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NEGATIVE INTEREST RATES: LESSONS LEARNED...SO FAR

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P R O C E E D I N G S

MR. WESSEL: Good morning and welcome. I'm David Wessel. I'm Director of the Hutchins Center on Fiscal and Monetary Policy here at Brookings.

Our mission is to improve the quality of fiscal and monetary policy and public understanding of it. We do this in a number of ways. I want to make a plug for a little computer game we've built on the federal budget problem in the United States called Fiscal Ship.org. And I have a feeling that even though this is a conversation today about monetary policy that we'll at some point find ourselves wondering into why are fiscal policymakers putting so much pressure on the monetary policymakers.

It really is an extraordinary moment in history, a time when we are consulting texts like Irving Fisher and John Maynard Keynes, "Debt Deflation and Liquidity Traps," texts written before World War II to make sense of our early 21 Century economic issues.

Our topic today, of course, is negative rates, lessons learned so far. According to Fitch, there are now $10 trillion worth of global sovereign debts trading at negative yields, really an extraordinary number.

The Wall Street Journal had a story a few months ago about a family in Denmark, Hans Peter Christensen, who had a mortgage and was getting 248 Danish Krone, about 38 US Dollars from the bank because he had a negative interest rate mortgage.

Now, the negative rate was 0.0562 percent. If you read well into the story, you discover somehow the bank had managed to charge fees, so he was actually still a net plus. But still it's pretty much a remarkable thing and something that most of never thought we'd see.

So today, we're going to ask a few questions. Do negative rates work? How do they work? Are negative rates an option for the U.S.? What is the role of fiscal policy at a time when interest rates are very low? In fact, is the problem not that negative rates but is a symptom of a bigger problem, a world economy with an excess of savings and a dearth of investment that has pushed equilibrium rates low?

And we're going to talk about, we're going to start this morning by talking about Europe. And I think during the day, Japan will come up, but we don't have anybody from Japan with us today.

The plan is that we have two presentations and two discussions, and then we'll, all the presenters in the discussions will come up here, and we'll have a conversation. Then we'll have a coffee break, and then we'll have another set of presentations.

So our opening presentation is by Signe Krogstrup, who is from the Swiss National Bank visiting here, and she'll be followed by Seth Carpenter, now at Rokos Capital Management, but formerly at the Fed and the Treasury who will respond.

And then we'll turn to Jean-Pierre Danthine, who is now at the Paris School of Economic, although from talking to him this morning, he seems to spend most of his life in airplanes. He's formerly at the Swiss National Bank, which, of course, is one of the big economies that has negative rates. And he'll be followed by Jamie McAndrews, now at the New York Fed.

So let's get started. Signe, do you want to come up here? I should mention this is being webcast. This is on the record. All the slides are already on our website, and enjoy yourself.

MS. KROGSTRUP: So thank you very much, David, for inviting me to talk at this very timely and important event on negative interest rates. I first have to do a disclaimer that the views that I express here today are my own, actually my own, and not those of the Swiss National Bank, not necessarily, at least.

So I get to open up this conference, and what I want to do is to give you all a broad introduction to the topic. I will do that through raising challenges, raising unanswered questions, giving you background.

And I'm going to do that based on the Geneva Report. This is the forthcoming Geneva Report. It's not out yet. I am coauthoring it this year with Lawrence Voll, Patrick Conahan, Joe Gangon and Torsten Slok, who is also here today.

So let me start. So what I'm going to do is first give you an overview of the background. Why is it that we are talking about negative interest rates in the first place? That, of course, has to do with the fact that we are much more frequently constrained by the zero bound or the lower bound on negative interest rates and how that concerns monetary policy.

I will than to the experiences with negative interest rates in five countries, and I'm going to finish up with some of what I think are the main challenges and unanswered questions when it comes to using negative interest rate as a monetary policy tool.

Okay. So starting with the background. It was previously considered really largely a theoretical curiosity that nominal interest rates would turn so low that it would constrain monetary policy options to respond to negative shots to the economy.

And that's really no longer the case. Nominal interest rates have dome down substantially also normal times. Nominal interest rates as I have put up here are equal to real interest rates plus inflation expectations according to Fisher type equation. And both of these components have come down substantially in the recent decades.

Neutral real interest rates have fallen. It has been a secular downward trend since the eighties for many reasons that are being heartedly debated. And inflation expectations have come down with actual inflation since the disinflationary policies of the eighties, and since the widespread introduction of negative, of inflation targeting in the nineties.

So both of these factors have resulted in nominal interest rates being much lower and much closer to their lower bound in normal times, and that has constrained monetary policy from reacting to strong shocks.

So the table that I have up here is supposed to illustrate how this frequency of the constraint of the lower bound has increased in the past decades. So this is a table with annual average policy rates in nine countries. And you don't have to be able to see the numbers. That's why I put colors in.

So we have these policy rates from 1980 and up to 2015. And all the cells that are yellow are policy rates that are on average below three percent. Cells that are pink are average policy rates that are below two percent. And cells that are read are average policy rates that are below, at or below one percent.

So as you can see, there was, the lower bound constraint on monetary policy basically was not there in the eighties. And if we go further back, we would find the same, we find the same. We did not have a constraint on monetary policy from these problems.

That changed in the mid-nineties, so the middle of the table here is more less the mid-nineties. We had the first incidents, the constraint of the lower bound. The prime example is Japan.

Arguably, more countries became constrained or getting close to becoming constrained on money policy in the early 2000s. Notably, the U.S. in 2001 that reduced the Federal Funds Rate to one percent in the very mind recess of 2001. That's the lower red dot down here.

And clearly since 2008, the lower bound constraint on monetary policy has been the norm rather than the exception. And there's no reason to think that this is just a feature of the current recession or aftermath of the recession. In fact, if real interest rates are going to continue their downward trend in the future, we might see a much more frequent incidence of the lower bound constraint.

So this unimportant problem, in the Geneva Report we estimate a very simple model for the U.S. in order to assess the costs of this problem. We assume in this model that the real, neutral real interest rate is one percent, and that inflation expectations are two percent.

And what we find is that when we have a model characterized, an economy characterized by this model, the nominal interest rate hits zero very often every time the unemployment rate exceeds the NIRU by 1.1 percentage point.

And if we go back in time for U.S. recessions, we find that that was the case in seven out of the eight last recessions in the U.S. That includes quite mild recessions meaning that going forward, if we have similar recessions even in the mild recessions all else equal, monetary policy in the U.S. is likely to hit the lower bound according to this model.

We have tried with different models and find very similar results. We also estimate counterfactuals of the severe recession in 2008, and that's what I have on the charts here. So we have a counterfactual where we assume that there is no lower bound on policy rates. And the upper panel in this figure shows the Federal Funds Rate from 2008 onwards. And the red dash line is the actual realization of the Federal Funds Rates, and the blue line is the counterfactual.

So we find that optimally, the Federal Funds Rate should have been reduced to minus 6 percent in 2009, according to this model. And if it had been possible, policy rates could have returned to positive territory already in 2011.

