

## **GROWTH-INDEXED BONDS: A PRIMER**

### **ABSTRACT**

Throughout history, emerging-market countries have suffered from various economic problems associated with high levels of government debt. This paper explores one way such countries might reduce the frequency and severity of these problems—the issuance of bonds indexed to the economy’s rate of growth. Although the paper does not make any recommendation for any particular country, growth-indexed bonds could potentially benefit emerging markets by partially insulating the government’s finances from economic fluctuations. This idea merits further exploration by the world’s economic policy community.

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### **I. OVERVIEW**

This paper discusses a proposal for countries to issue growth-indexed bonds, an instrument that could stabilize economic growth rates, reduce vulnerability to external shocks, and improve long-term development prospects.<sup>1</sup> It addresses general issues and considerations related to the issuance of growth-indexed bonds for a broad set of countries and is not intended to support or oppose any specific proposal from any particular country.

Growth-indexed bonds (also referred to as GIBs) would link payments on sovereign debt to the issuing country’s rate of economic growth. They would automatically stabilize government resources, reducing the need for drastic spending cuts when growth is slow and restraining new spending when growth is rapid. Avoiding the costs associated with macroeconomic volatility would not only help stabilize economic growth, but this reduced volatility would further raise long-term growth rates, thereby improving standards of living and reducing poverty. Although growth-indexed bonds could never compensate for unsustainable macro policies, by stabilizing debt ratios they could, in some circumstances, help reduce the occurrence of debt defaults and financial crises.

Growth-indexed bonds would be particularly advantageous for emerging markets, many of which have volatile growth rates and are vulnerable to events outside of their control, such as slower growth in major export markets, natural disasters, and falling prices for key commodity exports. Sharp economic slowdowns can disproportionately hurt the poor and spark social discontent. Developed economies can generally respond to these periods of slow growth and external events by lowering interest rates, reducing tax burdens, and/or increasing government spending. Emerging markets have less flexibility to use these traditional macroeconomic tools, however, since they tend to be more vulnerable to sudden

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<sup>1</sup> This paper draws extensively on Borensztein and Mauro (2004), Borensztein, Chamon, Jeanne, Mauro, and Zettelmeyer (2004), and Borensztein and Mauro (2002).

shifts in capital flows and need to maintain market confidence. Growth-indexed bonds can therefore partly compensate for emerging markets' limited ability to use traditional monetary and fiscal policy tools by providing an automatic mechanism by which to recover from recessions, respond to external events, and thereby stabilize growth rates.

Growth-indexed bonds and related instruments have been discussed intermittently for years.<sup>2</sup> In the past year, emerging market officials have expressed renewed interest in growth-indexed bonds, such as in the declaration of the Summit of the Americas and in the "Cuzco Proposals" of the Rio Group of Latin American countries. Argentina plans to offer a bond with payments linked to growth as part of its debt restructuring. Researchers at the IMF and Washington think tanks, as well as a working group from the G-7, have also recently discussed these instruments.

A number of coordination and technical issues have hindered the issuance and widespread acceptance of growth-indexed bonds. For example, there is concern about the timeliness and reliability of growth statistics, as well as the difficulty of starting a liquid market for any new financial instrument. Different countries, organizations and institutions could take a number of steps to help overcome these initial hurdles to the introduction of growth-indexed bonds. For example, they could help establish consistent legal standards to facilitate bond pricing, develop options to improve the reliability of growth statistics, and coordinate issuance by several countries in order to more quickly create a liquid market.

The remainder of this paper develops each of these ideas in more detail. It begins with a discussion of the design and potential benefits of growth-indexed bonds. Then it summarizes the history of these and related instruments, and the problems in introducing new financial instruments. Finally, it discusses some of the potential concerns with growth-indexed bonds and suggests several steps to facilitate progress in creating a market for these instruments.

## **II. BENEFITS OF GROWTH-INDEXED BONDS**

Most bonds issued by emerging markets specify fixed interest payments. If growth unexpectedly slows—such as due to a fall in export prices or a crisis in a nearby country—government revenues automatically fall and expenditures on the social safety net automatically increase. This increased fiscal pressure can make it difficult for countries to continue to pay the fixed interest on their outstanding debt during periods of slow growth. Governments may need to cut expenditures and/or raise taxes in order to control budgets—both of which could exacerbate the initial economic contraction. In severe cases, countries may be forced to restructure or default on their debt.

