# General Discussion: Monetary Policy and Stock Market Booms

*Chair: Susan M. Collins*

***Mr. DeGregorio:*** I like the paper. It is very original. But the assumption about the increase in asset prices is somewhat unrealistic because, according to what Larry said, in this model, everything is in the minds of consumers. But, at the end, nothing happens. Therefore, optimal policy is to try to make it so that effectively nothing happens. You have to follow a monetary policy rule just by looking at asset prices and do fiscal policy along those lines. But monetary policy is set in a world with much uncertainty. In the 200 years of analyzing stock prices, a lot of things have happened. So, the issue is not to think all stock market booms are unfounded and just in the minds of consumers.

***Mr. Kohn:*** My comment follows on the previous one. Larry, I wondered what would happen when you confronted the model with a situation in which the stock market boom was partly a reaction to a real phenomenon. So, I was thinking about the late 1990s as you were talking, and you had a situation there in which you had a stock market boom. But you also had a technologically driven increase in the rate of growth of productivity.

One, under those circumstances, the authorities figuring out what is real and what isn't is practically impossible. Two, it seems to me a rise in interest rates is not likely to cut off the boom because investors

have a real reason to think profits will be higher later, but they can still get carried away with their expectations when the expectations change.

In 1999, we raised rates and nothing happened. The stock market kept picking up speed as we raised rates in 1999. If there is a subsequent crash, it will happen in your model from a lower inflation rate. So, we will have a recession started from a lower inflation rate, which must have implications for the ability to deal with that recession and the possibility of nonlinearities around deflation and what not.

***Mr. Blinder:*** First, I wanted to align myself with the very nice presentation by John Geanakoplos, which had a lot of truth in it, including probably the parts he didn't explain.

Second, just a technical question for Larry. In this class of model, why doesn't a future boom get people deciding to work later when productivity is going to be higher—as you see in a lot of these models? If they believe that, you don't get a boom at all in terms of employment. I didn't quite catch that.

The main point I want to call your attention to is something you may know about. Many, many years ago, I think in the early 1970s, Franco Modigliani and Richard Cohn wrote a paper about why inflation is bad for the stock market—which turns the causation the other way around, from low inflation to a good stock market. Their argument had to do with money illusion and improper discounting, which is not allowed in your class of rational model, but I might suggest it as an alternative.

***Mr. Fraga:*** This is a quick question for John. I see the facts of a boom being described by lower margin requirements and haircuts. You didn't have time to cover this in your presentation, so maybe you could tell us why you think these numbers go down so much. I have some macro reasons, but I don't have time for that either.

***Mr. Shirakawa:*** I see Japan is cited very often, so I feel obliged to say something. Let me offer my observation. I was working for the monetary policy department in the late 1980s as a middle staffer in the monetary policy department. Although Larry's model is very simple, it seems his model captures the psychology of the Japanese people, the

economic situation, and the problems the Japanese policymakers faced at that time. As you said, we were experiencing a stock market boom. We were experiencing a real estate boom. Also, credit was increasing at a rapid pace as the investment boom was occurring.

All these data point to the need for monetary tightening, except one critical data—that is, the inflation rate. Actually, the inflation rate number was a bit negative or almost zero. So, when the Bank of Japan tried to raise the short-term rate, we were faced with the standard argument against early hikes of the interest rates. But, in retrospect, the expectations that the very low interest rate would continue into the future helped foster the environment in which credit and leverage was increasing. That is why I think your model best captures the situation at that time.

This episode raises a question about the relevancy of inflation targeting. A possible shortcoming with inflation targeting could be solved by adopting the flexible inflation targeting. But, people tend to look at the economy through the lens of inflation. This could have some bias. So central bankers are faced with how to solve this kind of psychology of framing, so to speak.

***Mr. Musalem:*** I'd like to echo the remarks made earlier. Out of the 18 stock market booms in the last 200 years, surely some were real—meaning, prompted by real productivity gains. So, the model seems a little one-sided, even though I really enjoyed it.

The question I wanted to ask is, Bringing that to today, today we have credit growth which is low; we have an equity market which is performing badly; and some people have expectations of a negative supply shock because of labor mismatching and higher non-accelerating inflation rate of unemployment (NAIRU). What would the model suggest for monetary policy today, given the diametrically opposed conditions hold?