The mid panel is the unemployment gap, and the lower panel is the inflation rate, both with actual and counterfactual simulated (inaudible), and they both will show you that economic performance could have been quite a lot better had there been no lower bound constraining monetary policy.

So this obviously has a lot of indications and not just for monetary policy. As Davis just mentioned, there are implications for how do use fiscal policy. What should the right mix between monetary and fiscal? Should we have structural policies?

In the Geneva Report we focus squarely on what central banks can do. So we take all other policies as given and not to be influenced by central banks. Given those, what can central banks do when they need this lower bound constraint and need to lose monetary policy in response to shocks?

We consider negative interest rates that we're considering today as well. We consider QE. We consider forward guidance. We argue that these tools are useful. They have advantages and drawbacks, and that those advantages and drawback differed across countries, and that there are limits that imply that probably we should consider other policies as well, policies that prevent the lower bound from happening in the first place. We notably consider raising inflation targets in the report.

I will focus in the rest of my remarks now on negative interest rates and what we have learned so far.

So negative interest rates is a way to further lose a monetary policy once nominal rates have hit zero. And five countries so far have gone down that route. Denmark's National Bank went there in 2012. That's the first country. ECB, the Swiss National Bank, Sweden's Riksbank followed, and the latest country to have gone into negative is the Bank of Japan.

So this offers a nice panel of countries that both have time variation across the country variation to assess some initials lessons on how negative interest rates might be useful for loosening monetary policy.

So do they work is the first question. Does transmission work? So here -- there are many facets to that question, so here I start with noting that when we look at these experiences, transmission to market rates, and from money market rates, capital markets rates has worked very well.

In fact, there are some examples of longer-term capital market rates coming down even more than they would in normal times suggesting that there are also some expectational effects, and I know that one of our presenters later today will talk about such issues.

We also find that transmissions or exchanges rates has worked very well. We base that on the experiences of Japan and Sweden, and the reaction of capital flows to negative interest rates in Denmark.

An important point to make here is that this is exactly as monetary policy would work in normal times. So this is not, just because the exchange rate channel is working very well here, it doesn't mean that negative interest rate is an exchange rate measure no more than monetary policy is an exchange rate measure in normal times. It is exactly the same.

Transmission changes is with banks. Deposit rates in banks. There has been some transmission. It doesn't mean that there's no transmission. There is some transmission to bank rate, so there has been transmission to interbank rates, to institutional rates, to some corporate deposits. Where there is no transmission is to retail deposits. So this raises a host of questions as to why that is, what is the restriction about, might it change in the future?

Lending rates. There's more cross-country variation. So in some countries, lending rates have come down. In the euro area, Denmark and Sweden, for instance. In Switzerland, lending rates did not come down when they introduced negative interest rates.

And in fact, some long-term mortgage rates increased. So there is a lot of cross-country variation in how bank lending rates are reacting to negative interest rates that raises a host of question as well that I'm sure we will talk more about today.

Just because negative interest rates transmit to the, to broader assets markets and interest rates doesn't mean that it's transmitting to the real economy. So this is a question that's been often debated, and I think the first point to make is that in theory, there is no reason why it wouldn't.

This is really monetary policy as usual. It's a cut in the nominal interest rate that leads to a cut in or a reduction in real interest rates and a reduction in international interest differentials. And it is those

relative prices that should matter for investment savings decisions, consumption decisions, and not the nominal rate per se.

Now, there are some that argue that when rates go into nominal negative, behavior changes, so this reaction to interest rate changes. In fact, it can even reverse so that lower interest rates will lead to high savings instead of lower saving.

That could be if there is widespread money illusion, and if people have nominal long-term savings targets that they have to meet. But that is more or less all always the case also for monetary policy in normal times, and it could also be that nominal illusion, money illusion could lead to the opposite, that we perceive of a much stronger cut in the interest rate and, therefore, it boosts spending through substitution effects. So that will be the normal case of monetary policy.

In the end, it's an empirical question and we don't really have evidence so far. We always have the problem that we don't have a kind of factual when we want to assess the effects of monetary policy.

There are some encouraging initial signs that credit growth seems to be picking up generally in countries that have introduced negative interest rates.

A very important question that I also will come back to my last side is, where is the lower bound? So using negative interest rates is obviously a way to get around the lower bound constraint on monetary policy.

Now, how much monetary policy fire power do negative interest rates currently offer? That depends on where this lower bound is. The lower bound is defined as the point of which we have a big scale switch into storage of cash, zero yielding cash. And we haven't seen any signs of the negative interest rate countries so far that that is taking place on the large scale.

Now, that point obviously depends on the assessment of the cost of storing cash and there are a number of studies out there that look at that. They seem to -- the variable cost of storing cash seem to be very low. There is some anecdotal evidence that they are very low.

There's some studies that go all the way up to 50 basis points, but that's really the highest number that I've seen, and it's more likely to be much lower than that.

And the fact that we still haven't seen a shift into cash, low variable cost of cash storage implies that there are some big fixed costs out there. These big fixed costs of setting up the storage capacity they're very difficult to assess. They have to be high in order to justify that it's not taking place on a large scale yet.

And that raises the question of whether they are high enough to justify going in even further into negative territory. That's another open question.

There have been a lot of concerns about the negative side effects of using negative interest rates. And I've grouped these into four categories. There are concerns that they adversely affect bank profitability.

That could in turn negatively affect the transmission mechanism. Could also negatively affect financial stability. There are concerns that the money market mutual fund industry will be destabilized by these measures.

There are also concerns that the insurance and pension fund business models will not survive negative interest rates. And then there are concerns about financial market infrastructures and markets, whether they can technically deal with a reversal in the streams of interest payments.

In the Geneva Report we look at all this and we find that, yes, some of these concerns are really worth keeping an eye on, but the experience so far seems to indicate that such concerns have been overstated, and they shouldn't be reason for not using negative interest rates if a central bank needs to further accommodate in response to a shock.

This can change. If interest rates remain negative for a longer time period, these costs can, of course, change.

That brings me to my final slide on what I see as some of the big challenges and unanswered questions for central banks but need to use negative nominal interest rates in order to (inaudible) in response to shocks.

And the first one is, as I already mentioned, is the lower bound on interest rates. So in order to counteract this lower bound on constraint on monetary policy, there has to be substantial additional

firepower below zero, and the question is how much firepower do we really have? Are we already at the limit, or can we go further down? This is an unanswered question.

There could be variation across countries. That means that if some countries (inaudible) doesn't necessarily mean that that could happen in other countries. That's something that needs to be considered.

And most importantly will it be enough, or should countries consider other policy measures in order to sufficiently be able to lose monetary policy in response to shocks?

The second point I have here is that if it's so important that there's lower bound, can we take measures to push down further the lower bound from where it is now?

And I'm going to leave that question here because I know that several of the presenters later will address that, so I'm sure we're going to have a lot of discussion. That's a very interesting topic.

