could be interested in GDP-linked bonds. Some initial clues are given by the fact that hedge funds reportedly have expressed the most interest in the WIFI (forward) trade for Argentine warrants. However, there also seems to be a clear case for pension funds' having an interest in such an instrument, as this could give them a stake in the upside of growth of emerging markets and all the benefits of international diversification this provides. Perhaps efforts are required to make these benefits more explicit for institutional investors.

Another interesting issue is whether primarily fixed-income investors will provide the main demand for such instruments. Indeed, a case could be made that GDP-linked bonds could also be of interest to equity investors, since the risk associated with these instruments is similar to equity risk. At the experts' meeting, a number of participants also noted that GDP-indexed bonds are neither pure equity instruments nor pure debt instruments. One participant thus suggested thinking more creatively about who the "consumers" of GDP-indexed bonds might be. It was pointed out that an entirely new set of investors—breaking from the traditional mould of bond and equity investors, and hedge funds—might be interested in this type of investment (United Nations, 2005a).

Issuer interest

While the benefits of GDP-indexed bonds for issuing countries have been outlined above, they need to be set alongside the costs. Two potential problems for issuers have been illustrated in the literature:

- Long-term benefits versus short-term costs may sit uncomfortably with the political cycle. It typically takes years for unsustainable debt positions to emerge, and the proposed indexation is likely to apply only to relatively long-term bonds with an original maturity of, say, 5 years or more. Against this, countries will have to pay a premium over the cost of standard debt. Given short political horizons, it has been argued that some Governments could be unwilling to pay a premium to issue indexed bonds that might make life easier for their successors several years down the road.
- Lags in the provision of GDP data may not be in sequence with the economic cycle. The advantages of GDP-indexed bonds, especially in playing the role of automatic stabilizers for borrowing countries, depend on the extent to which the indexed portion of the coupon payments reflects the true state of the economic cycle. If the GDP data become available with a long lag, savings on interest payments might materialize at a time when the economy might already be rebounding; there would be a risk that the impact would be pro-cyclical.

However, these concerns may be overplayed. Worries over lags in the provision of GDP figures may be limited by the high auto-correlation of GDP series and in countries where quarterly data is published. While the incentives relating to the political cycle is a more serious issue, a number of countries at forums such as the Rio Group and the Summit of the Americas have indicated a genuine interest in issuing GDP-indexed bonds. As mentioned above, the more important issue may concern the size of the premium arising from pricing difficulties. While the literature suggests that the additional cost in terms of a premium is unlikely to be very large,¹⁷ there is a need for further research in this area. The above sub-section on pricing discussed this issue in more detail and highlighted some suggestions made in the expert meeting.

¹⁷ Calculations made of the risk premium, according to the Capital Asset Pricing Model (CAPM), suggest that the risk premium on GDP-indexed bonds issued by emerging markets would likely be small. It could be higher for the initial transactions. The premium would likely reflect the initial lack of liquidity, the novelty of these instruments and any pricing difficulties. However, the cost required to compensate investors for the volatility of interest payments should, according to the literature, be minimal since growth in emerging markets has a very small correlation with global equity markets and with growth in developed countries (Council of Economic Advisers, 2004; Borensztein and Mauro, 2004).

Consideration may also be given to ways of ensuring flexible payment arrangements that would allow more breathing space for borrowers during bad times. For instance, one suggestion at the experts' meeting was that coupon payments remain fixed and the amortization schedule be adjusted instead. Countries would postpone part or all of their debt payments during economic downturns; they would then make up for this by prepaying during economic upswings. A historical precedent was set by the United Kingdom when it borrowed from the United States in the 1940s. The loan was negotiated by J.M. Keynes and included "bisque clauses" stipulating that payments would be stopped when certain events occurred (United Nations, 2005a).

Additional suggestions for overcoming obstacles

In addition to the ideas that have been mentioned above on ways to make GDP-linked bonds a more attractive instrument for both investors and issuers, the following proposals also deserve further examination:

- Multilateral or regional development banks could have a very active role as "market-makers" for GDP-linked bonds,¹⁸ and their involvement could help address the concerns regarding the liquidity and scale of transactions of these securities. These institutions could begin by developing a portfolio of loans, the repayments on which could be indexed to the growth rate of the debtor country. Once they have a portfolio of such loans to different developing countries, they could securitize them and sell them on the international capital markets. Such a portfolio of loans could be particularly attractive for private investors as it would offer them the opportunity of taking a position on the growth prospects of a number of emerging economies simultaneously. Given the low correlation among these countries' growth rates, the return/risk ratio would be higher. As correlations tend to be lower at the global level, the World Bank may be best placed to do such securitization. Moreover, the expertise developed by the World Bank as market-maker for the sale of carbon credits under the Kyoto protocol could provide a basis for these activities.
- An alternative modality for this instrument is to provide a "sweetener" that would only vary on the upside, i.e., paying only higher returns when growth is higher than expected. The investor would benefit from an equity-like instrument in upside periods. The benefit for the issuing country is that spreads would be lower than those on plain vanilla bonds in normal or bad times; only in good times, would they have to service more debt. Therefore, such bonds could open up some space, albeit limited, for counter-cyclical fiscal policies owing to the lower cost of the debt. Introducing such a sweetener could help entice investor interest in the early stages and ultimately provide a platform from which to develop a market for more symmetrical GDP-linked bonds. There are similarities with the Argentine warrant, although this instrument would be offered in "normal times".
- There have also been proposals for multilateral development banks to provide a form of partial guarantee to investors covering for initial sales of GDP-linked bonds. The main problem, however, is that such guarantees could further complicate the pricing of this instrument and were therefore not viewed favourably by some investors at the experts' meeting. Another disadvantage of a guaranteed first bond is that it does not provide a benchmark for future issues that may not be covered by a guarantee (Schröder and others, 2004). In spite of these problems, the feasibility of a guarantee may vary from case to case and needs to be examined within a country context.

18 We wish to thank José Antonio Ocampo for this interesting suggestion.

Policy implications and next steps

The preceding analysis suggests that the introduction of GDP-indexed bonds would represent a “win-win” situation, benefiting both issuer countries and investors. Moreover, GDP-indexed bonds should also be considered a public good that would benefit the global economic and financial system at large. At the same time, for reasons mentioned earlier, markets are unlikely to develop these instruments on their own. A natural tension is also likely to exist in the short term between the size of the premium that issuers are prepared to pay and that which investors expect. If a market develops, however, and these securities can be issued by a wider range of countries, including those that are not in distress, this tension should disappear as expected premiums come down. In fact, investors can change their minds about an instrument once it has been demonstrated in the market. For example, as pointed out in the experts’ meeting, TIPS were viewed sceptically by market participants when they were first introduced in 1997, but this scepticism has been overcome and the United States Treasury has thus far issued approximately \$100 billion worth of TIPS (United Nations, 2005a).

For these reasons, there exists a case for international public action to help develop these markets. There is a need to implement the next steps suggested below (some of which would require collaboration among the main stakeholders, namely interested Governments, multilateral development banks and the private sector):

- Undertake further research. In particular, there exists a need for work to be done on the criteria for pricing GDP-indexed bonds and the development of pricing models. Additional research could also be undertaken on the expected benefits of these instruments for different countries. Finally, there is a need for further consideration of the design of these instruments and methods of flexible payment arrangements for countries.
- Explore the possibilities for coordinating issuance to jump-start a market. Coordinated actions by a number of borrowers to issue GDP-linked bonds could overcome the problems of critical mass and illiquidity. Having a number of countries issuing these instruments simultaneously would also help establish the comparability needed to ease pricing and enhance the diversification benefits for investors. It has been suggested that one or several advanced industrialized countries could issue these instruments first. This could have some positive effects for those countries. Furthermore, this would have a demonstration effect and make it easier for developing countries to issue similar instruments. The precedent of the introduction of collective action clauses (CACs) into bonds, first by developed countries and later followed by developing countries, would seem to indicate that such demonstration effects can be very effective for introducing innovations in financial instruments. Alternatively, groups of developing countries (for example, the Rio Group) could undertake issuance, in a coordinated manner, probably with support from international institutions.
- Explore how international financial institutions could use this instrument. Regional development banks (such as the Inter-American Development Bank (IADB)) and/or the World Bank, as well as International Development Association (IDA), could consider lending through loans whose repayment would be indexed to GDP growth (Tabova, 2005). This on its own could help create a precedent for the establishment of a GDP-indexed private bond market for emerging market economies and, moreover, could extend the benefits of adjusting debt service to growth variations to countries that do not have access to the private bond market.

Moreover, consideration should also be given to a proposal made at the experts' meeting that these institutions go a step further and securitize these loans and sell them on the capital markets. Such a move would entail the World Bank and the regional development banks' carving out a new role for themselves.