***Mr. Carstens:*** About the leverage cycle comments and what to do about them: There is a recommendation that might just backfire, which is the idea of stopping foreclosures and writing down principal. This policy suggestion for sure would generate major moral hazard. Even though we have here Mike Mussa and I

remember the optimal amount of moral hazard, it just might make things worse. This is a policy recommendation that needs to be weighted very carefully. It is very hard to apply it across the board.

***Mr. O'Brien:*** A couple of questions for John. Do we have a good positive theory of what the right leverage should be in the economy so we can actually guide policy? What about the practicalities?

The financial system is pretty clever about getting around changes in regulation. Even if we regulate financial leverage, leverage can migrate into balance sheets and operating leverage. Companies could just gear up and achieve leverage that way. You see, that is actually the benefit of credit. Even if it is not the ideal instrument for the central bank to use, it is pretty easy to measure and ultimately maybe a better tool for the central bank to use to track this sort of stuff.

***Mr. Sinai:*** The work is motivated by inflation targeting. Our Fed has had a dual mandate for decades now. And, for more than 200 years, I am not sure there was any inflation targeting central banks operated on. So, how do you square what you derived from the model with the facts of life as you present them on low-inflation stock market booms and then go from that to a policy conclusion that is somewhat critical of the Fed creating the bubbles and booms? I can't quite get the squaring of that, and it leads me to ask a question about the relevance of the model motivated in the way it was.

***Mr. Collins:*** I just had a follow-up comment about the practicality of regulating leverage and whether you'd really thought about the mechanics of that in terms of the ability of the current regulatory environment to do what you're talking about, not just through the banking system, but through the securities markets and the enormity of that challenge as a policymaker.

***Mr. Geanakoplos:*** One of the questions I addressed in my presentation was, Why did leverage get so high in this crisis? There are a bunch of reasons. One is a prolonged period of low volatility. Secondly, securitization was a huge way of increasing leverage. In fact, just the whole idea of securitization was founded on increasing leverage. Part of it was a regulatory arbitrage. You can take a bunch of stuff that you had to put down a lot of regulatory capital to own, and

you cut it up into a bunch of pieces that add up to the same thing and the banks can buy the individual pieces and leverage them more. And, in total, they could put less money down on all the pieces than they would have had to put down on the original pool. So securitization, by the way, by breaking into tranches is also… there are many ways securitization increased leverage and I don't have time to talk about it. The government, of course, with its implicit guarantees allowed people to leverage much more—notably, Fannie Mae and Freddie Mac. And then the irrationality part of it: Low interest rates and global imbalances, everybody says, "Well, that's what caused the crisis." But, when you get a little bit further, how did it cause the crisis? It got people to leverage more. There is a missing step. They say global imbalances lowered interest rates—why is that so terrible? Because people seeking yield leveraged more. Also, people hid leverage better. Those are reasons leverage went up so much more.

Now, writing down principal causing moral hazard? It causes less moral hazard! Our current policy, which is once you stop paying, the government comes in and says, "Let's see if we can help you by lowering your interest payments if you show they are too high." That's a moral hazard. If you write down the principal *before* the guy has defaulted, that doesn't cause moral hazard. If you look at Chart 6, defaults are extremely sensitive to how far underwater you are. So, you can tell who is going to default. Two years ago, we knew who the people were—the subprime people—who were going to default. They were the ones who were furthest underwater. You write down the principal before they've defaulted, and you save the lender money. The government doesn't have to pay anything. The lender should be forced to do the write-downs. In fact, the lenders would want to do the write-downs, if they could get together, but they are all different bondholders and they can't communicate. That is why they haven't written it down themselves. So, the government should have stepped in and facilitated that communication to write down the principal, but they didn't do it.

The right level of leverage? If you keep track of all the loan-to-value ratios of all these securities and you see them suddenly going up, at the same time their prices are going up, you are going to be able to

tell if that leverage is skyrocketing and something wrong has happened. How does the Fed figure out what interest rate to set? We just found out the rule they've been using for 30 years makes no sense and gives you bubbles. So, if they don't know what interest rate to set, why worry they can't figure out what leverage to set?