The final point I think is one of the most important ones. And that is that there is a big challenge in the fact that the public does not necessarily understand or accept the use of negative interest rates.

This goes back to the problem of both money illusion that people don't really understand the difference between real and non-real interest rates. And this poses a big challenge for central banks when they need to use nominal negative interest rates to loosen monetary policy.

I think this raises questions both for how to communicate why such a measure is really important and needed, and also to communicate and educate better what is the difference between real and nominal rates, and what do these measures imply for the lifetime real incomes and savings of ordinary citizens.

So I will stop there.

(Applause)

MR. CARPENTER: Excellent. Thank you very much, David Wessel. Thank you for including me. Thanks to the Hutchins Center and to Brookings.

So I'm going to have a brief discussion focusing on some of what Signe just spoke about. Signe gave a good overview of a lot of the different topics we're going to be discussing here and I in some sense get to give an overview of an overview.

And so the way that I want to do that is to just lay out among the whole set of different issues that Signe brought up maybe three, three broad questions to try to frame, at least from my perspective, some of what are the interesting questions we'll be talking about today.

First, and in a very sort of general and quasi-philosophical way, is the debate that people are having about negative interest rates. There are lots of people who are strongly opposed to negative interest rates thinking that they have adverse effects on the economy and they don't do any good. Is the criticism about negative interest rates truly about negative rates per se, or is it somehow a confounding of the debate about monetary policy more generally? So we're in an era where it seems as if monetary policy, perhaps, is less powerful than it had been in the past. Is, in some sense, negative interest rates is a particular version of money policy getting tarred with a more general criticism for monetary policy.

Second, is there enough theoretical understanding of the transmission of the, transmission mechanism to assess the criticism of negative rates, and I'm going to be more specific about this on another slide.

But it does seem to be the case that we are unchartered water so this is, say, ten years ago, 15 years ago not the sort of topic that lots of economics textbooks would have treated, and as a result, when we're trying to think about what are the cost and benefits of negative interest rate, I do wonder if we have thought through carefully enough how the transmission mechanism works.

And lastly, to show my nationalistic, jingoistic bias, I'm going to ask if the U.S. is a different case, and how important market structure matters. I think it seems almost vacuously true that market structure matters for the transmission of monetary policy. It is interesting, of the large economies that we've been talking about that the United States did not, in fact, have negative interest rates. Indeed, the Federal Reserve did not even take it's

Reserves rate down to zero. It stopped in positive territory. And so I think that's another area to think about. What so special about the U.S?

So for the first question, again, I believe this slide is sort of questions within the question to try to frame what I think of as some of the important issues.

So how much of the debate about negative interest rates is just about the effectiveness of monetary policy. Signe alluded to this. If you were to plot nominal interest rates over a multi-decade time period, and if you were to do that at nominal rates or in real rates, you see this long secular decline.

Seems clear if you look at estimates of the neutral interest rate, the neutral interest rate is likely much lower than it had been historically. And so as a result, monetary policy of any kind just adjusting up or down the short-term interest rate might be less effective if you look at it for how much a given setting of the funds rates would be in the in the (inaudible) United States.

Is a one percent federal funds rate, nominal federal funds rate as stimulative now as it was before? Well, presumably if the neutral rate is lower, the answer has to be no.

But again, if that's the case, if the neutral rate for interest is lower than it had been in the past, then any given setting of monetary policy that might have been accommodative in the past is less accommodative now than it was before.

That's not necessarily a criticism that negative interest rates aren't effective as a monetary policy tool. It's just a general statement that monetary policy or interest rate policy is less effective than before.

Relatedly, one theoretical limit to monetary policy in general is about intertemporal substitution. Part of, at least one version of the theory of why monetary policy might work is that it could induce some intertemporal shifting of spending, and yet we've seen in the U.S. and other large economies extraordinarily low interest rates for an extraordinarily long period of time and, perhaps, due to people's ability to make computations out through time, or discounting, maybe there's a limit to how much intertemporal substitution can take place.

But again, that would be a criticism of monetary policy and the ability of low interest rates more generally to stimulate an economy after a large and persistent shock and not so much about negative interest rates.

To take the same question and turn it on its head a little bit, well, what would it mean for everyone to uniformly say that negative interest rates are a successful tool, or an effective tool?

I think it's too easy to say that negative interest rates aren't effective because if you look at the economies where, that have introduced negative interest rates, we don't see a large increase already in aggregate demand. We don't see large increases in inflationary expectations because, again, that would be leveling the criticism against all policy in those countries.

Signe notes that money market rates in the countries that have engaged in negative interest rates, have reacted in much the same way that money market rates work with positive interest rates. She made some reference to the same thing with exchange rates.

So is it possible then that negative interest rates are just as effective as any other sort of traditional monetary policy using interest rates, and it's simply that monetary policy itself has become less effective. I think that's the sort of question we need to delve into because it's a little bit too easy to criticize negative interest rates on their own because they're unfamiliar.

So the second set of questioning that I wanted to bring about is just our theoretical understanding. And a lot of what is discussed is the effects on banks.

Lot of discussion. Lot has been written about the effect of negative interest rates on banks' net interest margin. And so I think it's worth asking have banks actually be harmed that much? Or, more importantly over the medium term, is it like that they are going to have been harmed a great deal? Or is it possible it that possibly through better central bank communication, possibly just through experience, that banks and the public are going to rethink how banks work, and what is acceptable in terms of charging interest to their customers.

The simplest example I can think of is since time immemorial we have had checking accounts in the United States that pay zero interest, explicitly, and yet have fees attached to them, so in effect that's a negative interest rate, something that has happened for decades upon decades in the Unites States and no one has ever thought that somehow this was a challenge to the normal world order for banks. So we had had negative interest rates and people got used to it over time.

Similarly, in the face of regulation and regulatory costs, we've seen large banks start to shed nonoperating deposits because they were too costly. So there are changes that happen to the environment, and banks being profit- maximizing institutions learn how to adapt, and the customers presumably learn how to adapt as well.

There's more theory that needs to be explained from my perspective on the differential reactions of banks in different areas to negative interest rates. So as Signe pointed out that there were banks in some countries that, in fact, raise the rates that they're charging, especially on mortgages, in response to negative interest rates.

It's a bit puzzling, and so we'd want to think through how much this relates specifically to negative interest rates, and what's going on there, because if you thought about a simply competitive model, a single bank who raised the rates that it charged its customers would presumably at least the margin lose some of those customers to another bank. And so on their balance sheet, the loan, the higher yielding asset compared to the negative yielding reserves of the central bank, declined, and so that choice should actually be making their net interest margin much worse because they're shedding their higher yielding assets. So it's a bit funny. You need some sort of much more complicated than a competitive model of banking to explain that effect.

And finally, Ben Bernanke is frequently cited as having said that large scale asset purchases work well in practice but less so in theory, and I think here's another case where we want to think about that type of conundrum. Historically people have pointed to a flat yield curve as being very bad for a bank's net interest margins, and a steep hill curve as being better. And yet, the tends to be a fair bit more of a criticism that negative interest rates should be bad for a bank's net interest margin and not so much additional QE or large scale assets purchases.

