



# Trills Instead of T-Bills: It's Time to Replace Part of Government Debt with Shares in GDP

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**A**t this time of intense national debate on the rapidly rising national debt and on fundamental financial reform, a time of unusual economic and financial uncertainty, it is vitally important to reconsider the structure of government obligations. We believe that, in parallel with the many other ongoing changes in our financial structure, the obligations of the national government should take a new and innovative form.

Consider a new U.S. government-issued security, with a coupon tied to the United

States' gross domestic product (GDP) in current dollars. Ideally, this security would be long term in maturity, perhaps even perpetual.

We propose a small-denomination GDP share paying a coupon each year of one-trillionth of that year's GDP, or about \$14.60 at current levels. On this basis, we suggest the name 'Trill' be used to refer to this new security. Similar to shares issued by corporations paying a fraction of corporate earnings in dividends, the Trill would pay a fraction of the 'earnings' of the U.S.

The capital structure of the U.S. government, as with other countries, is entirely tilted to fixed-income debt obligations (similar to corporate debt) with nothing analogous to the equity-funding available to corporations. That means that the residual claimant on government operations is the domestic

taxpayer, coerced into playing this risky role, instead of willing investors as is the case with corporate equity. As the national debt rises, the implicit leverage borne by the taxpayer is rising. We believe that investors would be enthusiastic to bear some of this risk.

Currently, investors can purchase a fairly comprehensive menu of assets with which to diversify a portfolio. In spite of their scope, however, these securities represent a small fraction of the wealth of the nation. Roughly two-thirds of the U.S.'s GDP is made up of wages, salaries, and supplementary labor income, but trading on claims to these income flows is for all intents and purposes unavailable to markets and investors. In the language of financial economists, the current menu of available assets is incomplete. There are risks in the economy, related specifically to human

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capital and the GDP, that cannot be traded in existing financial markets, and this results in under-diversification of many, if not all, investors and certainly pensioners with no wage income.

The implicit portfolio of the U.S. government is long on claims to labor income (as well as corporate earnings) and short fixed incomes. Good times or bad, payments must be made on fixed-coupon government debt, and in deep recessions, countries, like companies, can have cash in- and out-flows so badly matched that financing crises occur.

Trills would have coupon payments that would rise in an expansion, of value to investors, and importantly for the U.S. government, would decline in a recession with declining tax revenues, in contrast to existing debt vehicles.

From a Keynesian stabilization perspective, the higher interest payments in better times may seem unfortunately procyclical. But, again from that perspective, payments of interest on the national debt are not quickly spent by consumers, having a low multiplier. In practice, the new securities would relieve recessionary pressures on the government so

that they could better conduct effective stabilizing stimuli.

From the perspective of the U.S. government, such a new security would diversify obligations. Risk-sharing with the private sector can improve the risk-return tradeoff of investors, the classic win-win through financial innovation and diversification.

#### HISTORY OF GDP SECURITIES

To the best of our knowledge, true GDP shares have not yet been issued by any country. One of us (Shiller) proposed GDP shares in a 1993 book but no such shares were issued; others have made analogous proposals.

By the mid-1990s bonds with attached GDP warrants were issued by Bulgaria, Bosnia, and Costa Rica in concert with their Brady Plan restructurings. These bonds included clauses to increase coupon payments at predetermined GDP thresholds rather than in lockstep with the GDP, and were not designed well enough to bring on a groundswell of investor interest.

In contrast, the Trill would be as simple and familiar as shares in corporations. We

believe that transparency and simple structure are essential to establishing demand for these securities and ensuring that their market is liquid.

Our partial-equilibrium analysis suggests that the cost of issuance of the Trill may be in the order of 150 basis points above short-term government debt. The government should be willing to pay this extra return on behalf of taxpayers since it helps them manage risks.

The costs may be different if we admit some general equilibrium considerations, see Athanasoulis and Shiller. In their model, introducing Trill-like securities would raise the riskless rate of interest in the new general equilibrium and raise the discount rate for risky assets. The higher riskless rate is unambiguously welfare improving in this model.

