Jeremy C Stein: Evaluating large-scale asset purchases

Speech by Mr Jeremy C Stein, Member of the Board of Governors of the Federal Reserve System, at the Brookings Institution, Washington DC, 11 October 2012.

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It's a pleasure to be here at Brookings. And it's a special thrill and honor for me to be here alongside Don Kohn. One of my only regrets about coming to the Fed is my timing. I wish I had had the good fortune to arrive a few years earlier, so I could have had the privilege of being Don's colleague, and of learning from him. Now I can only do so indirectly. Several of the best bits of advice I've gotten since joining the Board have been preceded by words like: "Here's what Don Kohn would have done in this situation…." So Don, thank you, and I look forward to our discussion.

I'd like to take this opportunity to describe the framework I have been using to think about monetary policy in the current environment, focusing primarily on the role of large-scale asset purchases (LSAPs). But before doing so, please note the usual disclaimer: The thoughts that follow are my own, and do not necessarily reflect the views of other members of the Federal Open Market Committee (FOMC).

There is a considerable diversity of views within the FOMC, and among economists more generally, about the use of LSAPs and other nonconventional policy tools. This diversity is both inevitable and healthy given the unprecedented circumstances in which we find ourselves. To be clear on where I stand, I support the Committee's decision of last month – namely, to initiate purchases of mortgage-backed securities (MBS) at a rate of $40 billion per month, in tandem with the ongoing maturity extension program (MEP) in Treasury securities, and to plan to continue with asset purchases if the Committee does not observe a substantial improvement in the outlook for the labor market. Given where we are, and what we know, I firmly believe that this decision was the right one.

In my comments today, I will only briefly review the case for taking action, as that ground has been well covered in a number of other places, most notably in Chairman Bernanke's recent Jackson Hole speech.[1] Instead, I will explore in more detail the factors that make decisions about LSAPs so challenging. The Chairman discussed these challenges in his recent speech, saying: "Estimates of the effects of nontraditional policies on economic activity and inflation are uncertain, and the use of nontraditional policies involves costs beyond those generally associated with more-standard policies. Consequently, the bar for the use of nontraditional policies is higher than for traditional policies."[2]

With this principle in mind, my aim is to lay out the thought process that I am bringing to bear in an effort to decide just how high the bar should be, and whether a proposed action clears that bar. Along the way I also hope to highlight some gaps in economists' collective understanding about LSAPs, and perhaps to provoke some further thought and research on these questions.

However, let me begin by setting the context. The point of departure for any analysis of monetary policy is our dual mandate – to foster maximum employment and price stability. The first pass here is pretty clear. Unemployment remains painfully high, and in my opinion, well above the long-run structural rate of unemployment. Moreover, smoothing through the ups and downs of incoming data, it appears that the economy is growing at a pace such that, absent policy action, progress on reducing unemployment will likely be slow for some time.

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1 See Bernanke (2012).

2 See Bernanke (2012).

Meanwhile, inflation is subdued, running at or below our long-run objective of 2 percent, while inflation expectations remain well anchored. If the federal funds rate were at, say, 3 percent, we would have, in my view, an open-and-shut case for reducing it.

The complication, of course, is that the federal funds rate is essentially at its lower bound, which means that we cannot do more simply by turning that dial further. Instead, we have to use unconventional tools, such as LSAPs and guidance about the future path of the federal funds rate.

With respect to LSAPs, my belief – which echoes the views expressed by Chairman Bernanke at Jackson Hole – is that past rounds of LSAPs have played a significant role in supporting economic activity and in preventing a worrisome undershoot of the Committee's inflation objective. The case is especially strong with respect to the first round of LSAPs, which was a very potent policy action that helped to bring the economy back from the brink in 2009.

However, we now face a harder set of questions – not about the value of past LSAPs, but about the marginal benefits and costs of further LSAPs. A number of observers have raised concerns about diminishing returns, or escalating costs. I think that, at least in the limit, these concerns must be right; we could in principle push this tool to the point that the hurdle for additional usage would become very high. As policymakers, it is our responsibility to be as clear as possible about the nature of the costs and benefits, and how they might evolve. In that spirit, I will try in what follows to outline the mechanisms that can give rise to decreasing marginal efficacy of LSAPs, or to increasing marginal costs.