Well, going to negative interest rates is cutting the front end of the curve. That should be all of sequel steepening of the curve and that should be better for banks' net interest margin. And more asset purchases should be flattening the curve which should be worse for banks' net interest margin. So somehow the criticisms leveled against net interest, negative interest rates and their effect on net interest margins seems to be not particularly carefully parsed out via-a-vis what the effect of large scale asset purchases are.

And then, finally, the U.S. Is the U.S. different? How much does the market structure matter? The U.S., I think as most people realize, is much less bank-centric than a lot of other developed economies. Much more capital market-centric. And because so many of the criticisms about negative interest rates have been leveled against the effect it has on the banking system, it is, at least to me, a bit ironic then that the one country that has not done negative interest rates is the least bank centric economy in the debate.

Signe pointed out how well money markets have taken to negative interest rates, and all of the debate in the U.S. about even going to zero, let alone going to negative interest rates, was about the potential functioning of money markets.

So, again, perhaps there's a bit of an irony there.
The rejoinder, of course, is that money markets play a much larger role in the United States in terms of capital allocation than they do in other economies, so maybe then the rule of money funds does make a differential.

But it's not entirely clear though to me if the criticism of negative interest rates is about its effect on banks that negative interest rates should be less well suited to the United States than to other countries.

And finally, I think what needs to be understood is credit easing because negative interest rates are never, never executed on their own. They're always part of a larger package of central bank initiatives.

And if the United States being less bank centric matters, then perhaps the interaction is not just negative interest rates in other countries that should be compared to what's going on in the United States. Its negative interest rates in the context of these credit easing program through a bank centric model.

Again, I think these sorts of questions about the structure are important and hard to answer. Thanks.

(Applaud)

MR. WESSEL: Thank you, Seth and Signe. So I just want to explain that we're going to now take this, we're going to look at three countries. Switzerland first, Denmark next, and then the European Central Bank.

So to start us off, Jean-Pierre Danthine, who's a former Vice President of the Swiss National Bank, and now a Professor of Finance and Economics at the Paris School of Economics, will talk about Switzerland. Jamie McAndrews, who is the Research Director at the New York Fed, will then respond, and then we'll have a coffee break. So Jean-Pierre.

MR. DANTHINE: So anyway, thank you for an invitation. It's a pleasure to be here. I am going to be zooming in on the Swiss experience and trying to be as complimentary as I can from what Signe said, so that I'll be very focused here.

I have a very simple message, and let me go directly to it.

First message is that negative interest rates are not popular. And the fact that they are not popular come from Switzerland. That means that -- you've got it forward. I think what we can conclude is that we cannot go much lower. We have basically the effective lower bond take it or leave it a few basis points.

So in order to go much lower, we need to have (inaudible) measures that have been proposed by people in this room, and I will mention them in a moment, and these (inaudible) measures simply are not democratically enforceable today. That would be the Swiss lesson. First one.

Second one. Negative (inaudible), I just summarize what Signe has been saying, are transmitted to market rates, but mostly not to bank rates. And I say mostly not. I will detail it a bit, but for Switzerland, it's almost not at all.

Retail deposits in particular have not been affective, but bank lending rates have been only minimally affected. Now, that could look like bad news. I will take it as I had good news because I consider that an intermediate constellation such as this one. That is where the general public is not directly affected, but, of course, as a counterpart, there is asymmetric, a symmetrical propagation, could constitute an avenue for further a push into negative rates into negative territory, of course, with negatives of this ultimate avenue which is that this could be a limited transmission mechanism.

And so my question was do we have, is the interest rate unbound? Are we freed from (inaudible)? I would say, no. Not soon at least for central bank in search of the monetary stimulus (inaudible), but, yes, in a limited sense for small open economies like Switzerland in search of an interest rate differential, tongue-in-cheek, (inaudible) for a safe haven currency.

Now, I will logically talk about how long can we go, and whether we have a symmetrical transmission. Just again, detail a little bit some of the lessons that we have taken.

As an introduction, I would like to make three points. First of all, negative rates what for? What is the motivation? And I think it's important here, and it's important for my message which is dichotomous to see that there are two reasons to motivation to reason why they negative rates have been introduced. On the one hand, small open economies, and I will take specifically Denmark and Switzerland, have introduced negative rates for exchange rate consideration.

Okay. They wanted to protect an exchange rate (inaudible) in the case of Denmark. In the case of Switzerland, that was the initial motivation. Later on it was to reintroduce an interest rate differential, and moderate the forecasted appreciation of the Swiss franc following the drop of the (inaudible) exchange rate.

For larger economies like Japan and the euro area, then DID is more (inaudible) of classical monetary stimulus. This difference is important particular relative to my conclusion.

In the case of Switzerland, I can illustrate the fact that in order to have a reasonable, I would say, exchange rate when you have a safe haven currency, you need to have a negative interest rate differential. Your investment interest comes with sort of an insurance (inaudible). That insurance has to have a cost, and the cost if lower than, lower interest rate.

Here you see in particular very striking the gray three-months (inaudible) in the euro areas since 2000, in blue the three-months (inaudible) in Switzerland since 2000. You've got this what we in Switzerland an interest rate bonus, which is a bonus in good time, but it's of course, that's a counterpart to (inaudible) in bad time.

First, that was my first observation. Second observation, five countries have introduced negative rates. As Signe has mentioned, retail depositors have not been affected. No negative rate on retail deposits.

Why? Well, I would argue that the reason is that negative rates are not popular, and I will detail that in a moment. They're not popular. As a result, banks are afraid of losing their client's permanently, in particular, losing their clients which are the good clients. The ones on which they make money because they bring in cash flow free in normal times.

And so they are going to manage their clients' relationship, and they can do so, that's a second development of it because central bank, the Swiss National Bank in particular has introduced very large exemption thresholds so that the bank can afford not to transmit this negative rate to their funding site.

Third observation -- let me go back here. My third observation it's an unpopular measure. Okay. Why is it unpopular? I cannot go through whole the argument here, but I will say three things.

First of all, people do not understand it. That's what Signe has mentioned. They are counterintuitive. They're unnatural. They're against nature. And you say, we economist cannot say but you have had this all along. It was negative (inaudible). No, that's not enough. That doesn't simply, that simply doesn't work, and that's one problem.

Second problem that comes at the sequence, at the end, maybe the end, hopefully, the end of a long period of very low rates, which is frustrating everyone. And this is the cherry on the cake. People are complaining about very low rate, and here we come with negative rates. This is really terrible and people are complaining, complaining in particular the pension fund lobby, are very vocal. Everybody has a pension, so indirectly everybody is affected and feel like is he's in some sense cheated.

The third thing which is a bit more (inaudible) is that all exemption policy (inaudible) the Swiss National Bank has led to very inequal a partition of the (inaudible).