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<sup>2</sup> See Shiller (1993) and Borensztein et al. (2004) for broad discussions of the creation of markets to share macroeconomic risk. See Borensztein and Mauro (2002, 2004) for more specific discussions of growth-indexed bonds.

Growth-indexed bonds could mitigate these problems by linking the size of debt payments to the issuing country's rate of economic growth.<sup>3</sup> For example, imagine that a country is expected to grow at an average annual rate of 5 percent, and that it can issue bonds with fixed annual interest payments of 10 percent. This country might instead issue growth-indexed bonds that would pay 1 percent of additional interest for each 1 percent of growth above expectations, and 1 percent less interest for each 1 percent that growth falls below expectations. The country also might pay an additional interest premium of 1 percent in order to compensate investors for the lower liquidity, novelty, and additional variability in the bonds' payments; this additional 1 percent can be viewed as the premium for the insurance provided by the bonds. If the economy performs poorly and only grows by 2 percent, the country would only need to pay 8 percent interest (instead of 10 percent) on its debt, thereby reducing debt expenditures just as budgets automatically tighten due to slower growth. If the economy performs well and grows by 8 percent, investors share in this upside by receiving interest payments of 14 percent, and the government's ability to use the temporary surge of revenues to start new spending programs is automatically limited. Therefore, growth-indexed bonds can automatically stabilize government spending, reducing the need for drastic spending cuts when growth is slow and restraining new spending when growth is rapid.

By automatically facilitating counter-cyclical fiscal policy, growth-indexed bonds could help stabilize growth rates. This is in sharp contrast to the historical experience of emerging markets, which are often forced to follow pro-cyclical fiscal policies during periods of slow growth to maintain access to external credit markets.<sup>4</sup> For example, many developing countries are forced to raise interest rates and/or cut government spending during periods of slow growth, aggravating the initial recession, in order to maintain market confidence and stabilize capital flows. Although growth-indexed bonds could never fully compensate for unsustainable macroeconomic policies, they could decrease the volatility of debt ratios and reduce the occurrence of debt defaults and financial crises. Simulations show that these effects can be substantial.<sup>5</sup>

These positive effects of growth-indexed bonds could also generate additional benefits that improve overall economic development. For example, by stabilizing growth rates and reducing macroeconomic volatility, growth-indexed bonds could improve the investment and business climate. Individuals are more likely to start new businesses and engage in longer term projects (both of which are critical engines of growth) in countries with lower aggregate risk. Growth-indexed bonds could also disproportionately benefit the poor. When governments need to cut expenditures to balance budgets, many of these cuts often fall on social spending programs on which the poor are more reliant. By reducing the need to cut social spending when growth slows, growth-indexed bonds could minimize the

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<sup>3</sup> There are a number of different options for how growth-indexed bonds could be structured. For example, interest, principal, or total debt service (interest + principal) payments could be linked to growth in a given period. Payments could also be linked to cumulative growth in order to minimize problems with data revisions. For simplicity, this paper focuses on examples in which only the interest payments are linked to growth in a given period.

<sup>4</sup> For example, see Gavin and Perotti (1997), Talvi and Vegh (2000) or Riascos and Vegh (2003).

<sup>5</sup> For examples, see Borensztein and Mauro (2004).

harmful effects of economic downturns on the poor and alleviate any corresponding social pressures.

A simple simulation shows how growth-indexed bonds could have benefited Mexico during the 1990s. During 1994 and 1995, Mexico devalued its peso and had a sharp recession. At a time when unemployment was at its highest rate in years, real tax revenues declined by nearly 8 percent and real public spending on health care dropped by 17 percent. Mexico experienced large-scale protests. According to research by IMF staff, if just half of Mexico's public external debt had been indexed to growth, Mexico could have saved about 1.6 percent of GDP in interest payments in 1995.<sup>6</sup> The Mexican government could have used these additional resources to avoid making drastic spending cuts and/or to increase government spending in areas to alleviate the costs of the crisis.

A different way to think about the benefits of growth-indexed bonds is as a new instrument that allows countries to insure against growth risk by allowing investors to take an equity stake in the country. Investors share in the country's upside when growth is stronger than expected, and share in the downside when growth is weaker than expected. This debt structure allows countries to adopt a liability structure that is popular for companies (i.e., equity shares)—but not previously available for sovereigns. Moreover, growth-indexed bonds provide investors a very different opportunity than holding shares in a country's stock market. Equity market returns in emerging markets tend to have very low correlations with growth rates. (For example, in 2003 Brazil's Bovespa equity index rose by about 100 percent, while Brazil's real GDP declined by 0.2 percent.)