The model is only suggestive for the real world since it relies on some narrow assumptions. But if there is a higher riskless rate after Trills it should be thought of as a symptom of better investment opportunities for the people and reduced exposure to tax risk, not higher government borrowing costs.

The dividend yield on Trills is likely to be extremely low now, since investors are likely

to expect real GDP to grow at something like its historical rate of over three percent a year. The low dividend yield will reduce the immediate cash-flow problem of the government.

#### WHY INVESTORS NEED TRILLS

Of particular note in light of recent market turmoil, Trills would have virtually no counterparty risk, in contrast to currently available assets that protect relative standards of living in retirement. Because nominal GDP would be used to determine the Trill's coupon value, the inflation-protection properties of the Trill would resemble those of the U.S. Treasury's Inflation-Protected Securities (TIPS). Inflation protection alone would be sufficient to generate interest in Trills comparable to that which exists for TIPS. Further interest would be generated since Trills would protect relative standards of living in retirement as they are a constant share of GDP, in contrast to TIPS, which purchase a declining real share of a growing GDP over time.

Creation of Trills can be motivated in terms of models of intergenerational risk sharing. There is a small literature that considers the benefits of intergenerational risk-smoothing

through long-lived assets. Some of this work does not involve government debt (as argued by Dan Peled, Franklin Allen and David Gale, and John Geanakoplos) though much of this literature does investigate the impact of government debt on welfare. Gale shows that uncertainty in an overlapping generations (OLG) model leads to incompleteness and allows for government debt issuance to be Pareto-improving through its impact on intergenerational transfers.

Improvements in welfare may not be surprising with incomplete markets. In this case the government can provide innovative financial securities and complete markets. Even if markets are complete, however, in an OLG model the competitive equilibrium may be inefficient so that government debt or transfers can still improve welfare, as Gabrielle Demange has shown.

Henning Bohn has made a strong argument for government liabilities that provides a hedge (for the government) against macroeconomic shocks to smooth tax revenues and maximize welfare. He finds that shorting the stock market is one way this could be accomplished. Of course, issuance of Trills is a more

natural way for the government to do this. Bohn builds on a model of Peter Diamond's to show that in an OLG neoclassical framework, government use of debt is potentially welfare improving, because of inefficiencies in the allocation of risk across generations, in particular the problem that future (unborn) generations are naturally excluded from financial markets.

Dirk Kruger and Felix Kubler applied the overlapping generations model of Paul Samuelson to show that government interventions analogous to Trills can be Pareto-improving. Trills can also be motivated in terms of models of international risk sharing, as described by Stefano Athanasoulis, Robert Shiller and Eric Van Wincoop.

As we detailed in 2009, we can, subject to some assumptions, estimate the return in the future to holding a Trill. Standard mean-variance (return versus risk) optimization over asset classes, including the estimated return to holding Trills, suggests that Trills might allow investors a return very nearly as high as the S&P 500, with half the volatility. Indeed, investors gain a much higher return and lower volatility than if Trills are excluded from the

mix. This mean-variance optimization produces an optimal portfolio composition of 28 percent of assets in long-term bonds, 38 percent in the S&P 500 index and 34 percent in Trills. Thus, the addition of Trills to the asset mix available today would likely have a dramatic impact on investor portfolio composition and investor well-being.

It may go without saying, but Trills should never replace conventional government debt completely. Capital markets rely on the term structure of U.S. government nominal debt as a reference point for pricing other fixed-coupon nominal debt, and as a hedging instrument.

#### THE URGENCY

Public confidence may be boosted if the U.S. government does something fundamental to correct the faulty risk management implicit in pure-debt government financing that helped make the current crisis as bad as it is, and that inhibits a constructive response to the crisis

Despite rising concerns about U.S. government solvency, U.S. government bonds

currently remain highly demanded and thus their market yield is low. We suspect that the same remarkable demand, even more remarkable perhaps, may extend to Trills.

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