This is explained in my next slide which is not, especially the right-hand side here, you see the Swiss National Bank has increased liquidity massively before moving to negative interest rate buying Euros to protect the floor, but this excess liquidity which led to a balance sheet of almost hundred percent, we have 100 percent of GDP, as being very unequally shared.

In blue you have the big banks, in red you have the (inaudible) banks, in yellow you have all the other Swiss banks. All the other Swiss banks are mostly the wealth managers.

These wealth managers have in a sense promoted (indiscernible) specific asset class. They have attracted a lot of cash. They have huge cash holdings relative to the pre (inaudible) required reserves, and they have been hit. Even though we have a 20 times reserve threshold, they have been hit massively, and they have been extremely active in protesting against the policy of the Swiss National Bank with calls of unfairness which are, which the public love to hear. Today, anything that is unfair is laudable, and it's good for the discussion, and so this has been the situation.

Okay. Now, let me say a few words about how low can we go? I would argue that we are there. That the effective lower bond is very close to minus 75 basis point. We have gone from zero to minus 75. I don't think that mean that we can go much lower.

I don't fully agree with the diagnosis that there is big fixed costs. I don't think they have big fixed cost. I would simply suggest that, yes, may say it take some time to set up alternatives, cash hoarding. In the case of Switzerland, you know, we are expensive country, so other may say 50 basis point, we are maybe a bit higher, and we have a small country where (inaudible) by the Swiss National Bank is more effective than elsewhere. But I think basically, we are very close, a few basis points here, are very close to the effective lower bond.

So my conclusion is that from that little argument is that if you're going to go lower, you want to be radical. You want to be radical. That is, you must abolish paper currency. That's the first (inaudible). Abolish paper currency. Make cash hoarding impossible.

Or you may introduce an exchange rate between paper currency and (inaudible) money to force negative rates on paper currency as has been proposed and will be discussed, to make cash hoarding ineffective.

I will describe little (inaudible) way where we could say we will make wholesale cash hoarding ineffective, and we will make retail cash hoarding pointless. Okay? I will describe that in a moment. Before I do that, I would like to suggest that simply abolishing cash or introducing an exchange

rate between paper currency and (inaudible) money is not within reach in democratic society taking Switzerland as an example.

Abolishing cash I would say not in the near future if people have a voice. And here I take, talk about (inaudible) preference first.

Cash is not on the decline except in Sweden. Here you have in red the ECB, in yellow the Swiss National Bank, the Switzerland in whatever it is, Denmark in purple, and it's only Sweden where we have a decrease in cash holding.

So people continue using cash despite what we think and what we describe. More even I think revealing, if you take Switzerland which may well be representative of the German type of countries, I would bet that both here and Germany would be the same. If you take the ratio of paper currency to GDP since 1907, and you see that there is a big peak, big peak during the Second World War, and following the Second World War, there was a big decrease in cash, you can imagine why it was, a big decrease in cash collected from GDP, but that has stopped in 1990.

Since 1990, there has been no more economizing of cash because of credit cards and advancing technology. Flat. That's a long period. And given the very long evolution, and you see, of course, since the crisis there has been big increase in cash demand.

Now, what I explain that, behind that what you have is the fact that people still are using cash flow payments. It's not rare to see people coming out with a one thousand Swiss franc bill. It is not rare. They're using it for transaction. They are using it and that's clearly what we see since 2007 for precautionary savings, precautionary demand for money.

In fact, here you have the demand for thousand Swiss franc bill which is, I know, (inaudible) lately. You see, it's starting to really boom since 2008, and we have daily data so I can tell you it started right after Lehman Brothers.

There's not a big increase in (inaudible) right after Lehman Brothers.

(Laughter)

MR. DANTHINE: It is really due to the fact that people want to have something safe to hold on once times are uncertain and the banking system is under suspicion. And what they hold on is one

thousand Swiss franc bill. They probably hold on gold as well, but for Swiss the one thousand Swiss franc bill is much better and lighter than gold.

So my conclusion from this is that in direct democracy, there's no way we can abolish cash in the near future, and that route is prevented. No. As well, of course, you may say the technocrats can prevail. I would beware of that. I think it would be very, very dangerous.

The second possibility would be to have an exchange rate with electronic money. It's clearly less radical. That was the goal of it, but it will require legal changes anywhere. Anywhere in Switzerland at least. So there will be a public discussion, and we know why we would want to introduce that exchange rate. It's to permit lower negative rates.

And people hate these lower negative rates. So the discussion is most likely to conclude that with a no vote, we don't want that kind of development.

I don't think at the moment, I think the unpopularity of negative rate means that it is not an avenue that is feasible again thinking about a democratically supported measure.

Is there a third way, or is it the end of it? As I suggested in my introduction, I think there is a third way, but it's not palatable for everyone.

The third way in a sense, is to consolidate the current situation in Switzerland. What would that be? Three step. One, spare the banks too large exemptions. Okay? So continue to make sure that the banks are hit by negative rates at the margin which affect market rates that they have not hit on the massive of their reserve.

Second, build on the unpopularity of negative rate to insure that the general public is not affected. That is, build on the fact that bank deposit rates are set to zero, and in that case, there will be no cash hoarding incentive for the general public.

And third, introduce a fee for abnormal cash withdrawals at the central bank, thus making wholesale cash hoarding unprofitable.

We could use (inaudible) mechanism. I have no time to detail them. The point here, of course, is that you want to have a fee that simply prevents cash hoarding so that it will be never (inaudible).

It will simply make wholesale cash hoarding unprofitable. And in that case, it will be possible to impose significantly lower negative rates.

Okay. Now, the rest is, can be very short because we have said what needs to be said. Of course, with the proposal that I make, we will have a very, we will (inaudible) the asymmetrical transmission mechanism that we are observing, market rate versus bank rate, and that means that in terms of impact on the real economy, the impact will be limited, but it might be sufficient for the purpose of some of the central banks.

Here I have a few slides basically to (inaudible) simply the fact that, yes, market rates. Here you have the Swiss bonds of the confederation have been falling on the spot immediately on the date of the announcement of the negative rate, so clear reaction of money rates, clear reaction of bond rates.

What is more interesting, including private borrowing, what's more interesting is bank lending rate. Bank lending rate if you see absolutely no pattern, no impact on bank lending either in short-term or of mortgages. More interesting line here is the red, the green line.

The green line are long-run mortgage, up to ten year mortgages in Switzerland, you see on the date of the announcement of the negative interest rate, there was start actually on the date, there was a dip. It lasted a few days, and then mortgage rates started to go up, and couple of months later, they were at the same level as they were mid-December before we started even to talk about negative rates.

How do we understand this? I think it's really this notion that the bank don't want to transmit (inaudible) on the deposits side, so on the founding side they are at zero. They would like as much as possible to protect their profitability by making sure that on the asset side they also do not have to transmit the rate, and they've been able to do so by values mechanism. One was that ahead of, they saw the negative rate comings. A year or two before, they decided that the (indiscernible) plus mortgages would be built on (inaudible) plus a margin, or max of zero and (inaudible) plus something.