### **III. HISTORY AND RELATED INSTRUMENTS**

Growth-indexed bonds and related instruments that would allow countries (or states) to hedge against various risks have received intermittent support for well over a century.<sup>7</sup> For example, in 1863 the Confederate States of America issued "cotton bonds" which increased payments when cotton prices rose. More recently, after the debt crises of the 1980s, there was a wave of interest in linking debt payments to GDP, exports or commodity prices to lessen the damage caused by any future crises.<sup>8</sup> In the mid-1990's, there was another wave of interest in response to Robert Shiller's work on "macro markets".<sup>9</sup> This discussion expanded to include the idea of using growth-indexed bonds in developed countries subject to fiscal constraints (such as the euro zone). After the series of emerging market crises in the late 1990's, 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.<sup>10</sup>

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<sup>6</sup> Borensztein and Mauro (2004).

<sup>7</sup> Borensztein and Mauro (2004) is the source of most of the examples in this paragraph.

<sup>8</sup> For example, see Lessard and Williamson (1985), Krugman (1988), and Froot, Scharfstein and Stein (1989).

<sup>9</sup> For example, see Shiller (1993), Barro (1995), Obstfeld and Peri (1998), and Drèze (2000).

<sup>10</sup> For example, see Haldane (1999) and Caballero (2002).

In the past year, there has also been renewed interest in these instruments. In May 2004, a paper analyzing the potential benefits of, and obstacles to, the use of growth-indexed bonds and related instruments was discussed in an informal seminar at the Executive Board of the IMF. A G-7 working group has been discussing issues related to growth-indexed bonds for several months. Recent studies of how to improve the international financial architecture frequently include a discussion of growth-indexed bonds.<sup>11</sup> In January 2004, the declaration from the Summit of the Americas requested that governments explore “financial instruments, such as growth-indexed bonds and others, to promote macroeconomic stability and reduce financial vulnerability.” The city of Buenos Aires recently issued bonds linked to tax revenues, and in May 2003, the “Rio Group” of Latin American countries voiced support for growth-indexed bonds as part of their “Cuzco Proposals.”

Growth-indexed bonds, occasionally referred to as “capacity-to-pay” bonds, have not yet been issued on a large scale. Several small countries, such as Costa Rica, Bulgaria, and Bosnia and Herzegovina, issued bonds as part of their Brady restructurings that included clauses or warrants which increased their payments if GDP reached a certain threshold. The specific structure of these bonds, however, was not carefully thought out and had a number of problems. Given the severity of these design problems, the experience of these instruments does not yield very much information about the market prospects for well-designed, growth-indexed bonds.

For example, the Bulgarian bonds were callable—so that when growth exceeded the threshold to generate additional payments, the government simply recalled the bonds rather than pay the additional fee. Furthermore, the bonds did not clearly specify what measure of GDP should be used to calculate the threshold. For instance, although the World Bank is listed as the reference for GDP statistics, there is no clarification if the bonds should pay out based on the World Bank’s measurement of GDP at market prices or at factor costs. Even more problematic, the bonds do not even specify whether nominal or real GDP should be used—which makes a substantial difference in a high-inflation environment. The lack of technical rigor in drafting these contracts suggests a role for support from the official sector or think-tanks in designing future growth-indexed bonds.

A number of instruments that share certain characteristics of growth-indexed bonds, however, have been issued by different countries with varying degrees of success. Inflation-indexed bonds are the most closely related example and show the difficulty in introducing new financial instruments. Although there was interest in inflation-indexed bonds since the eighteenth century, they were not issued on a wide scale until the final decades of the twentieth century, largely due to concerns about data reliability, investor interest, pricing, and liquidity. Moreover, studies find little explanation for why inflation-indexed bonds have been very successful in some countries, only moderately successful in others, and never even been issued in some countries. These studies highlight the coordination problems and role for government in jump-starting the issuance of new and beneficial financial instruments.

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<sup>11</sup> For example, see Goldstein and Turner (2004) and Williamson (2004).

