

Jeremy C Stein: Research on the monetary transmission mechanism

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Let me start by thanking the organizers for including me in this event. It’s a great pleasure to be here with other old friends and colleagues to pay tribute to Raghu, and to congratulate him not only on winning the Deutsche Bank prize for Financial Economics, but also on his new job as governor of the Reserve Bank of India. It’s an understatement to say that Raghu has a few challenges on his hands in this new role, but having known him for more than 20 years, I can’t imagine anybody being better equipped – in terms of intellect, judgment, and strength of character – to handle these challenges.

I would like to talk briefly about some recent research of mine, done jointly with Sam Hanson of Harvard Business School, on the monetary transmission mechanism.¹ As will become clear, our work is heavily influenced by some of Raghu’s earlier writing, and in particular his famous 2005 Jackson Hole paper.² After describing what we find, I will try to draw some connections to the current monetary policy environment as well as some lessons about the interplay of monetary policy and financial stability. As always, I am speaking for myself, and my views are not necessarily shared by other members of the Federal Open Market Committee (FOMC).

In our paper, Sam and I begin by documenting the following fact about the working of conventional monetary policy: Changes in the stance of policy have surprisingly strong effects on very distant forward *real* interest rates. Concretely, over a sample period from 1999 to 2012, a 100 basis point increase in the 2-year nominal yield on FOMC announcement day – which we take as a proxy for a change in the expected path of the federal funds rate over the following several quarters – is associated with a 42 basis point increase in the 10-year forward overnight *real* rate, extracted from the yield curve for Treasury inflation-protected securities (TIPS).³

On the one hand, this finding is at odds with standard New Keynesian macro models, in which the central bank’s ability to influence real variables stems from goods prices that are sticky in nominal terms. In such models, a change in monetary policy should have no effect on forward real rates at a horizon longer than that over which all prices can adjust, and it seems implausible that this horizon could be on the order of 10 years. On the other hand, the result suggests that monetary policy may have more kick than is implied by the standard model, precisely because long-term real rates are the ones that are most likely to matter for a variety of investment decisions.

¹ See Samuel G. Hanson and Jeremy C. Stein (2012), “[Monetary Policy and Long-Term Real Rates \(PDF\)](#),” Finance and Economics Discussion Series 2012–46 (Washington: Board of Governors of the Federal Reserve System, July).

² See Raghuram G. Rajan (2005), “[Has Financial Development Made the World Riskier? \(PDF\)](#)” in *The Greenspan Era: Lessons for the Future, A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 25–27, 2005* (Kansas City: Federal Reserve Bank of Kansas City), pp. 313–69.

³ Our findings can be illustrated with the events of January 25, 2012. On that date the FOMC changed its forward guidance, indicating that it expected to hold the federal funds rate near zero “through late 2014,” whereas it had previously only stated that it expected to do so “through mid-2013.” In response to this announcement, the expected path of short-term nominal rates fell significantly from two to five years out, with the 2-year nominal yield dropping 5 basis points and the 5-year nominal yield falling 14 basis points. More strikingly, 10-year and 20-year *real* forward rates declined by 5 basis points and 9 basis points, respectively.

So what is going on? How, in a world of eventually flexible goods prices, is monetary policy able to exert such a powerful influence on long-term real rates? A first clue is that the movements in distant forward real rates that we document appear to reflect changes in term premiums, as opposed to changes in expectations about short-term real rates far into the future. Said differently, if the Fed eases policy today and yields on long-term TIPs go down, this does not mean that the real short rate is expected to be lower 10 years from now – but rather that TIPs have gotten more expensive *relative* to the expected future path of short rates. These changes in term premiums then appear to reverse themselves over the following 6 to 12 months.

This observation then raises the question of *why* monetary policy might be able to influence real term premiums. Here is where we draw our inspiration from Raghu’s work, in particular his hypothesis that low nominal interest rates can create incentives for certain types of investors to take added risk in an effort to “reach for yield.” While an emerging body of empirical research investigates this hypothesis in the context of credit risk – documenting that banks tend to make riskier loans when rates are low – our focus is instead on the implications of the reach-for-yield mechanism on the pricing of interest rate risk, also known as duration risk.⁴

The theory we sketch involves a set of “yield-oriented” investors. We assume that these investors allocate their portfolios between short- and long-term Treasury bonds and, in doing so, put some weight not just on expected holding-period returns, but also on current income. This preference for current yield could be due to agency or accounting considerations that lead these investors to care about short-term measures of reported performance. A reduction in short-term nominal rates leads them to rebalance their portfolios toward longer-term bonds in an effort to keep their overall yield from declining too much. This, in turn, creates buying pressure that raises the price of the long-term bonds and hence lowers long-term yields and forward rates.