***Mr. Christiano:*** Thank you very much, John, for your comments and for all the other comments. I won't be able to respond to everything. I wanted to say a couple of things first. I want to clarify something. When I started talking about this particular issue about the interaction between inflation targeting and stock markets, I did *not* mean to suggest that's the only, or even most important, topic now facing us.

I do agree regulation and issues about whether leverage is naturally wrong, if you wait for the economy to produce its own leverage ratios, are very, very important issues. Personally, I would probably rank them ahead of the one I'm talking about. The one I'm talking about is relevant and interesting, and one can say something about it because of the historical data. That's why I chose to talk about it.

Let me react to a couple of people. Maybe Don Kohn's remarks might be a place to start. I'm sometimes accused of writing complicated papers where no one can figure out what's going on, where there are 15,000 different things going on. The idea with this paper is to try to make it simple. I tried to focus specifically on this worry that a part of stock market booms is floating on thin air on expectations about the future. I tried to address the idea that inflation targeting might be able to take the steam out of that part of the stock market boom.

The story is going to be a lot more complicated if we have some actual productivity growth going on at the same time. But it will always still be true, particularly with these models I work with. They linearly add up. It will always still be true the part riding on hopes and expectations will be overstimulated by an inflation-targeting rule. That fact would have been complicated if I had merged everything together.

By the way, you raised the question that it looked like things were on the ground happening in the 1990s. I want to remind you of one little thing, which is the analysis here suggests it is really tough to

determine whether things are happening on the ground or not. In my own simulation, labor productivity was rising a lot.

One response I wanted to make to John Geanakoplos. There is a clarifying point. I may not have made this clear enough in the paper. The simulations with credit growth in the model involve a model where credit is essential. It involves a version of the model that incorporates the Bernanke, Gertler and Gilchrist financial frictions, and credit is essential in that model, and leverage is endogenous and moving around all over the place.

Now, net leverage is never inappropriate in that model. With limited liability, the vague promise of a bailout, and so on, then leverage can get out of whack in a private economy. That is the way it is in the United States, and that is why regulation is a very important topic. But I want to emphasize the final conclusion that maybe credit growth could help and the conclusions about these stock market booms are all done in a version of the model that has financial frictions in it.

On Alan Blinder's question about why people work harder in this thing, in the actual equilibrium, most of what is happening is because of the blast coming from the monetary authority. The reason why they are working harder is basically because we have an expansionary monetary policy. Interest rates should be high, but it's actually going down in the wrong direction.

However, even in the efficient equilibrium, employment is taking off. Perhaps your question had to do with that. Well, in the efficient equilibrium, the promise that things are going to be better in the future *means* there is going to be a lot more investment in the future because ex ante you don't know this is not going to happen. In the model, it is the case the efficient way to get ready for an investment boom in the future is to start gearing up now. It is like a presentation; the efficient way to prepare a presentation for this audience is not to start the night before, but to start a little bit of time in advance. That is built into the model. You know you are going to be doing a lot of investment in the future. And, through various mechanisms in the model, you get the outcome that it is desirable to get more

investment in the present. That is part of the story about what leads, then, to a rise in employment during the boom.

There were some questions about the relevance of the 19th century data because we were under a gold standard a lot of the time, although we went off the gold standard during the Civil War—but I dropped the Civil War from the database. What I want to emphasize is what we're concluding from this is there is a surprising correlation between inflation and stock market booms that spans lots and lots of different monetary policies.

Actually, I was quite persuaded by John Taylor's argument he made a few years ago that *all* policy at all times is actually a Taylor rule, even the gold standard. Under the gold standard, it looks a lot like a Taylor rule. You have high prospective inflation under a gold standard. If you have high prospective prices in your country under the gold standard, what you will get is outflows of gold because you will run a current account deficit—outflows of gold. That will cause a shortage of specie in the country and raise interest rates. So, a gold standard operates a lot like a Taylor rule.

The coefficients are not 1.5 and 0.5. But what I want to stress here is I can avoid this kind of discussion because what I am trying to stress is, if we look at data, we don't see evidence inflation takes off in stock market booms. At most, we see evidence inflation goes down a little bit. Now, I agree a lot of these booms probably involved real things. But remember, every single boom I looked at in the 19th century ended in a crash and panic. So, there must have been a big component, at least toward the end, that was riding on thin air.