

Having your cake and eating it too: The maturity structure of US debt

John H. Cochrane¹

November 15 2012

Robin Greenwood, Sam Hanson, and Jeremy Stein² nicely model two important considerations for the maturity structure of government debt: Long-term debt insulates government finances from interest-rate increases. Short-term debt is highly valued as a “liquid” asset, providing many “money-like” services, and potentially displacing run-prone financial intermediaries as suppliers of “liquidity.” Long-term debt also provides some liquidity and collateral services, (Krishnamurthy and Vissing-Jorgensen³ (2012)) but not as effectively as short-term debt. How do we think about this tradeoff?

Posing the question this way is already a pretty radical departure. The maturity structure of U.S. debt is traditionally perceived as a relatively technical job, to finance a given deficit stream at lowest long-run cost, as Colin Kim eloquently explained in the panel. Greenwood, Hanson and Stein, along with the other papers at this conference, are asking the Treasury’s Office of Debt Management to consider large economic issues far beyond this traditional question. For example, saying the Treasury should provide liquid debt because it helps the financial system and can substitute for banking regulation, whether or not that saves the Treasury money, asks the Treasury to think about its operations a lot more as the Fed does. Well, times have changed; the maturity structure of US debt does have important broader implications. And getting it right or wrong could make a huge difference in the difficult times ahead.

Go Long!

As I think about the choice between long and short term debt, I feel like screaming⁴ “Go Long. Now!” Bond markets are offering the US an incredible deal. The 30 year Treasury rate as I write is 2.77%. The government can lock in a nominal rate of 2.77% for the next 30 years, and even that can be paid back in inflated dollars! (Comments at the conference suggested that term structure models impute a negative

¹Professor of Finance, University of Chicago Booth School of Business, Research Associate, NBER, Senior Fellow, Hoover Institution, and Adjunct Scholar, Cato institution. John.cochrane@chicagobooth.edu, <http://faculty.chicagobooth.edu/john.cochrane>. These are comments prepared for the Second Annual Roundtable on Treasury Markets and Debt Management, Department of the Treasury, November 15, 2012.

² Robin Greenwood, Samuel Hanson, and Jeremy Stein, 2012, “[A Comparative-Advantage Approach to Government Debt Maturity](#)” Manuscript, Harvard University.

³ Krishnamurthy, Arvind and Annette Vissing-Jorgensen, 2012, “The Aggregate Demand for Treasury Debt. *Journal of Political Economy*. (April 2012)

⁴ Actually, I’ve been screaming “go long” for a while now. In particular, see “[Inflation and Debt](#),” *National Affairs* 9 (Fall 2011), and “[Understanding fiscal and monetary policy in the great recession: Some unpleasant fiscal arithmetic](#),” *European Economic Review* 55 (2011), 2-30.

risk premium to these low rates: They are below expected future short rates, so markets are paying us for the privilege of writing interest-rate insurance!)

Our Government has taken the opposite tack. When you include the Fed (The Fed has bought up most of the recent long-term Treasury issues, in a deliberate move to shorten the maturity structure) the US rolls over about half its debt every two years⁵.

Here's the nightmare scenario: Suppose that four years from now, interest rates rise 5 percent, i.e. back to normal, and the US has \$20 trillion outstanding. Interest costs alone will rise \$1 trillion (5% of \$20 trillion⁶) – doubling already unsustainable deficits! This is what happened to Italy, Spain, and Portugal. Don't think it can't happen to us. It's even more likely, because fear of inflation – which did not hit them, since they are on the Euro – can hit us.

Moreover, the habit of rolling over debt every two years leaves us vulnerable to a rollover crisis. Each year our Treasury does not have to just borrow \$1 trillion to fund that year's deficits. It has to borrow about \$4 trillion more to pay off maturing debt. If bond markets say no, we have a crisis on our hands.

Going long buys us insurance against all these events. And bond markets are begging us to do it! Most large companies are issuing as much long-term debt as they can.

I emphasize "insurance." Long rates are low, and interest rate volatility is low. This isn't about the forecast (you can't buy insurance against something expected) and it's not about volatility. It's about a big left tail. What if the 4% growth underlying our already depressing deficit forecasts turns into another 4 years of sclerotic 1.5% growth, the CBOs static revenue forecasts from higher tax rates fail to materialize, inflation picks up, budget chaos raises the risk premium of US debt, and China⁷ stops buying?