- Examine sources of creative partnerships between public and private sectors. In addition to the above-mentioned ideas regarding the roles that multilateral development banks and Governments could play in creating a market for GDP-linked bonds, there also exists the possibility of public-private collaboration in jump-starting a market for these instruments. It might be interesting to draw lessons from the approach taken in the development of CACs, where Governments and private sector groups collaborated; the G-10 and the Institute of International Finance (IIF) played an important role, notably in drafting model clauses and initiating discussions on how best to design them, as well as in spurring on a number of countries to take the lead in using the instrument.
- Undertake initiatives to improve the reliability, accuracy and timeliness of GDP data. An issue that needs to be further explored is the feasibility of and need for having an outside agency to verify a country's GDP statistics. Other important actions include technical assistance from donors and multilateral organizations to improve the quality of GDP statistics in issuer countries and also to strengthen the effectiveness and independence of national statistical agencies.
- Prepare a draft GDP-linked bond contract. A sample contract could clarify how to address concerns relating to data revisions, the link between growth and interest payments and specific problems that have occurred in the past, such as Governments' calling back their bonds when growth has been higher than expected (Council of Economic Advisers, 2004). This would also ensure standardization, and the emphasis would be on simplicity. A draft contract would also draw on a code of best practices, which needs to be elaborated (United Nations, 2005a). It could be useful to have a model, with variants and wording options, to discuss with both potential investors and issuers.

References

- Borensztein, Eduardo, and Paolo Mauro (2004). The Case for GDP-indexed Bonds. *Economic Policy* 19 (38): 166-216.
- Council of Economic Advisers (2004). GDP-Indexed Bonds: A Primer. Washington, D.C. [<http://www.whitehouse.gov/cea/growth-indexed-bonds-white-paper.pdf>].
- Eichengreen, Barry (2004). Financial instability. In Bjorn Lomborg [ed.]. *Global Crises, Global Solutions*. Cambridge: Cambridge University Press.
- Goldstein, Morris, and Philip Turner (2004). *Controlling Currency Mismatches in Emerging Markets*. Washington, DC: Institute of International Economics.
- Griffith-Jones, Stephany, Miguel Segoviano and Stephen Spratt (2004). CADs and Developing Countries: The Potential Impact of Diversification Effects on International Lending Patterns and Pro-cyclicality. Available from www.stephanygj.com.
- Griffith-Jones, Stephany, and Ricardo Gottschalk (2006). Costs of currency crises and benefits of international financial reform. www.stephanygj.com.
- IMF (2004). *Sovereign Debt Structure for Crisis Prevention*. International Monetary Fund, Washington, DC. [<http://www.imf.org/external/np/res/docs/2004/070204.pdf>].
- Ocampo, José Antonio (2003). Capital account and counter-cyclical prudential regulations in developing countries. In Ricardo Ffrench-Davis and Stephany Griffith-Jones [eds]. *From Capital Surges to Drought: Seeking Stability for Emergency Economies*. UNU-WIDER Studies in Development Economics and Policy Series. Basingstoke: Palgrave Macmillan: 217-244
- Schröder, Michael, Friedrich Heinemann, Susanne Kruse and Matthias Meitner (2004). GDP-linked Bonds as a Financing Tool for Developing Countries and Emerging Markets. ZEW Discussion Paper 04-64, Centre for European Economic Research, Mannheim. [<ftp://ftp.zew.de/pub/zew-docs/dp/dp0464.pdf>].
- Segal, Richard (2004). *Bulgaria: The Balkans' Other GDP-Linked External Debt*. London: Exotix Limited. [http://newfinancialorder.com/Bulgaria_April_2004%5B1%5D.pdf].
- Shiller, Robert (1993). *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*. New York: Oxford University Press.
- Shiller, Robert (2005a). In Favour of Growth-Linked Bonds. *The Indian Express*. March 10.
- Shiller, Robert (2005b). In Inge Kaul and Pedro Conceicao [eds]. *The New Public Finance, Responding to Global Challenges*. New York: Oxford University Press.
- United Nations (2005a). Report of the seminar on 'GDP-Indexed Bonds: Making it Happen'. New York, 25 October. www.un.org/esa/ffd/gdp-indexed%20bonds.
- United Nations (2005b). *World Economic and Social Survey 2005: Financing for Development*. New York: United Nations.
- Tabova, Alexandra (2005). On the Feasibility and Desirability of GDP-Indexed Concessional Lending. GRADE (Group for the Analysis of Development) Discussion paper 9, Lima [http://www.econo.economia.unitn.it/new/publicazioni/papers/9_05_tabova.pdf].
- Williamson, John (2005). *Curbing the Boom-Bust Cycle: Stabilizing Capital Flows to Emerging Markets*. Washington, DC: Institute for International Economics.