Two other existing instruments sharing certain characteristics of growth-indexed bonds are commodity-linked bonds and catastrophe-insurance contracts. These instruments can also play an important role in reducing country vulnerabilities and stabilizing budgets. One potential benefit of these two instruments over growth-indexed bonds is that the sovereign has less ability to affect the relevant variable determining the bond payments (such as a commodity price). Commodity-linked bonds are less promising than growth-indexed bonds for emerging markets, however, since most emerging markets have fairly diversified production and exports, so there is often no natural commodity price to link to bond payments.<sup>12</sup> Moreover, commodity prices are less correlated with tax revenues and government spending than growth, thereby providing less effective insurance against growth and budget volatility. Catastrophe-insurance contracts can have an important role in cushioning economies during extreme events, but are less effective than growth-indexed bonds in stabilizing budgets and debt ratios during normal cyclical periods of slower and faster growth. In fact, linking debt payments to GDP would allow countries to insure against the broadest set of risks.

One final issue, which is alluded to above but merits further emphasis, is why the market for growth-indexed bonds has not developed if it could have such substantial benefits. An extensive literature, as well as historical experience, suggests a number of reasons why new and beneficial instruments are not developed unless there is a “large player” (including an active government) that can move first and/or coordinate efforts to create a liquid market quickly.<sup>13</sup> One of the greatest hurdles to the acceptance of new instruments is ensuring a critical mass. Markets for new debt instruments initially tend to be small and illiquid, making it difficult for investors to price the new instruments and raising the cost of issuance (the “novelty premium”). Countries are less likely to issue the new instrument if they need to pay a much higher premium than for standard debt instruments. A second problem is the need for standards and standardization. In order to create a liquid secondary market, all instruments should have similar features and payment standards. The development of the market for credit default swaps clearly reflected this problem. The market remained small for years and only took off when standards defining a “credit event” were clearly specified and broadly accepted.

A final example of the difficulty in successfully introducing new financial instruments, in addition to the examples of inflation-indexed bonds and credit-default swaps, is the use of collective action clauses in U.S.-law bond contracts. Many compelling arguments were made for collective-action clauses, and they were already widely accepted in bonds issued under different jurisdictions. Emerging markets were initially reluctant to issue bonds with these clauses, however, and were concerned that it would substantially raise the cost of debt issuance. Investors also expressed concern and claimed that they would only purchase bonds with these clauses if they received a premium. Once the G-8 decided to support the

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<sup>12</sup> Of the 27 emerging markets with data, only two have over 30 percent of their exports in a single commodity. Only six of these countries have more than 25 percent of their exports in one commodity, but only three of these are in commodities other than oil (copper in Chile, tea in Kenya, and tobacco in Zimbabwe). Source: Borensztein and Mauro (2004).

<sup>13</sup> For an excellent discussion of the challenges to successfully introducing new financial instruments, see Athanasoulis, Shiller and van Wincoop (1999).

introduction of collective-action clauses, however, several countries included them in their new debt offerings within a few months. The clauses have had little (if any) impact on the cost of debt and have been widely accepted by the previously “reluctant” investors. Yet, without the G-8’s effort in coordinating and supporting collective-action clauses in U.S.-law bond contracts, it is unlikely that they would have been adopted.

#### **IV. POTENTIAL CONCERNS**

There are currently no laws or regulations preventing the issuance of growth-indexed bonds, although there are several unresolved practical issues that have hindered their development. A few of the most common concerns raised are:

*Accuracy of growth data.* Many investors are concerned about the quality of GDP data from emerging market statistics agencies, which is critical in determining the value of payments on growth-indexed bonds. This concern could be surmountable, however, if carefully addressed in the bond contract. Borrowing countries have overcome similar concerns with the measurement of inflation and successfully issued inflation-indexed bonds for years. In conjunction with the issuance of growth-indexed bonds, countries could improve their GDP measurement. Any growth-indexed bond should clearly specify exactly what measure of GDP is used to calculate the bond payments. The IFIs could provide technical assistance on improving GDP measurement, ensuring the independence of statistical agencies, and improving the transparency of statistics generation. In cases where investors still have concerns about the accuracy of the GDP data, the bond contract could specify that any GDP data must be verified by an outside agency.<sup>14</sup> In extreme cases, there could be provisions for the data underlying GDP calculations to be provided to an outside agency (such as a private company or an IFI) that would independently recalculate the aggregate statistics and have the option of verifying the accuracy of the individual data components.