While much of my discussion will focus on the direct hydraulic effects of LSAPs on the economy, it should be emphasized that their overall impact may be augmented via a signaling or confidence channel. Another important tool in the Committee's arsenal these days is its use of forward guidance about the expected path of the federal funds rate. And a change in this guidance was a key part of the September FOMC statement, with the Committee stating that "a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the economic recovery strengthens." I believe that the LSAP component of the statement helped bolster the credibility of the forward guidance component by pairing a declaration about future intentions with an immediate and concrete set of actions. And I suspect that this complementarity helps explain the strong positive reaction of the stock market to the release of the statement.

In addition to this signaling channel, LSAPs of course also have a variety of direct effects on the economy, as I just noted. To understand these effects, it is useful to compare them with those that make monetary policy work in normal times. Away from the zero lower bound, conventional monetary policy is thought to work via an expectations channel; when the Fed cuts the federal funds rate, long-term rates also fall, primarily because expectations regarding future short-term rates shift down. By contrast, a principal motive for doing LSAPs is to influence interest rates not just through expectations, but via supply-and-demand effects in the long-term bond market. As the Fed buys more long-term bonds, their price goes up, and their yield falls, even if expectations of future short rates are unchanged. Said differently, the so-called term premium on long-term bonds declines, which means that post-LSAP, long-term bonds are expected to perform less well as an investment relative to short-term bills.

There is a large body of evidence that suggests that LSAPs do in fact exert significant pressure on long-term Treasury yields.[3] Estimates of the *cumulative* effect of past LSAPs on 10-year yields range from 80 to 120 basis points.[4] And these past actions are one reason

[3] Papers include Gagnon and others (2011), Krishnamurthy and Vissing-Jørgensen (2011), Swanson (2011), Meaning and Zhu (2011), D'Amico and King (forthcoming), D'Amico and others (forthcoming), Li and Wei (2012), and Wright (2011).

[4] See Li and Wei (2012), Pandl (2012), and Meyer and Bomfim (2012).

why Treasury term premiums are now near historic lows, on the order of minus 80 basis points, according to a well-known model used by the Board staff.[5]

A central theme of my talk today is this: When policy works by moving term premiums, as opposed to moving expectations about the path of short rates, the transmission to the real economy may be altered in subtle yet important ways that can have implications for the benefits of a policy action, its costs, and even its consequences for financial stability. Moreover, to address these issues, we need to understand not only *by how much* an LSAP moves term premiums, but also *why* it does so. It should be noted that many standard macro models completely set aside the distinction I am emphasizing here. For example, in the Board staff's main model, FRB/US, a fall in the long rate is assumed to have the same effect on economic activity irrespective of whether this fall comes from the term premium or from expectations of future short rates.

For the sake of concreteness in what follows, let's think in terms of a hypothetical $500 billion LSAP, conducted entirely by buying longer-term Treasury securities; later I will speak to the differences that arise when the program is carried out with MBS purchases. A reasonable estimate based on the literature would be that such a program reduces the term premium, and thus the 10-year Treasury yield, by 15 to 20 basis points. In my mind, this step is the least controversial piece of the transmission mechanism.[6] Moreover, I have no reason to expect any diminishing efficacy on this market-impact dimension, so in this instance the past evidence seems like a good guide to future outcomes.

However, the evidence on Treasury-market impact is just a starting point. To fully evaluate an LSAP, one needs to take several further steps, some of which are more open to debate. In so doing, it is helpful to clarify the specifics of the supply-demand story. One version of this story works through the market price of duration risk, which is the interest rate risk borne by an investor in long-term bonds. In this case, all bonds – including Treasury securities, corporate bonds, and MBS – can be thought of as close substitutes for one another, and an LSAP, by reducing the total quantity of duration in private hands, lowers the price of duration risk and so reduces the yields on all long-term bonds by an amount proportional to their duration. Going further, this story might also suggest that, to the extent that equities embed duration risk, the return investors require to hold them should fall commensurately, thus giving a significant boost to stock prices.