Thus, according to this theory, an easing of monetary policy affects long-term real rates not via the usual expectations channel, but rather via what might be termed a “recruitment” channel – by causing an outward shift in the demand curve of yield-oriented investors, thereby inducing these investors to take on more interest rate risk and to push down term premiums.

To provide some evidence that bears on the theory, we look at the maturity of securities held by commercial banks. Banks fit with our conception of yield-oriented investors to the extent that they care about their reported earnings – which, given bank accounting rules for available-for-sale securities, are based on current income from securities holdings and not mark-to-market changes in value. And, indeed, we find that when the yield curve steepens, banks increase the maturity of their securities holdings. Moreover, the magnitudes of these portfolio shifts are large in the aggregate, so that if they had to be absorbed by other, less yield-oriented investors, the shifts could plausibly drive changes in marketwide term premiums. We also find that primary dealers in the Treasury market – who, unlike banks, must mark their securities holdings to market – take the other side of the trade, *reducing* the maturity of their Treasury holdings when the yield curve steepens.⁵

Overall, I read this evidence as suggesting – albeit tentatively – that some mechanism involving yield-oriented investors may eventually turn out to be central to our understanding

⁴ The idea that banks take on more credit risk when rates are low is explored in, for example, Gabriel Jiménez, Steven Ongena, José-Luis Peydró, and Jesús Saurina (forthcoming), “[Hazardous Times for Monetary Policy: What Do 23 Million Bank Loans Say about the Effects of Monetary Policy on Credit Risk-Taking? \(PDF\)](#)” *Econometrica*.

⁵ Primary dealers are broker-dealer firms that serve as trading counterparties of the Federal Reserve Bank of New York in its implementation of monetary policy.

of how monetary policy works, both in ordinary and extraordinary times. When I say “central,” I mean that this mechanism may play a role not only in determining how monetary policy influences the pricing of credit risk, but also in how it shapes the real and nominal yield curves for credit-risk-free Treasury securities. Of course, much work remains to be done before statements like these can be made with any degree of confidence. But I think there is a promising research agenda here, and one that owes much to Raghu’s insights.

With these observations in mind, let me now turn to the events of the past few months in the bond market. A brief summary goes as follows: Long-term real and nominal rates and term premiums in the United States were very low as of early May, with the 10-year Treasury yield bottoming out at 1.63 percent at the beginning of the month, with an associated term premium estimated to be on the order of negative 0.80 percent.⁶ The 10-year TIPS yield reached negative 0.72 percent around the same time.⁷ However, following Chairman Bernanke’s May 22 testimony to the Joint Economic Committee and after our June 18–19 FOMC meeting, yields rose sharply, with the nominal and real 10-year rates reaching 2.61 percent and 0.60 percent, respectively, as of June 25.⁸

In the absence of a significant shift in policy fundamentals, a number of observers have highlighted the role of a variety of market dynamics in driving the observed changes in yields. These factors include the unwinding of carry trades, tightening of risk limits in the face of higher volatility, convexity hedging by holders of mortgage-backed securities, and large outflows from bond funds. I believe these factors to have been important collectively, although it is difficult to say how much of an effect is due to any one of them.

However, beyond trying to understand the market dynamics that drove changes in rates over the period from May through June, it is also useful to ask a question about the starting levels: What explains why real and nominal rates were as low as they were at the beginning of May? Clearly, our accommodative policies – the combination of forward guidance and asset purchases – played an important role. But I want to draw a key distinction between two views of *how* our policies might have mattered. One view would be that the configuration of market rates in early May was largely a direct hydraulic outcome of our policies. For example, according to this view, a nominal 10-year yield of 1.63 percent in early May could be explained to a first approximation based on the expected path of the federal funds rate, plus a negative term premium that was itself primarily a function of the cumulative amount of duration that we were expected to remove from the market via our asset purchase program. Let’s call this the “direct Fed control” view.

An alternative hypothesis is that our policies were indeed responsible for the very low level of long-term rates, but in part through a more indirect channel. According to this view, real and nominal term premiums were low not just because we were buying long-term bonds, but because our policies induced an outward shift in the demand curve of other investors, which led them to do more buying on our behalf – because we both gave them an incentive to reach for yield, and at the same time provided a set of implicit assurances that tamped down volatility and made it feel safer to lever aggressively in pursuit of that extra yield. In the spirit of my earlier comments, let’s call this the “Fed recruitment” view.

⁶ The 10-year nominal rate hit 1.63 percent on May 2, 2013. The Kim-Wright term premium was estimated to be negative 0.78 percent on this day. (For more information on the term premium, see Don H. Kim and Jonathan H. Wright (2005), [“An Arbitrage-Free Three-Factor Term Structure Model and the Recent Behavior of Long-Term Yields and Distant-Horizon Forward Rates \(PDF\)”](#), Finance and Economics Discussion Series 2005–33 (Washington: Board of Governors of the Federal Reserve System, August).