*Moral hazard on country performance and reporting.* Some people have suggested that governments might adopt policies to slow growth or deliberately underreport growth in order to reduce their interest payments required on growth-indexed bonds. Politicians, whose approval and reelection is largely based on economic performance, however, would be unlikely to understate growth intentionally.<sup>15</sup> Moreover, if countries underreported growth in one period in order to reduce payments on growth-indexed bonds, this would likely raise the cost of debt issuance in the future, further reducing the risk of moral hazard.

*GDP revisions and methodological changes.* GDP data is frequently revised and investors may worry that the revisions or any methodological changes in compiling the statistics could complicate payments on growth-indexed debt. Though revisions tend to be smaller in emerging markets than in developed countries, debt contracts should clearly outline the treatment of GDP revisions and methodological changes in advance. The simplest

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<sup>14</sup> In Brazil, investors were concerned about the accuracy of government-generated inflation statistics, so certain indexed contracts are now based on an independently-generated inflation series.

<sup>15</sup> On the other hand, for inflation-indexed bonds both the political and financial incentives would be to understate inflation, but investors are generally not concerned about moral hazard with these instruments.

approach is to have the bonds payout based on growth estimates as of a certain date (set to provide enough time to ensure fairly accurate statistics), and ignore any later revisions. Another possibility is to base bond payments on a cumulative index of growth, thereby automatically incorporating any later revisions into subsequent bond payments.<sup>16</sup> This technique could also limit the government's ability to temporarily understate growth to reduce bond payments, and then revise growth upward at a later date. Changes to statistical methodologies could be handled by requiring governments to keep separate GDP series calculated with the old methodology, even after adopting a new technique for other purposes, until the outstanding contracts reach maturity. Alternatively, an outside agency could be required to "sign off" that any methodological changes would not materially affect bond payments.<sup>17</sup>

*Hard to price.* While these bonds are more difficult to price than plain-vanilla, fixed-income instruments, it is unclear why they would be substantially more difficult to price than other emerging market securities, such as inflation-indexed bonds and equities. One potential difficulty is that investors can price floating-rate or inflation-indexed bonds using market-based indicators. There are currently, however, many public- and private-sector forecasts of GDP growth that could be used for this purpose, even if they are not market based. Further, the emergence of a growth-indexed bond market would undoubtedly lead to an even greater availability of growth forecasts.

*Market illiquidity.* As with most new securities, an important initial challenge would be to establish sufficient liquidity so that the instruments can be actively traded and investors do not require a large premium. Multilateral institutions and/or the official sector could help overcome this challenge by encouraging several countries to issue growth-indexed bonds around the same time in order to jump-start a larger market. Multilateral institutions could also consider initially purchasing a portion of the newly-issued bonds to guarantee a minimum size for the market.<sup>18</sup>

*Cost/premium over standard bonds.* Economic theory suggests that the risk premium required for growth-indexed bonds should not be excessive and would primarily reflect the initial lack of liquidity, the novelty of these instruments, and any pricing difficulties. The

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<sup>16</sup> For example, assume that growth is expected to average 3 percent, and the bonds payout 4 percent if growth meets expectations. For every 1 percent that growth is above or below 3 percent, the bonds payout 4 percent plus or minus one percent, respectively. If a country initially announces 3 percent growth for the first year, the index value will move from 100 to 103 and the bonds would payout 4 percent. If growth is subsequently revised upward to 6 percent, the first payout would remain unchanged, but the index value would be increased to 106. If growth in the second year is 3 percent, the new index value (about 109) would be evaluated relative to the index value at the last payout (103), and the bond would payout about 7 percent (the base of 4 percent plus about 3 percent due to higher growth in the previous period than initially reported). The basic principle of this structure is that any underpayment or overpayment due to GDP revisions in one period would result in a corresponding overpayment or underpayment in the next period.

<sup>17</sup> The UK has adopted this later solution in inflation-indexed bond contracts which specify that the central bank review methodological changes. If the Central Bank determines that methodological changes are "material," the bonds relying on the relevant data series become puttable.