And so when the (inaudible) becomes negative, the zero was the bond. And so there was no change legally, and no contestable change on a flexible (indiscernible) rate mortgages.

On long-run mortgages, it's clear that there has been concerted effort by the bank to protect their margin. They could not get any help on the funding side. They should not be able to push it on the

negative side. This may have been helped by the fact that the Swiss National Bank was suggesting that the situation was very risky, that the market was booming, that there was overexuberance, and that banks should be prudent and conservative.

So they might help consolidate an equilibrium around policy to be less generous in terms of mortgages, but the result is there. Mortgages have not moved.

Now, if you think that mortgages and, basically, lending to firms has not been affected, you, of course, have a very limited transmission mechanism on the real side of the economy.

And that leads me on my last segment to simply, my conclusion, are interest rate on bond. The answer is, no, but maybe. No, because for big economic areas, going lower is not immediately feasible in my view, and the current circumstances are the proposal that I made, does not, has not a real side impact (inaudible), but maybe for small open economies in search of a negative interest rate differential where, indeed, it would be possible to go lower with limited ambition in terms of the transmission mechanism, but with a significant effect on market rate including excluding exchange rates.

(Applause)

MR. McANDREWS: Thanks. Very happy to be here. Thank you, David, for the invitation, and I would like to say that the views I express are my own and don't necessarily reflect the view of the Federal Reserve Bank of New York or the Federal Reserve System.

Jean-Pierre gave a wonder presentation of a really excellent paper where he reviews the experience with negative rates in Switzerland. And it's really quite an interesting story.

He points out a very strong downward move in the government yield curve. But at the same time, bank deposits are anchored at zero. And this is where I think Jean-Pierre points out his story differs a little bit from Signe's and Seth's where we have this very unusual policy mix. Where we have market rates at one area, at one level, and then deposit rates at another level. And that's distinct from the policy moves in positive interest rate territory.

Interestingly, mortgage markups rose, and there was even some evidence of rising net interest margins of banks, and there's been no large surge of currency use.

So the question is now effective has this policy been. So importantly, the policy objective, as Jean-Pierre pointed out in Switzerland, and he ascribed this to Denmark as well, was to prevent the Swiss franc from appreciating. They had just lifted the floor on the Swiss franc, and they introduced the negative interest rates as a supportive measure to keep the Swiss franc from appreciating.

And there has been a very strong transmission into market rates as he pointed out, and the repo rates. But at the same time, the policy mix, as Seth pointed out, the policy is always a bundle of policies, and in this case the bundle includes a very large exemption on bank reserves, 20 times the required reserves are exempt from this negative rate policy.

And banks have generally refrained from imposing negative deposit rates on their depositors.

So it seems that the effect of the negative rate policy on market rates is consistent with policy objectives, and that's similar in Denmark.

But if the goal is to more broadly affect aggregate demand via the portfolio balance channel, then the exemptions of large amounts of reserve balances may not be so supportive of that policy objective. So I think that's something to look for across countries. I don't think we have the evidence to determine very easily.

But the increase in longer term mortgage rate and these other spreads, which Jean-Pierre points out on his paper, are very much to me a very cautionary sign about the effectiveness of negative policy rating easing financial conditions broadly.

While highly rated borrowers do seem to have experienced lower borrowing costs after negative rates were implemented, there was one little area in Jean-Pierre's slide where the borrowing rates for very highly rated borrowers actually dipped below zero.

Mortgage rates and other bank rates moved up. And again, it appears that banks' net interest margins may have actually expanded.

In Denmark, as well, longer-term mortgage rates, the rates on longer-term fixed rate mortgage rates actually moved up with the negative rate policy.

So that again, makes me question how effective this has been as a policy to ease financial conditions separate from the interest rate, on the exchange rate aspect of it.

Now, Seth pointed out that the lowering short-term rates can steepen the yield curve, and that could be good for banks. Here we look at the slope of the yield curve with the Switzerland ten-year government bond, and the dash line is the ten-year government bond minus the policy rate, and indeed, lowering the, imposing the negative interest rates did raise the slope of the yield curve.

But if we instead look at the blue line, which is the ten-year government bond minus the three-month site deposit rate, the savings account rate at banks, there we see that the compression in yield. So if a bank, if all a bank did was taken deposits and invest in ten-year government bonds, it would be losing money.

So the banks felt they had to do something to expand their ability to preserve their profits, as Jean-Pierre pointed out, this may have led them to actually raise mortgage and, perhaps, other, some other borrowing costs.

Now, in that environment, you can get financial innovation. And Jean-Pierre talks about the (inaudible), these other institutions that fund themselves in the market rather than through deposits, and here is just a slide that my colleague, Andrea Suster, who's Swiss, was able to find for me that compares just two institutions, Credit Suisse, and AXA Winterthur that are examples of this sort of competitive effect taking place.

We see at that very big dip, that's when the negative rate policy went into effect, and we see the mortgage rates for Credit Suisse in green, and the mortgage rates for AXA Winterthur in dark gray, and you can see that the spread between those rates expanded then.

Now, these companies have very low market share in Switzerland. I don't know if this is a, you know, practically a large competitive move on their part, but nonetheless, it's a sort of financial innovation that we can expect with policies like this.

And here the area which can be exploited in this policy is the difference between the deposit rate and the market rate which is the unusual aspect at the negative rates as they've been implemented in, especially in Denmark, Japan, and Switzerland where there are large exemptions to the bank reserves.

So again, I think that there are reasons to question how effective the Swiss experience with negative rates has been. As Jean-Pierre points out, we don't have the counterfactual, and as Seth pointed out, so we don't know.

But the experience of wealth managers offering zero rate deposits to foreign depositors is I think a pretty significant limitation, has this really affected the exchange rate because if the sworn depositors can still get zero through these wealth managers, that would seem to be countering the objective of the policy. So that's one question I ask.

The transmission at the bank deposit rates and limiting markets as we've talked about. And then a very interesting case that Jean-Pierre pointed out at the end of his talk is this contractual impediment that was put in place a year before the policy by the banks looking forward saying if we ever get negative rates, we darn sure don't want to give negative rates on our variable rate mortgages, so we'll say the mortgage rather than being set at LIBOR plus markup is going to be set at zero plus a markup, no matter what the LIBOR rate is if it goes below zero.

So that was a clever move on the part of the banks to not have to deal with that. And I'll talk this afternoon about why some of those things may be difficult to implement. Why, you know, the particular design in mortgages has to be thought of very carefully if money is going to be moving to the borrower.

And so we're left with the question has exports been the main channel of transmission. So this is a question of Signe and Jean-Pierre. Has there been, what has been the effect of exports? That seems to be the one channel of transmission that would be open since domestic financial conditions don't appear to have eased significantly?

What alternative policies might have been used even granting the lifting of the exchange rate floor? So Switzerland is sitting there and it lifts the exchange rate floor, and then they turn to negative rates. Could they have done anything else?