In other versions of the story, markets are more segmented, and Treasury securities and other bonds are not such close substitutes, so an LSAP has differential effects on various securities. In this case, an LSAP that absorbs Treasury supply would be expected to lower the yields on Treasury securities relative to those on corporate bonds, or alternatively, to increase the corporate-Treasury spread.[7] And by a similar logic, an LSAP might have only a modest effect on stock prices.

With this backdrop, let's start with the efficacy side of the question. Take our $500 billion LSAP and, as mentioned earlier, stipulate that it reduces the 10-year Treasury rate by 20 basis points. A simple way to proceed would be to plug this 20 basis point change into one of our econometric models and ask what the consequences are for gross domestic product growth and unemployment. As a concrete case, if you did this exercise with the Fed's workhorse FRB/US model, it would tell you that the $500 billion LSAP should bring down the unemployment rate by approximately two-tenths of a percentage point at a two-year horizon.[8] This effect is economically meaningful.

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[5] The model is due to Kim and Wright (2005).

[6] See Woodford (2012) for an opposing view

[7] See Krishnamurthy and Vissing-Jørgensen (2011) for an articulation of this view.

[8] See Chung and others (2012).

Naturally, all models rely on a host of assumptions, so the true effect could be larger or smaller than what comes out of the FRB/US model. But I will focus on two sources of uncertainty in particular. A first uncertainty relates to a point raised earlier – that a given impact on Treasury bonds may not pass through fully to other rates that are more relevant for consumption and investment decisions, such as corporate bond rates or primary mortgage market rates. The recent academic literature seems divided on this point, as some papers argue that the pass-through is near 100 percent while others claim that it is quite low.[9] My own reading of the evidence is that, thus far, there has been substantial pass-through from LSAPs to corporate bonds and mortgages, and some, but considerably less, to other, more distant asset categories like equities.

Leaving aside this set of complications – so that we suppose our $500 billion LSAP has an impact of 20 basis points on corporate bond rates as well as on Treasury rates – there is a second, perhaps more fundamental, issue. How should one expect a company to respond when its long-term borrowing costs fall not because of a change in the expected future path of short-term rates, but because of a change in the term premium? As noted earlier, many macro models – like the Fed's FRB/US model – treat the two sorts of shocks as having similar effects. But is there any reason to believe that, in reality, the response to the two might differ?

A basic corporate-finance analysis suggests the answer may be yes. To see why, consider the following example. A risk-neutral firm faces a rate on its 10-year bonds of 2 percent. At the same time, it expects that the sequence of rolled-over short-term rates over the next 10 years will average 3 percent. Hence, there is a term premium of minus 1 percent. What should the firm do? Clearly, it should take advantage of the cheap long-term debt by issuing bonds. But it is less obvious that the bargain 2 percent rate on these bonds should exert any influence on its capital spending plans. After all, it can take the proceeds of the bond issue and use these to pay down short-term debt, repurchase stock, or buy short-term securities. These capital-structure adjustments all yield an effective return of 3 percent. As a result, the hurdle rate for new investment should remain pinned at 3 percent. In other words, the negative term premium matters a lot for financing behavior, but in this stylized world, investment spending is decoupled from the term premium and is determined instead by the expected future path of short rates.[10]

This reasoning suggests why one might expect future rounds of LSAPs to have diminishing returns. As noted earlier, the data make clear that past rounds of LSAPs have pushed down interest rates and term premiums. But the further the term premium is driven into negative territory, the more the previous logic comes into play, and hence the weaker is likely to be the response of aggregate spending to further downward pressure on long-term rates.[11]

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[9] Papers that examine the pass-through issue include Gagnon and others (2011), Wright (2011), Krishnamurthy and Vissing-Jørgensen (2011), Swanson (2011), and Hancock and Passmore (2011). Primary mortgage rates, of course, are distinct from secondary-market rates for assets traded in centralized markets. A variety of factors affect the wedge between the secondary MBS rate and the primary mortgage rate, and these factors, and hence the degree of pass-through, may vary over time.

[10] See Kiley (2012) for a recent model that predicts a differential reaction of spending to changes in term premiums versus changes in the future path of short rates. A similar set of issues arises in thinking about how firms should respond to "nonfundamental" movements in their stock prices – movements that are not driven by changes in expected future cash flows. See, for example, Baker, Stein, and Wurgler (2003).