<sup>18</sup> The International Monetary Fund is currently restricted from purchasing instruments such as growth-indexed bonds, but other multilateral institutions, such as the World Bank and Inter-American Development Bank, could explore this option under current legal arrangements.

premium required to compensate investors for the volatility of interest payments should be minimal, since growth in emerging markets has a very small (and sometimes negative) correlation with global equity markets and with growth in developed countries. For example, IMF researchers estimate that Mexico would be required to pay a risk premium of 0.36 percent per year on growth-indexed bonds over its standard interest rate on fixed-rate debt.<sup>19</sup>

*Investor appetite.* A range of investors could be active in the market for growth-indexed bonds. Although these instruments would not offer a traditional hedge against interest rate movements or inflation risk (as provided by floating rate and inflation-linked bonds, respectively), they would offer investors an equity-like exposure to a country. External investors cannot currently take a position on a country's growth rate. Even investing in equity markets does not provide this opportunity, since returns in emerging equity markets are often not closely correlated with aggregate growth. Pension funds and insurance companies may also be interested in this additional investment option. Moreover, since growth rates across emerging markets tend to be fairly uncorrelated, a portfolio including growth-indexed bonds for several emerging markets would be well hedged. Domestic pension funds may also wish to hold growth-indexed bonds, which could better align the value of their assets with their future liabilities.<sup>20</sup>

*Issuer appetite.* Issuers would not want to pay too large a premium over the cost of standard debt for the insurance provided by growth-indexed bonds. Public declarations by many countries at the Summit of the Americas and as part of the Rio Group, however, indicate interest among borrowing countries in issuing growth-indexed bonds. The first-country to introduce these instruments is likely to face the greatest premium, creating a first-mover problem. Therefore, countries would be more likely to initially issue growth-indexed bonds if they acted simultaneously with a group of countries and/or if issuance was coordinated by a multilateral institution.

## **V. THE WAY FORWARD**

The discussion in Section IV suggests a series of next steps to explore further possibilities for the successful issuance of growth-indexed bonds. Many of the concerns could be addressed by establishing clear legal and technical standards for the bond contracts (including for the reliable measurement of GDP), and overcoming the hurdles to starting a liquid market for a new financial instrument. Potential issuers, investors, international financial institutions, NGOs, groups of countries (such as the G-7 or G-20), and other relevant parties could make progress in ameliorating these concerns by focusing on several specific steps:

*Draft a sample bond contract to clarify exactly how certain potential concerns could be addressed.* For example, the contract could clarify how to treat data revisions, and how to

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<sup>19</sup> Borensztein and Mauro (2004).

<sup>20</sup> Pension fund liabilities are closely linked to wage growth, which tends to be highly correlated with economic growth. Therefore, in addition to providing diversification benefits, growth-indexed bonds could be attractive to pension funds as a hedge against changes in the value of their future liabilities.

structure the link between growth and interest or principal payments. The contract should also include language to avoid problems experienced in past growth-linked bonds (such as clarifying that the bonds are not callable if growth is higher than expected). These sample contracts could include several different wording options that could be used in an actual contract. Sample contracts could be very useful since initial discussions with investors about growth-indexed bonds are often hindered by a lack of concrete legal detail.

*Provide concrete alternatives to ensure reliable and accurate GDP statistics.* These alternatives should provide options for addressing practical concerns (such as data manipulation, data revisions, and changes to statistical methodologies). These alternatives could also evaluate broader questions, such as whether GDP or other statistics (such as industrial production) are the best measure of aggregate income. These alternatives could also include possible roles for an independent statistical agency to verify (or even compile) GDP data. In order to benefit from the existing expertise on these issues, it may be useful to hold an international conference that would re-examine and codify the best practices for GDP measurement and for the publication of national income statistics.

*Explore options to help jump-start a liquid market for growth-indexed bonds.* Governments could explore whether any national regulatory barriers or other conventions could be relaxed to foster a liquid market for growth-indexed bonds. For example, domestic pension funds may be a natural investor base for growth-indexed bonds, but in some countries pension funds may be restricted from investing in these types of instruments. Different groups of countries (such as the G-8 or G-20) could also consider coordinating issuance of growth-indexed bonds to help jump-start a larger and more diversified market. These countries could also specify a set of standards and norms, including solutions to many of the technical issues, to facilitate development of a liquid market including similar growth-indexed bonds from a range of countries.

*Encourage involvement by the IFIs.* The IFIs have ongoing work on transparency and improving data reliability, which could be built on to improve the reliability and accuracy of GDP statistics. The IFIs could sponsor a forum to share knowledge and prompt debate on these issues, as well as to stimulate discussion on financial innovation more broadly. The IFIs could also provide technical assistance for countries wishing to issue growth-indexed bonds, including coordinating the actions of governments with the private sector. Multilateral institutions, such as the World Bank or Inter-American Development Bank, could explore purchasing growth-indexed bonds from many countries in a well diversified portfolio—thereby guaranteeing an initial source of demand for the bonds and helping jump-start a more liquid market.<sup>21</sup> The IFIs may also consider encouraging borrowing countries to issue growth-indexed bonds as part of their program commitments to reduce vulnerabilities. This automatic form of self-insurance could even reduce countries' need to borrow from the IFIs and/or renegotiate IFI programs during future periods of slow growth.