Well, one other possible policy to think about, and this is just for discussion purposes. I'm not suggesting these. I'm just trying to think of what else could be done.

One would be capital controls. So directly taxing the deposits of those foreign depositors. So that would be an alternative, and that would get around this competitive dilemma that those wealth managers are in that prevents the transmission of the negative rates to those large foreign depositors.

Those seem to be the precise people that should be taxed in order to prevent this appreciation to which the Swiss franc has, is prone at common interest rates. So if the interest rate is the same between Europe and Switzerland, between the Euro Zone and Switzerland, the Swiss franc depreciates so one could tax those types of deposits.

Another alternative is the Swiss National Bank's interest rate target is generally understood to be from zero to two. It's less than -- inflation target. Excuse me. Yes, their inflation target is generally understood to be from zero to two. That they have a target of less than two percent, the people understand this to be zero to two percent.

The Swiss National Bank could change that as the Bank of Japan did, and move it, let's say, to a range of from one to two percent to make clear that very low rates of inflation are unwelcome, and they could emphasize this in communication and in other elements of the policy framework.

So there's just some alternatives that might be worth thinking about. Thank you very much.

(Applause)

MR. WESSEL: Why don't we bring all four of you out here, and we'll briefly discuss, and then we can turn to questions?

Okay, thank you all. I think I might start with Jamie's last point. Jean-Pierre, when the Swiss National Bank moved to negative interest rates, it was, seems to me, primarily aimed at the exchange rate. And if I understand what you said correctly, it worked, and had an effect on the exchange rate.

MR. DANTHINE: Well, it's a million dollar question because we don't have the counterfactual, but we know that the, it did restore an interest rate differential with the euro, and you would expect that that's the one valuable that we know seem to be effective in exchange rate equations, and it did seem to work. At least, the evolution has been the way predicted. It was a huge overreaction on 15th of January. Today, we are at one franc to the euro and almost one franc to the dollar almost, which is exactly the type of constellation that people would have said if that's where we get at, things are okay.

In fact, the Ministry of Finance exactly said that the day after the lifting of the floor.

So it's really plausible to argue that, yes, it has been working. The interest rate differential is not as large as it should be, as I've shown, if we wanted to have a properly valued exchange rate, and we have an overvalued exchange rate, but it has been much less overvalued (inaudible) evaluation was expected when we lifted the floor and introduced --

MS. WESSEL: And has that had the desired effect one exports?

MR. DANTHINE: And as a result, we knew that, of course, lifting the floor would mean that the Swiss franc was going to get stronger, and that would hurt export. Exports have been hurt. The economy has been hurt.

The forecast that we made on the day previously to the 14th of January which the (inaudible), but the decision was that we would have a growth of 0.9 percent for the year instead of 2 percent. So we knew that there was going to be a cost, an economic cost.

And, in fact, and that cost would last for two years was assessment, and it has been so far totally vindicated a rate of growth, the last estimate of the rate of growth 2015 was 0.9 percent.

So, you know, there is a slowdown of the economy. Because the exchange rate is going to go too high because we have limited margin of (inaudible) at the lower bond rates, we cannot restore an interest differential as large as necessary, but we do, we go some way, and we get some of that.

MS. KROGSTRUP: I just want to add to that, that is one of the reasons that it's hard to assess the impact of a negative interest rate in Switzerland. In case of Switzerland, it was introduced exactly at the same moment as another policy was introduced that led to a 10 percent appreciation of exchange rate.

And of course, that shock had a huge negative impact on the economy. A negative rate arguably holding the other direction, but it's very hard to separate those two effects.

And in fact, the net effect on real rates was almost constant, so we wouldn't expect a big boost from real rates when this negative interest rate dropped because inflation expectations fell strongly when we had this negative exchange rate drop.

MR. WESSEL: Seth, what do you think of Jean-Pierre's argument on the politics of all this?

MR. CARPENTER: I think it's pretty astute, I'd say, going from a fairly nonpolitical place like the Fed to when I was at Treasury where there is always the sort of rigid analytics, plus the political overlay.

MR. WESSEL: What does Elizabeth Warren think? Is that --

(Laughter).

MR. CARPENTER: I was fairly well convinced by the argument. I mean, trying to force some pretty substantial massive change in cultural norms through a democratic process is just very, very difficult. And Niels is going to be talking later about some of the pretty dramatic changes you could make to get rid of the zero lower bound. And it all works extraordinarily well in theory. I think, getting people to understand the benefits is a big part of what's difficult.

Similarly, people talked about we don't know counterfactual. (inaudible) happens just with low interest rates, and we economist believe that lower interest rates should over time stimulate the economy, and, in fact, get you back to a normal sort of level of interest rates and a normal growth rate of the economy.

And yet, people are angry. Interest rates are low, and they're not getting the return that they want. And to say, yeah, yeah, but the return that you would be getting would be even worse. If we left interest rates another percentage point higher, just doesn't seem to resonate.

MR. WESSEL: Yeah.

MR. CARPENTER: And I think that's sort of political calculus is important.

MR. WESSEL: Yean. Signe, is just the banking system different so that we shouldn't generalize? I mean, as you pointed out, Denmark and Switzerland have had very different experiences. Is that just because institutional factors make Switzerland different?

MS. KROGSTRUP: So I think this is a really important question that we need to look much closely at. I think Jean-Pierre has added a lot of information today about what's going on in Swiss banks which is really useful. We need the same type of information, the same type analysis for other banking systems, and then we need to start comparing.

I think that this is a new area. It's an area of research that's opening up, and it's, these are the differences that we need to understand.

And I'm convinced that institutional differences play a huge role here. And we need to understand better what those are.

MR. WESSEL: So Jamie, you pointed out that, yes, negative rates should make the yield curve steeper except depends what negative rate you're talking about. And I suppose also it depends on now long people think negative rates are going to be. If you're expecting negative rates for a long time in the future, it could do it.

So on balance, do you think that very low rates or negative rates are bad for bank profits, or is this just hyperbole from the banks who always like to complain about whatever it is the Fed's doing?

MR. McANDREWS: I think that from what we've seen so far empirically, I don't think they have negatively affected bank profits very much. Again, that's in the context of this constellation of policies which include a large exemption policy on the reserves of banks held at the central bank.

So --

MR. WESSEL: You mean -- just to be clear. So a large part of the reserves of the Swiss banks are not subject to this negative rate?

MR. McANDREWS: Right. They're earning zero.

MR. WESSEL: Is that a unique feature in Switzerland compared to the others?

MR. McANDREWS: No. It's -- all of the banks have it to some extent, but it's especially large in Denmark, Switzerland, and Japan, which has a very large exemption threshold.

Again, those, that policy tends to counteract the negative interest rate policy at least to some extent. So it's hard to sort out the effects on bank profits.

I do think that there will be though these sorts of financial innovations that Jean-Pierre was talking about where you have competition from insurance companies and others that don't have to pay depositors zero, but can pay negative rates to wholesale funding.