The world has changed. In the past, the Treasury could adjust maturity structure thinking only about liquidity or term premiums. The fiscal risks were small, since the overall amount of debt was small. With debts above GDP, and 5 times Federal revenues, the old rules go out the window.

⁵I got this from Hamilton, James D. and Cynthia Wu, 2011, "[The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment](#)," Manuscript, UCSD and University of Chicago. They put all debt on a zero coupon equivalent basis. Beware the average maturity numbers, as this ignores coupons and weights long maturities too heavily. What we want of course is the duration of US debt – change in market value in response to interest rate changes – which I don't have handy.

⁶ I use the total debt, including that held by government agencies, as these are the claims on the Federal income tax. Using debt held by the public does not generate a much prettier picture.

⁷ Daniel Beltran's paper presented at the conference, said China alone is worth 2%! (Beltran, Daniel, Maxwell Kretchmer, Jaime Marquez, Charles P. Thomas (2012) "Foreign Holdings of U.S. Treasuries and U.S. Treasury Yields" Federal Reserve Board.

Fix the accounting

Why not go long? I suspect the Treasury is reluctant to go long because, under current accounting, moving \$10 trillion of debt to long-term would add \$277 billion to interest costs, which makes the current deficit look much worse.

But this accounting makes no economic sense. Yield to maturity is not the same thing as the annual cost of borrowing, which includes capital gains and losses. Confusing yield and one-year return is a classic fallacy. (It makes even less sense given that the Fed is buying all the long term debt, so that the maturity hasn't really changed at all!)

If this consideration is holding the Treasury back, *we should fix the accounting*. Politically difficult you say. We'll get accused of cooking the books, you say. OK, but is it really worth running the country into a fiscal crisis because we can't *fix the accounting*? In simple ways that every business follows?

Simply marking to market capital gains and losses, and including that in the budget would be a good start. Then, we need to calculate and report expected capital gains and losses during the next year.

According to the expectations hypothesis, which holds well at well at the relevant multiple-year horizons, and perfectly if we are willing to footnote "expectation" with "risk-neutral," the *expected cost is independent of the maturity structure*. An upward sloping yield curve means that the government expects to make capital gains on long-term bond issues that just offset their higher yields. I expect that the Treasury would use a more sophisticated term structure model, to isolate risk premia and liquidity premia as well as expectations effects. That would be all well and good, but the overwhelming effect would still be to remove the confusion of yield with return. You might see 20 or 30 basis point cost of going long, but not 2.77%.

Now, accounting is not miraculous. Interest costs don't disappear. Higher long-term yields correspond to higher future interest rates, and thus higher interest costs in future years. But here, the calculation would correctly show that the US will pay these higher future expected interest costs independently of the maturity structure. Today's 2.77% 30 year yield is not "paid" today, in any meaningful sense. It is paid when interest rates actually do rise. And rolled-over short term debt would pay the same costs, at the same time.

Go even longer, and more liquid

Why stop at 30 years? The Treasury should issue perpetuities – bonds with no principal repayment date. When the government wants to pay down the debt, it simply buys them back at market value.

Perpetuities pay a set coupon – say \$1 – forever. Their price varies as interest rates rise and fall. It would be better for the Treasury to sell only one coupon amount – say \$1 – rather than adjust the coupon amount so that the bond sells at par. After all, a \$2 coupon is just two perpetuities, unlike the case of coupon bonds. (If it really matters to sell bonds at "par," then the Treasury can simply bundle the perpetuities. At a 1% yield, one \$1 perpetuity costs \$100, so sells at par. If yields rise to 2%, so the price

of a single perpetuity falls to \$50, the Treasury can issue them in bundles of 2, at “par.” Or maybe people can figure this out on their own.)

Perpetuities do not age, so perpetuities issued at different times are identical securities. There will be no more on-the-run / off-the-run spreads, no more liquidity premiums, no more arbitrages between economically-equivalent bonds because one can't be delivered when the other has been shorted. And there will be no need to roll over of maturing debt, ever.