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<sup>21</sup> The International Monetary Fund is currently restricted from purchasing instruments such as growth-indexed bonds.

## **VI. FINAL THOUGHTS**

To raise long-term growth rates and improve economic development, the most important consideration for governments is to adopt sound macro- and microeconomic policies. Financial innovation cannot compensate for inconsistent and unsustainable economic policies. Nonetheless, financial innovations such as growth-indexed bonds can augment sound economic policies and further stabilize and improve growth prospects. Growth-indexed bonds can also improve the ability of emerging markets and developing countries to adopt counter-cyclical (instead of their traditional pro-cyclical) fiscal policies, thereby improving their ability to stabilize growth rates, especially during economic downturns and in response to external events. Moreover, the poor could substantially benefit from reduced volatility, less severe recessions, and higher growth rates over the longer term. Therefore, growth-indexed bonds have the potential to be an important tool in helping countries improve their growth and development prospects.

## REFERENCES

- Athanasoulis, Stefano, Robert Shiller, and Eric van Wincoop (1999). "Macro Markets and Financial Security." *Federal Reserve Bank of New York Economic Policy Review*, 5(1): 21-39.
- Barro, Robert (1995). "Optimal Debt Management." NBER Working Paper # 5327.
- Borensztein, Eduardo, Marcos Chamon, Olivier Jeanne, Paolo Mauro, and Jeromin Zettelmeyer (2004). "Sovereign Debt Structure for Crisis Prevention," International Monetary Fund, forthcoming.
- Borensztein, Eduardo and Paolo Mauro (2004). "The Case for GDP-indexed Bonds." *Economic Policy*, April: 165-216.
- Borensztein, Eduardo and Paolo Mauro (2002). "Reviving the Case for GDP-Indexed Bonds," IMF Policy Discussion Paper No. 02/10.
- Caballero, Ricardo (2002). "Coping with Chile's External Vulnerability: A Financial Problem." MIT Working paper.
- Drèze, Jacques (2000). "Economic and Social Security in the Twenty-First Century, with Attention to Europe." *Scandinavian Journal of Economics*, 102(3): 327-48.
- Froot, Kenneth, David Scharfstein, and Jeremy Stein (1989). "LDC Debt: Forgiveness, Indexation, and Investment Incentives." *The Journal of Finance*, 44(5): 1335-1350.
- Gavin, Michael, and Roberto Perotti (1997). "Fiscal Policy in Latin America." *NBER Macroeconomics Annual*. Cambridge, MA: MIT Press, pgs. 11-61.
- Goldstein, Morris and Philip Turner (2004). *Controlling Currency Mismatches in Emerging Markets*. Institute of International Economics.
- Haldane, Andy (1999). "Private Sector Involvement in Financial Crisis: Analytics and Public Policy Approaches." *Financial Stability Review*, Nov: 184-202.
- Krugman, Paul (1988). "Financing vs. Forgiving a Debt Overhang." *Journal of Development Economics*, 29: 253-68
- Lessard, Donald and John Williamson (1985). *Financial Intermediation Beyond the Debt Crisis*. Institute for International Economics. Policy Analyses in International Economics #12.
- Obstfeld, Maurice and Giovanni Peri (1998). "Regional Non-Adjustment and Fiscal Policy," in David Begg, Jurgen von Hagen, Charles Wyplosz, and Klaus Zimmerman, eds., *EMU: Prospects and Challenges for the Euro*. Special Issue of *Economic Policy*, 26.

Riascos, Alvaro and Carlos Vegh (2003). "Procyclical Government Spending in Developing Countries: The Role of Capital in Market Imperfections." Mimeo.

Shiller, Robert (1993). *Macro Markets: Creating Institutions for Managing Society's Largest Economic Risks*. New York: Oxford University Press.

Talvi, Ernesto and Carlos Vegh (2000). "Tax Base Variability and Procyclical Fiscal Policy." NBER Working Paper #7499.

Williamson, John (2004). "Curbing the Boom-Bust Cycle: Stabilizing Capital Flows to Emerging Markets." Institute of International Economics. Forthcoming mimeo.