[11] If the term premium starts out significantly positive, so that long-term rates are well above expected future short rates, an initial reduction may indeed spur further investment among financially constrained firms who need to issue long-term bonds to fund new investment. However, once the term premium becomes negative, we hit a corner where the financial constraint no longer binds and the relevant opportunity cost becomes the option to invest in short-term securities or repurchase shares. Baker, Stein, and Wurgler (2003) model an analogous diminishing-returns effect for stock prices and corporate investment.

The corporate-finance example is also consistent with what we have observed in markets in recent months. Issuance of both investment-grade and high-yield bonds has been robust. Indeed, domestic nonfinancial corporate bond issuance is on pace to set a record in 2012, and the speculative-grade segment may also register a new high for the year. At the same time, a large fraction of issuance has been devoted to refinancing – either to retiring existing debt or to payouts to equity holders via dividends and share buybacks. These uses of proceeds have accounted for about two-thirds of all issuance by speculative-grade firms so far this year. Such patterns are what one would expect in a world of segmented markets and negative term premiums.[12]

This caveat about the diminishing effectiveness of LSAPs can be thought of as a specific version of Goodhart's law.[13] It may be that under normal circumstances, changes in 10-year rates have significant explanatory power for economic activity, perhaps because they are a proxy for the expected future path of short rates or other aspects of financial conditions. But it doesn't follow that when one sets out to influence the 10-year rate directly, via asset purchases – without changing the future path of short rates – the usual historical relationships will continue to apply.

While we should acknowledge these doubts, it is important to keep them in perspective. In addition to lowering interest rates, LSAPs also boost equity prices and other asset values. Taken together, these effects of LSAPs seem likely to be meaningful, even if the benefits of an impetus to rates are less than in the baseline scenario sketched earlier. And to be sure, there is a wide confidence interval around any estimate we might make of the benefits.

Moreover, it is worth repeating a point made earlier: whatever direct hydraulic effects LSAPs create by pushing down term premiums and discount rates, their overall impact may be reinforced via a signaling effect, whereby they enhance the credibility of our forward guidance about the future path of the federal funds rate. Indeed, this signaling benefit strikes me as an important part of the argument in favor of LSAPs in the current environment.

Let me turn now to the cost side of the equation. Several potential costs of LSAPs have been discussed. One is the exit problem – that a large balance sheet may make it harder for the FOMC to raise rates when the time comes. Between the ability to pay interest on reserves, as well as various reserve-draining methods that the Fed has been methodically testing, I am confident that we have the tools to raise rates. If the FOMC needs to act in the face of an emerging threat to price stability, there is little doubt in my mind that we *can*. As to whether we *will*, the Federal Reserve has repeatedly made clear its commitment to both sides of its mandate – to price stability as well as to maximum employment.

A second set of costs has to do with the possible effects of further asset purchases on various aspects of market functioning, including bid-ask spreads and market depth. And it would indeed be a concern if large Fed ownership of some segments of the Treasury or MBS market were to cause market liquidity to deteriorate significantly. We have seen little evidence of such problems so far, and we continue to closely monitor market conditions. If problems do begin to crop up, we will know it, and we will be able to adjust.

A final notion of cost relates to the currently low yields and term premiums on Treasury bonds. At an intuitive level, one might think that, for the Fed, as for any other buyer contemplating a large asset purchase, information on prices and expected returns should be a relevant factor in the decision. Said differently, the case for an LSAP might seem more

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[12] As borrowing costs have fallen, Federal Reserve staff estimates of the expected return on the stock market (using a model based on analysts' earnings expectations) remain near historic highs. It is this divergence in the costs of debt and equity that is likely to make debt-financed repurchases of equity attractive.

[13] Goodhart's original formulation is that "Any observed statistical regularity will tend to collapse once pressure is placed on it for control purposes." See Goodhart (1975).

appealing if the term premium on Treasury bonds were at plus 200 basis points instead of its current level of roughly minus 80 basis points.

