

Comments on the UK Debt Structure

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The comments below are inspired by the recent Bank of England Conference on Index-Linked Gilts. My focus is on the broad issues of government debt structure raised by Robert Barro's conference presentation. I should emphasize that some of the substantive conclusions are highly preliminary. This is more a survey of the conceptual issues than an attempt to derive specific policy recommendations.

1. Robert Barro's remarks at the conference were broadly correct. He asked the right questions and answered most of them correctly.

First, why does debt structure matter? Debt policy as a whole would not matter (neither level nor structure), if Ricardian Equivalence applied. But debt policy does matter in practice, because taxation is distortionary.

Second, if taxes are distortionary, what should be the government objective with respect to debt structure? Barro's classic answer is that the government should smooth tax rates.¹ The reason is that fluctuations in tax rates would magnify the adverse incentive effects of taxation. Robert Barro originally used the tax-smoothing argument to determine the optimal level of debt. Later, Lucas and Stokey and others, including me, realized that the same argument applies to debt structure.² With regard to the level of debt, the argument is that if government spending needs and/or the tax base fluctuate over time, the government should keep tax rates roughly constant and let the level of debt fluctuate to absorb the fiscal impact of economic fluctuations. Regarding debt structure, the argument is that a welfare-maximizing government should structure its debt in a way that minimizes the risk that tax rates will have to be changed later in response to economic disturbances. For example, if a supply shock reduces tax revenues and raises welfare spending (in a recession), fiscal pressures would be reduced if the government had issued contingent debt of a type that is worth less in a recession than

in a boom. Nominal debt could serve this role if adverse supply shocks tend to raise the inflation rate. To sell contingent debt that is worth less in a recession than in a boom, the government would presumably have to promise a higher payoff in good times. But in good times, tax revenues would presumably be more plentiful, too.

Overall, debt structure matters because different types of debt embody different contingencies. Different contingencies may provide a better or worse match between the government's debt obligations and the government's ability to service its debt without having to raise taxes. The key practical question about debt structure is therefore how to use the menu of available securities most effectively to "insure" the government against economic disturbances.

2. The practically most important choices about the debt structure are about long-term versus short-term and about nominal versus inflation-indexed debt. Since consumer prices are fairly predictable in the short run, there are only three significant categories: Short-term debt (nominal or indexed), long-term nominal debt, and long-term indexed debt.³

Short-term debt is safe for investors because a known principal is returned in the near future. But it is risky for the government because of the need to refinance the debt at unknown future interest rates. Long-term nominal debt is risky for both investors and the government because of inflation uncertainty. The desirability of nominal debt for the government depends crucially on the insurance features represented by the inflation contingency. Long-term indexed debt appear to be risky at first sight, because the market value of long term bonds fluctuates significantly. But the fixed real interest rates provide maximum safety for the government with regard to the real level of debt service.

3. I should note that the above assessment of interest rate risk is based on the implicit assumption that the government is rolling over its debt essentially for ever. Barro appeals to this assumption, too, and it is probably not unrealistic. But the assumption is worth making explicit because it provides the foundation for Barro's argument in favor of very long term government debt, and because policy makers should know that

the argument must be modified if the government anticipates significant budget surpluses in the foreseeable future.

The basic argument should be familiar from corporate finance. Firms tend to finance short term projects with short term debt and long term projects with long term debt. Why? Because interest rate risk is minimized when the debt payments can be serviced out of contemporaneous payoffs from the investment project. Government debt is serviced out of general tax revenues rather than from a specific project. But the same logic applies. The government has the ability to pay down the principal of government debt if and only if it runs a budget surplus (including interest payments). Thus, interest rate risk is minimized if the schedule of debt maturities matches the timing of expected future budget surpluses.

Barro's recommendation in favor of consols follows from this general argument as a special case if the government is expected to run budget deficits (or at best, balanced budgets) into the indefinite future. (Of course, the government will not be able to run non-interest, primary deficits for ever; but it has the ability to run permanent with-interest deficits, especially in a growing economy.) In the last few decades, most governments around the world, including the UK, have run persistent deficits. Hence, Barro's recommendation is a sensible one. But since some projections of future UK fiscal policy show surpluses, it should be stated clearly that the risk-minimizing maturity structure of government debt is the one that matches maturity dates with budget surpluses. An infinite maturity (consols) is the optimal choice if, and only if, no significant surpluses are anticipated.