⁷ The 10-year real rate hit negative 0.72 percent on April 26, 2013.

⁸ See Ben S. Bernanke (2013), [“The Economic Outlook”](#), statement before the Joint Economic Committee, U.S. Congress, May 22; and Board of Governors of the Federal Reserve System (2013), [“Federal Reserve Issues FOMC Statement”](#), press release, June 19.

I take the events of the past few months to be evidence in favor of the recruitment view. And, to be clear, I don't mean this as a criticism of the set of policies that we have in place. Quite to the contrary – it can be useful to enlist help when you have a big job to do. Indeed, my whole point in talking about the research I described earlier was to underscore my belief that something like this investor-recruitment mechanism is central to how monetary policy acquires much of its traction over the real economy even in ordinary times. Of course, the magnitude of the effect – the extent of downward pressure that we may have been inducing other investors to apply to the term premium--is likely to have been more noteworthy given the unprecedented scope of our overall monetary accommodation. But in an important sense, this effect is just a powered-up version of what makes garden-variety monetary policy work.

Again, the existence of this recruitment channel is helpful; without it, I suspect that our policies would have considerably less potency and, therefore, less ability to provide needed support to the real economy. At the same time, an understanding of this channel highlights the uncertainties that inevitably accompany it. If the Fed's control of long-term rates depends in substantial part on the induced buying and selling behavior of other investors, our grip on the steering wheel is not as tight as it otherwise might be. Even if we make only small changes to the policy parameters that we control directly, long-term rates can be substantially more volatile. And if we push the recruits very hard – as we arguably have over the past year or so – it is probably more likely that we are going to see a change in their behavior and hence a sharp movement in rates at some point. Thus, if it is a goal of policy to push term premiums far down into negative territory, one should be prepared to accept that this approach may bring with it an elevated conditional volatility of rates and spreads.

When we talk about the interplay of monetary policy and financial stability, I think that this kind of tradeoff is an important part of what we should be bearing in mind. Indeed, maybe the term “financial stability” is a bit misleading, because the risk scenario that I am describing – and that may be among the most relevant when thinking about the costs and benefits of our current highly accommodative policies – need not be one that is so dramatic as to call into question the viability of any large financial firm or threaten an important part of the market's infrastructure. Rather, one scenario to be worried about may simply be a sharp increase in marketwide rates and spreads at an inopportune time, such that it becomes harder for us to achieve our dual-mandate objectives.

Having said all of this, I believe we are currently in a pretty good place with respect to the pricing of interest rate risk. The movement in Treasury rates that we have seen since early May has led to somewhat tighter financial conditions in certain sectors – most notably the mortgage market – but has also brought term premiums closer into line with historical norms, and thereby has arguably reduced the risk of a more damaging upward spike at some future date. On net, I believe the adjustment has been a healthy one.

Finally, let me say a few words about last week's FOMC meeting. I voted with the majority of the Committee to continue our asset purchase program at its current flow rate of \$85 billion per month. It was a close call for me, but I did so because I continue to support our efforts to create a highly accommodative monetary environment so as to help the recovery along by using both asset purchases and our threshold-based approach to forward guidance.

How should the pace of purchases evolve going forward? The Chairman laid out a framework for winding down purchases in his June press conference.⁹ Within that framework, I would have been comfortable with the FOMC's beginning to taper its asset purchases at the September meeting. But whether we start in September or a bit later is not in itself the key issue – the difference in the overall amount of securities we buy will be modest. What is much more important is doing everything we can to ensure that this difficult transition is

⁹ Information on the Chairman's June 19, 2013, [press conference](#) is available on the Board's website.

implemented in as transparent and predictable a manner as possible. On this front, I think it is safe to say that there may be room for improvement.

Achieving the desired transparency and predictability doesn't require that the wind-down happen in a way that is independent of incoming data. But I do think that, at this stage of the asset purchase program, there would be a great deal of merit in trying to find a way to make the link to observable data as mechanical as possible. For this reason, my personal preference would be to make future step-downs a completely deterministic function of a labor market indicator, such as the unemployment rate or cumulative payroll growth over some period. For example, one could cut monthly purchases by a set amount for each further 10 basis point decline in the unemployment rate.¹⁰ Obviously the unemployment rate is not a perfect summary statistic for our labor market objectives, but I believe that this approach would help to reduce uncertainty about our reaction function and the attendant market volatility. Moreover, we would still retain the flexibility to respond to other contingencies (such as declines in labor force participation) via our other more conventional policy tool – namely, the path of short-term rates.

Thank you very much. I look forward to your questions.

¹⁰ To be clear, I am sketching out a broad concept, and many details would need to be filled in to make it operational – such as, what to do if the unemployment rate falls in one month and then later rises.