This standardization would also sharply increase the liquidity of long-term debt. In turn, raising that liquidity should lower the overall rate the government pays. It's a win-win all around.

(While we're at it, the Treasury should also issue an inflation-protected perpetuity, with a fixed *real* coupon, and adjust that coupon downwards for deflation symmetrically with upwards adjustments for inflation. The coupon pays \$1 2012 dollars, forever. That would be a better and more liquid version of its current TIPS. Finally, the Treasury should issue variable-coupon debt. The coupon on this debt would act like corporate dividends, and variable-coupon debt would function like an equity source of government financing. By cutting the dividend in bad times, the government could reduce its debts without the calamities of default or inflation. By raising the coupon in good times, the government would establish a reputation that makes the bonds saleable, and convince investors to hold on through coupon reductions. Coupon adjustments should be made by Congress, of course.)

Go modern

If we go long, what about the liquidity advantages of short-term debt? Just a little financial engineering could avoid the apparent tradeoff between long and short term debt, allow the Treasury to quickly go longer without having to dramatically reform the maturity structure of government securities, which will take far more time than we have, and it could help to get around faulty accounting.

In modern finance, *exposure* is no longer tied to *investment amounts*. With aggressive use of interest rate swaps, (and, potentially, futures, interest-rate options, or CPI swaps,) the Treasury could buy the interest rate protection the government urgently needs, supply as much short-term debt as liquidity demands, and satisfy the political demands of budget accounting. There need be no tradeoff at all. We can have our cake and eat it too.

For example, suppose the Treasury issues only one-month debt, but then swaps it all to fixed rate. The Treasury agrees to pay to swap counterparties the fixed (2.77%) rate and receive the floating one-year rate. Now, it has issued \$16 trillion of one-month debt, surely satisfying any liquidity demand to the utmost. But the Treasury is fully protected against interest rate rises just as if it had issued the entire amount in 30 year bonds. The *investment amount* is one month, the *risk exposure* is 30 years. Every bank routinely uses swaps to adjust its interest-rate exposure without touching its low-cost source of funds (sticky liabilities) or its profitable but illiquid assets (loans). The Treasury should do the same!

(I don't know enough about deficit accounting to know where swap payments go, but I'll leave it as an article of faith that the sharpies at Goldman Sachs who made Greek debt disappear in 2006 can get around that one too.

Yes, we need to make sure that swap counterparties are not too-big-to-fail banks, of course! But swap contracts are collateralized, so counterparty credit risk is not really that big an issue. The lower posts enough collateral that the winner can replace the contract in the event the loser defaults. And if Dodd-Frank is good for anything, it ought to be good for keeping plain-vanilla interest rate risk off the balance sheets of "systemically important" banks.

Finally, I say "Treasury," but what matters of course is the consolidated government. If it makes more sense for the Treasury to issue and pass on government interest-rate risk management to the Fed, so be it. The Fed can more explicitly be the Treasury's asset management service.)

The bigger point: The Treasury should enlarge its "maturity" selection beyond the 18th century choice of maturity among coupon bonds, to include at least 20th century plain-vanilla modern fixed income instruments.

Go long, again

I don't know if I've pounded my fists on the table enough. Historically normal interest rate rises will send the US into a fiscal tailspin, with interest costs doubling our deficit, and thus forcing a true fiscal crisis. The markets are offering to take this risk from us for next to nothing. For a while.

I don't exaggerate much when I say, the fate of the Republic is in your hands!

Go Short

On the other side, Greenwood, Hanson, and Stein remind us of the liquidity value of short-term US Treasury debt. For example, it is the most widely accepted form of collateral, even in crises. Owning a one-month Treasury always allows you to borrow. Many accounting rules treat short-term Treasury debt as equal to cash. More of that too seems a good idea.

Again, though, we can do better, and we can avoid the tradeoff.

Why stop at traditional Treasury bills? These have awkward properties: They are only issued in large denominations, and they are rolled over frequently. *The Treasury should go beyond bills, and issue floating-rate debt*, held in electronic book-entry form. Either the Treasury can directly allow small denomination, or it can encourage money-market funds to intermediate for retail clients.