4. Returning to the question of debt structure, let me proceed under the assumption that the UK will have a government debt outstanding indefinitely. The risk of interest rate fluctuations will then be minimized if the bulk of UK debt is financed with long-term debt. Barro and I seem to agree up to this point. We disagree, however, about the next step. Barro ends the argument here and simply recommends that all UK debt should be long term inflation indexed. I believe the logical next step is to think about the contingencies inherent in short-term debt and in long-term nominal debt and to determine whether or not they

are desirable -- taking the "safe" choice of long-term indexed debt as benchmark.

Regarding short term debt, I do not see desirable insurance features in the way interest rates fluctuate. In a closed economy, one might argue that high real interest rates should be correlated with "good times"--high private investment demand--so that tax revenues and interest rates might be positively correlated. But this argument is questionable in an increasingly integrated world economy. UK interest rates are likely to fluctuate in response to shocks to world interest rates that are unrelated to events in the UK. Hence, I agree with Barro that the interest rate contingency inherent in short-term debt is generally undesirable. Short-term debt (nominal or indexed) is clearly inferior to long-term indexed debt.

Regarding long-term nominal debt, I come to different conclusions than Barro. Historically, inflation has often been associated with "bad times". Inflation has been a traditional means of war finance. The correlation between bad harvests and inflation is also obvious. In modern times, the data (at least for the US) show a clear correlation between inflation and adverse supply shocks as reflected in a negative correlation between inflation and future GDP. Hence, nominal debt has the desirable "insurance" feature that its value tends to decline at times when the government faces fiscal pressures.

It is of course true that nominal debt provides dangerous incentives for the government to inflate opportunistically. In the post-World War II years, more governments seemed to have succumbed to this moral hazard than in previous centuries. It may therefore be worth exploring whether the value of government debt can be made responsive to economic conditions in some other way than through nominal debt, say, through explicit indexation to GDP or to aggregate consumption. But these are theoretical ideas at this point.⁴ If the choice is between nominal and indexed bonds, nominal bonds are the only securities that provide some flexibility in bad times. I would definitely be concerned about a complete shift to securities that require a debt service that is totally unresponsive to economic conditions. Hence, I disagree with Barro's proposal to issue only inflation-indexed bonds. Instead, I would

maintain that the optimal structure of government debt should include a mixture of nominal and indexed debt.

5. What then should the UK do? I do not have a quantitative recommendation with regard to the optimal fraction of nominal and indexed debt. But Barro and I seem to agree that as long as the government anticipates being in debt in the long run, it makes more sense to issue long-term debt than to roll over short-term debt. Thus, I would suggest that we set aside the question of long-term nominal debt and focus first on the choice of short-term debt versus long-term indexed debt.

Currently, new issues of UK debt are about 15% indexed, and the other 85% are issued short-term, medium-term, and long-term in equal proportions, i.e., about 28% of total debt in each of these maturity bands.⁵ Thus, the UK is planning to issue much more short-term debt than long-term indexed debt. Based on the arguments above, this policy is suboptimal from the perspective of welfare maximization. To make the problem worse, the even-handedness suggested by the equal proportions of new issues is deceptive, because all the new long- and medium-term issues will eventually become short-term as they approach maturity. Under the current policy, the steady-state share of short-term debt will be closer to 1/2 than 1/3.

A natural, but perhaps somewhat radical, proposal would be to stop issuing short-term debt entirely and to issue long-term indexed debt instead (i.e., about 43% instead of 15%). This change would improve the maturity characteristics of government debt (reduce the risk of refinancing at uncertain future interest rates) without significantly changing the government's exposure to inflation risk. In addition, medium-term debt could be replaced by a combination of long-term nominal and long-term indexed debt with the same sensitivity to inflation. This would further improve the maturity distribution of government debt without affecting the inflation-sensitivity. Since long-term debt includes more inflation risk than medium term debt, the substitution would be less than one-for-one. The net result of these two adjustments would be mixture of around 30-50% long-term nominal debt and 50-70% long-term indexed debt.