However, to make sense of this intuition, we have to return to the question of *why* LSAPs move term premiums. One interesting possibility is that, in a world where other sovereign debt has come into question, long-term Treasury securities are uniquely able to provide a money-like safe-haven service to certain investors. By analogy, think of currency, which investors are willing to hold even at a zero yield, because of the flow of convenience services it provides. Similarly, the negative term premium on long-term Treasury securities may in part reflect the relative scarcity of this money-like asset. If so, it would be economically costly to remove Treasury securities from the system.[14] This logic is an application of the so-called Friedman rule.[15]

So a key question is to what extent removing long-term Treasury securities is like removing currency. This question is hard to answer precisely and depends on the details of how you tell the story. If you believe that only nominal Treasury securities – but not something similar, such as agency securities or AAA-rated corporate bonds – provide money-like services to investors, you can try to measure the value of these services by looking at the spread on Treasury securities relative to something else that is very safe but not literally a Treasury bond – for example, corporate bonds coupled with credit default swap protection to minimize the credit risk. Arvind Krishnamurthy and Annette Vissing-Jørgensen of Northwestern University take this approach and conclude that between 24 and 70 basis points of the yield premium on Treasury securities is attributable to a "money-ness" effect.[16] Numbers in this ballpark suggest that the costs of further LSAPs on this dimension are likely to be modest relative to even a conservative estimate of their potential benefits.

However, a couple of caveats are worth noting. First, this methodology may only provide a lower bound on the welfare costs of an LSAP, as it is plausible that not just Treasury securities, but also agency securities and perhaps highly rated corporate bonds, also have some degree of money-ness to them in terms of being useful in satisfying safe-haven demands. In this case, a spread of the sort just described may underestimate the value of monetary services provided by safe and near-safe assets. This area is one where both our conceptual understanding and our measurement techniques remain underdeveloped and where more work would be of great value in informing policy.

Second, things can change over time. One episode of interest is the Clinton-era debt buyback program, which was in many ways analogous to an LSAP. Between March 2000 and December 2001, the Treasury repurchased long-term bonds with a face value of $63.5 billion, about 10 percent of the value of long-term government debt then outstanding. Much as with an LSAP, this program appears to have had a powerful negative effect on the term premium, with long-term rates falling sharply relative to short-term rates.[17] But in contrast to what we have seen with LSAPs thus far, it was also associated with a

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[14] To be clear, this argument relies on there being multiple distinct monetary assets. That is, the case needs to be that, for some investors, long-term Treasury securities provide a type of service that is not provided as effectively by short-term bills or reserves. If all safe assets provide the same kind of monetary services, then an LSAP that swaps reserves for long-term bonds has no effect on the net supply of monetary assets. See also Woodford (2012) and Krishnamurthy and Vissing-Jørgensen (2012).

[15] Friedman (1969) famously argued that a socially efficient outcome involves setting the opportunity cost to investors of holding money equal to the marginal cost to the government of creating additional money.

[16] Krishnamurthy and Vissing-Jørgensen's (2012) analysis is based on market quotes from July 20, 2012. One obtains similar estimates if their methodology is updated to the present. However, it is important to emphasize that spreads of the sort they study can be subject to a variety of other idiosyncratic influences, so care must be taken not to over-interpret any one of them.

[17] See Greenwood and Vayanos (2010) for an analysis of the Clinton buyback program and its effect on the Treasury yield curve.

pronounced increase in Treasury-specific scarcity. One way this scarcity manifested in the data available at the time was in a widening of the Treasury-swap spread, which rose rapidly after the announcement of the buybacks, and hovered in a range of 120 to 130 basis points in the spring and summer of 2000.[18] The lesson to be drawn is that we should continue to develop and monitor a variety of metrics of this scarcity phenomenon because they may provide an early warning if LSAP costs begin to rise relative to benefits.

For the sake of concreteness, I have couched the discussion in terms of a hypothetical all-Treasury LSAP. In light of our recent initiation of an MBS purchase program, it is natural to ask what the salient differences are between buying Treasury securities and buying MBS. In my view there are two, both of which suggest that MBS purchases may offer a better cost-benefit profile than Treasury purchases in the current environment. First, on the cost side, I have just alluded to the idea that Treasury securities may provide money-like services to certain investors, such that removing them from the system may entail a welfare cost. Presumably, MBS are less money-like than Treasury securities, so this element of cost could be reduced when buying MBS.[19] Second, if the efficacy of Treasury purchases is diminished by the fact that many corporate borrowers already have plentiful access to low-cost funds, it is natural to focus on a sector that is more sensitive to financing costs. The housing market would seem to fit this bill. To the extent that markets are segmented and MBS purchases therefore have a more powerful effect on primary mortgage rates than do Treasury purchases, this possibility may be another appeal of going the MBS route.