The most "liquid" floating-rate debt has a constant principal value of \$1.00, always. It's like a money-market fund, where each share is always worth \$1, and interest is paid on top of that. That can be achieved by a daily auction, as overnight repo rates were set in a market each day. However, a daily auction is not necessary, if the Treasury simply guarantees the value at 1.00 like a money market fund. Then the rate can then be indexed or simply adjusted at a periodic auction to adjust the quantity

outstanding. (The Treasury maintains an account at the Fed, and uses that buffer to freely trade bonds for reserves at 1.00 between interest-rate reset periods.)

Yes, this is interest-paying money, issued by the Treasury. Every collateral, liquidity, or money-like feature of one-month Treasury debt I can think of works better with such fixed-value floating rate debt. Why bother “money-like” monthly Treasuries, when we can have money itself, without suffering any interest cost?

Overnight, floating-rate, electronic-entry Federal debt already exists. It’s called bank reserves. However, bank reserves are only available to banks, so have to be intermediated again to be available to the rest of the financial system. Also the Fed’s current “exit strategy” involves reestablishing a spread between reserves and market rates, which means reducing the quantity of reserves and sending the financial system off to other sources of “liquidity.”

Fixed-value, floating-rate, Treasury debt -- interest on reserves for everyone -- allows us to live the “optimum quantity of money” described by Milton Friedman. With an interest cost, people unnecessarily economize on money balances by spending more time and effort economizing on money balances. Without an interest cost, they voluntarily hold huge money balances and save all that time, effort, and cash-conserving financial engineering.

The advantages for our modern financial system are much deeper. With abundant floating-rate, fixed-value government debt, there is simply no need for all the complicated and run-prone “liquidity creation” that engulfed the financial system. Special purpose vehicles holding mortgage tranches funded by short-term debt, overnight repo, money market funds holding Lehman Brothers debt and promising fixed value, even bank deposits funding mortgages all become unnecessary for the purpose of creating liquid assets. Rather than allow all this intermediation and then hope that regulation can stop the next run, why not fully satisfy the demand for such assets directly? Then we need not fear requiring that anyone who wants to hold risky or illiquid liabilities match those liabilities with similar assets, eliminating runs and the need for extensive risk regulation. Greenwood, Hanson and Stein call it “crowding out,” and a partial substitute for regulation. Yes, but let’s crowd out entirely and substitute for a lot more regulation!

No theory of inflation says there is any problem with the creation of such “money-like” assets, any more than the liquidity value of one-month bonds causes a problem for price-level control. Keynesian and new-Keynesian models say that the level of interest rates, which the Fed still controls by announcing the rate on reserves and discount window lending, controls inflation. An artificial interest spread between classes of Fed liabilities doesn’t matter. The Fiscal theory of the price level says that fiscal solvency gives price level control, not a scarcity of “liquid” vs. “illiquid” government debt. Monetarists think of reserves that pay full interest as bonds, not money, so arbitrary amounts are not inflationary. Milton Friedman himself called for interest on reserves.

Bottom line

As a policy priority, buying insurance against interest rate spikes at our current extremely low interest rates is the first priority. This has to be accomplished before long-term interest rates rise. The left-tail danger of a run on US Treasury debt, and an interest-cost death spiral, is real.

Providing abundant liquidity with floating-rate debt, which will discourage the reconstruction of a run-prone shadow banking system, is only a slightly longer term priority.

An ideal maturity structure of government debt is perpetual. Long-term debt has a fixed \$1 *coupon*, and a floating price. Short-term debt has a fixed \$1 *price* debt and a floating coupon. Then there is never rollover risk, or rollover transactions cost. Making all Treasury debt even more liquid, by standardizing the long issues and allowing low-cost electronic transactions of the short issues, greases the financial system and lowers the rates the Treasury will pay.

By opening up to swap and other derivative transactions, the Treasury can dissociate the amount of interest-rate insurance it purchases or sells on behalf of taxpayers from the task of supplying the amount of these fundamental securities that private-sector “liquidity” demands require, and that provide the least-cost source of funding.

Obviously, these moves need to be coordinated with the Fed. There is no point in lengthening if the Fed just twists it away. I notice a tendency of the two institutions to follow parochial concerns and to forget that there is a single budget constraint uniting them!

Enjoy your cake.