6. At this point, a comment on cost considerations is appropriate. The expected interest cost of government debt will generally differ for different types of debt. If investors are sufficiently homogenous that optimal debt policy and asset pricing can reasonably be examined in a representative agent model, it is straightforward to prove mathematically that equilibrium risk premiums leave the optimal debt policy approximately unchanged. (The approximation comes from a Taylor series approximation of the relevant first order conditions.) In other words, the optimal policy is determined by tax-smoothing considerations alone. If tax-smoothing considerations suggest that the government should issue a securities that carries a risk premium, the government should pay this premium without complaining. The premium simply represents a fair insurance premium against the risk of tax rate fluctuations. Because of this reasoning, all the above arguments were about risk and insurance. I did not even mention cost.

Cost may become an issue, however, to the extent that private financial markets are incomplete and investors are heterogeneous. Then the government may be able to earn monopoly profits -- reflected in lower interest cost -- by issuing securities that are, for some unknown reason, not issued in the private market. This issue has not been explored much in the academic literature, but it should be acknowledged before one jumps to policy recommendations.

Several comments made at the conference suggested that market segmentation is currently a factor in the indexed gilt market, as most indexed gilts are held in pension and insurance accounts. A significant increase in indexed gilt issues might reduce the "scarcity premium" paid by these investors. The proposed reduction in the issue of short and medium term nominal debt may raise similar issues, in the opposite direction, if there are investors who like to hold nominally-safe short and medium-term government debt and who would be willing to pay a scarcity premium for such securities if the government suddenly reduced the volume of new issues.

Given the lack of empirical evidence about scarcity premiums, most comments about them are necessarily speculative. Two points can be made, however.

First, the government will have to make a decision whether the potential loss of a hypothetical scarcity premium in current indexed gilt prices should deter the government from increasing the supply of indexed gilts. I believe that the answer should be no, for several reasons: (a) The welfare-theoretic argument in favor of more indexed gilts is convincing. (b) It is not proven that there is a significant scarcity premium. Note that a scarcity premium must not be confused with a risk premium in this context. As explained above, a normal premium for risk would not be a valid argument against a certain type of security. (c) The reliance on monopoly profits at the expense of certain investor groups, which is implicit in discussion of scarcity premiums, is rather questionable from a welfare perspective. Separately, the information content of indexed gilt prices might be improved if the government issued enough indexed gilts that it would not have to worry about scarcity premiums that might distort the impact of inflationary expectation on the spread between nominal and indexed yields.

Second, given the tax-smoothing argument against short and medium term debt, the government will have to decide whether to shift away completely from issuing such debt, as suggested by Barro and by my "radical" proposal above, or to move more slowly. It is an open question whether or not there is a clientele that would pay a scarcity premium for short and medium-term government securities if the government reduced the volume of such issues to near zero. Given this uncertainty -- that is, unless one can clearly document that there is NO clientele that would pay a premium for short and medium term securities -- the most prudent course of action is perhaps to "test the market" by progressively reducing the issue of short and medium term bonds, in steps, and to assess along the way if a scarcity premium starts to appear.

Let me emphasize, however, that I do not advocate inertia. The current UK debt structure is clearly tilted far too much towards short term debt. At a minimum, I do not see a convincing reason why the UK should not shift immediately to a policy of issuing at least as much of the more desirable long-term indexed debt as it issues of the less desirable short- and medium-term nominal debt. (Say, about 18% short-term nominal, 18% medium-term nominal, 36% long-term indexed, and an

unchanged 28% long-term nominal debt.) This would be a significant, but far from radical, first step to a debt structure more in line with welfare maximization.

¹ See Robert Barro, "On the Determination of Public Debt," Journal of Political Economy 87, 1979, 940-971.

² See Robert Lucas and Nancy Stokey, "Optimal Fiscal and Monetary Policy in an Economy without Capital," Journal of Monetary Economics 12, 1983, 55-93; Henning Bohn, "Why Do We Have Nominal Government Debt?" Journal of Monetary Economics 21, 1988, 127-140; and Henning Bohn, "Tax-Smoothing with Financial Instruments," American Economic Review 80, 1990, 1217-1230.

³ For some countries, the currency-denomination is another major issue, but that is apparently less relevant for the United Kingdom; see Henning Bohn, "A Positive Theory of Foreign Currency Debt", Journal of International Economics 29, November 1990, 273-292.

⁴ My paper on "Tax-Smoothing with Financial Instruments," (op.cit.) presents these ideas in more detail.

⁵ This is according to the recent Bank of England publication on "Gilts and the Gilts Markets: Review 1994-5" (p.13).