Finally, let me touch on the implications of LSAPs for financial stability. Some observers have argued that a long period of low rates can create incentives among market participants (such as banks, insurance companies, and pension funds) to reach for yield by taking on higher levels of risk with adverse consequences for stability. These concerns should be taken very seriously, and a lot of work at the Fed is devoted to monitoring such risks. A short summary would be that there is some qualitative evidence of reaching-for-yield behavior in certain segments of the market, but that we are not seeing anything quantitatively alarming at this point. Of course, the worry is that one often sees only the tip of the iceberg in these kinds of situations, so one needs to be cautious in interpreting the data.

Taking as a given that reaching for yield could be a problem, what are the implications at the margin for monetary policy, and for LSAPs in particular? First, it is just a fact of life that we are likely to be in a low-rate environment for a considerable period of time, in light of the economic outlook. It is not a choice at the margin. While we are going to have to pay careful attention to the attendant financial stability issues and be prepared to intervene with supervisory and regulatory tools as needed, I would find it hard to accept the proposition that we should preemptively resolve them by, say, starting to raise the federal funds rate today. The potential damage that could be caused by choking off the recovery is too great.

Second, one can argue that, by reducing term premiums, LSAPs in particular have potentially significant benefits in terms of financial stability. A major source of problems during the recent crisis was the excessive maturity transformation undertaken by financial firms. Put simply, these firms were relying too much on short-term debt. One of the thrusts of regulatory reform has been to attack this problem – for example, via the constructs of the Liquidity Coverage Ratio and the Net Stable Funding Ratio that are a part of Basel III. However, a complementary way to deal with the problem is to influence the underlying incentives for short-term debt issuance. And these incentives are in turn shaped by the structure of rates and term premiums in the market.

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[18] One important distinction is that in the case of the Clinton-era buybacks, bond prices were likely influenced not simply by the bond purchases themselves, but by the prospect of future surpluses over a longer horizon.

[19] This argument is made by Krishnamurthy and Vissing-Jørgensen (2012). One natural reason why MBS may be less money-like than Treasury securities is their exposure to prepayment risk.

As I noted earlier, a natural response for any firm facing an unusually low term premium is to adjust its capital structure by issuing cheap long-term debt to replace its shorter-term debt. It is therefore not surprising that the average debt maturity of large nonfinancial firms has increased notably over the past few years. Moreover, the same pattern shows up among large financial firms – they too have been significantly lengthening their average debt maturity.[20]

The current cheapness of long-term debt contrasts with the pre-crisis configuration, where there was frequently a pronounced premium favoring issuers not at the long end of the yield curve, but at the very short end. In other words, the fact that the yield curve often tended to be steeply upwards sloping at the front end gave financial firms a strong incentive to issue overnight paper. The bottom line is that I suspect that LSAPs have, by changing the structure of term premiums in the market, helped encourage an extension of debt maturity by both financial and nonfinancial firms. All else being equal, this development is a good thing from a financial stability perspective.[21]

To conclude, I believe that our recently announced policy of MBS purchases, coupled with the change in our forward guidance, are strong positive steps. I am hopeful that these actions by the Federal Reserve will help to give economic growth a much needed boost. At the same time, I am keenly aware of the many uncertainties we still have about the workings of nonconventional policies, and of LSAPs in particular. As I have tried to explain, LSAPs really are a different animal, and it is important for us to try to better understand these differences, and to do our best to take them into account when making policy judgments. In short, there is a lot left for us to learn. Thank you very much.

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[20] These statements are based on an analysis of Compustat data, updating the results of Custódio, Ferreira, and Laureano (forthcoming). Greenwood, Hanson, and Stein (2010) show that the following is a general tendency in historical U.S. data: When government debt maturity is low, expected returns (that is, term premiums) on long-term bonds are low as well, and private firms fill in the gaps by lengthening their own debt maturity.

[21] Greenwood, Hanson, and Stein (2012) make a similar argument in the context of Treasury debt maturity, and its potential effect on financial stability goals.

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