MR. WESSEL: And just finally before we turn to the audience, is there anything we learned from Japan that's relevant to this part of our conversation, or is Japan just such a special case?

MR. McANDREWS: I think Signe highlighted it at least in part, which is how important communication is for the effectiveness in negative rates. I think, especially (inaudible) markets and maybe

elsewhere, we're pretty surprised at the sequence of communications that culminated with the shift to negative rates, and I'm a general believer that effective communication makes monetary policy work more effectively. That's got to be even (inaudible) than negative rates.

MR. WESSEL: Yeah. I was trying to imagine as you were speaking the chair of the Federal Reserve explaining to the House Financial Services Committee that real rates are really what matters, and nominal rates are just kind of an illusion, and I imagine the congressman from some state, well, pick your favorite state, explaining that, well, Ms. Chairman, my constituents get paid a nominal dollar, so this real thing doesn't work for my voters. (inaudible) thing.

Yes. A question here on the aisle? If you could stand up so people can see you, and tell us who you are, and keep your questions as questions.

SPEAKER: Chris (indiscernible) with T.Rowe Price. I'm sorry. Two questions. One for Signe, and one for Jamie. The first question is I was a bit surprised on your assertion about the impact on exchange rates. So, for example, just take Japan as an example.

Two questions. First, seem to appreciate. Second, in particular, interest rate differential. One thing that we've noticed on the trading floor is that interest rate differentials have mattered much less in explaining their movement so it seems to be less driven by (indiscernible 16:27:59:) considerations.

So maybe if you could expand on that a bit.

And Jamie, I was really struck by your yield curve, right? Because if you think of it as kind of your work horse assessment of financial conditions where we are in the cycle, given that there's now such a difference, does that imply that there's increased uncertainty in our assessment of where we are in the cycle, and should that imply higher interest rate volatility, higher uncertainty going forward, and how you've been kind of trying to reconcile that within the Fed.

MR. WESSEL: I admire your attempt to get some useful information out of economists about exchange rates.

(Laughter).

MR. WESSEL: It's worth a try. So Signe.

MS. KORGSTRUP: So on the Japan case, this is a question that I will often get because the yen did appreciate before and after. But if you look at, if you want to isolate specific event, if you look at the house after the announcement, you will see a depreciation in exactly the say that we would expect for normal monetary policy impacting the exchange rate.

That is one thing. That's what we look at. Everything else away from that window, that's the event window that we look at. Everything else is influenced by many other factors. There was a general trend toward appreciation.

The second point is that we shouldn't expect very much from a move that was 10 basis points. So people look at this move into negative as being a big thing. Maybe we can look at it as money illusion. But in fact, they moved depending on how you measure it, it was 10 to 15 basis points dropped from just about positive and then to 10 percent minus negative.

So we wouldn't expect a huge impact in the exchange rate even in normal times from such a move. We did see that impact in the hours after the event.

MR. WESSEL: You have to trade fast. That's the answer. Jamie, on the old curve question? Maybe you could state the question because I didn't follow it.

MR. McANDREWS: The question --

MR. WESSEL: State the question you're going to answer. Whether or not it's the one that was asked.

MR. McANDREWS: State the question I wanted to answer. What I looked at was the 10-year rate minus the policy rate, and then the 10-year rate minus the three-month deposit rate and showed that those diverged with the advent of negative rates in Switzerland.

MR. WESSEL: In Switzerland.

MR. McANDREWS: And so I don't think it reflects on — certainly the question was does that add uncertainty about where we are in the cycle and so on. I don't think it's necessarily an issue of uncertainty, but it's this desire as part of the policy design to exempt the retail part of the economy from the effective negative rates, and have the negative rates imposed not on deposit funding institutions, but on the market funding institutions.

So firms like -- who borrows in the repo market in Switzerland is sort of the question for Jean-Pierre, but I assume the insurance companies and other large financial companies can obtain these negative rates in their funding.

Again, I just put that slide up there to show that banks had to do something else to adjust their profitability. Jean-Pierre pointed out they seemed to have raised their mortgage rates to that may again limit the effectiveness on easing financial conditions more generally.

And the curious aspect is the wealth managers have not imposed negative rates on their --

MR. DANTHINE: That's a misunderstanding.

MR. McANDREWS: Deposits? Ah, thank you.

MR. DANTHINE: The wealth managers had a lot of cash at zero rate. Of course, they got caught and they were forced to do something. And they were (inaudible) afraid of losing their clients, but in some cases they did impose negative rates, and in other cases, they (inaudible), they suggested other investment product typically in (inaudible) currencies, and so that went exactly

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MR. McANDREWS: So that worked well. Yeah.

MR. WESSEL: Miles. Wait for -- this it Miles Kimball?

MR. KIMBALL: So I think these are wonderful presentations, and I think one of the big issues is really this political issue. And I think that really interacts very strongly with legal issues. So it really depends what central banks can do on their own.

So my view would be that if you have a macroeconomic crisis that most central banks would go to deep enough negative interest rates to do what's required if, in fact, they had the legal authority to do so. That differs from country to country.

I would love to be able to have a real dialogue with some Swiss monetary policy lawyers and see what the details are. What I do know is --

MR. WESSEL: We won't be televising that.

MR. KIMBALL: Two other cases. Sweden has a very expansive monetary policy law, and so all the things, even very quite radical measures are legal there in Sweden. I've been -- Peter Conte

Brown and I are writing a law review article about a, about the law in the United States. And in general in the U.S., administrative law is such that there's great deference to agencies, and if anything there's more deference to the Fed. And so in particular, the time varying paper currency deposit fee at the cash window which would be required to economically create an exchange rate is the sort of thing that we, you know, our initial discussion suggests that should be legal. The kind of things I'm going to talk about this afternoon, some are tougher problems than others. Some of them might be in the jurisdiction of the SEC, for example.

But I think you don't want to assume that it requires new legislation to do a very powerful negative interest rate policy. That really depends on the details. And one of the things that's very essential is for people both within and people outside central banks to be robustly debating these legal issues.

MR. WESSEL: Thank you. I think we have time for one more question. Gentleman over here. We'll have more rounds of questions later.

MR. CARR: Hi. I'm Doug Carr with Carr Capital. Interest rate arbitrage would suggest that if you're tamping down you currency by increasing a negative differential, that in order for returns to be equivalent on other asset classes from other countries, that you're building in an expectation of appreciation in your own currency.

You've got a lower interest rate. So for that to be equivalent, it's going to be offset by appreciation in that currency. So how do you resolve that dilemma that you're trying to hold down your current rate, but you're building in an expectation of future appreciation in your currency?

MR. McANDREWS: Because I face the same issue, you know, as I've been thinking about this and reading Jean-Pierre's paper. But if you read Jean-Pierre's paper, and the point is that there's a large risk premium built in as well that breaks the interest rate arbitrage.

So as Jean-Pierre showed, you know, the investors in the Swiss debt instruments earned a lower interest rate over time. And that didn't lead to, you know, that's what prevented the appreciation because they're being charged an insurance premium, essentially.

MR. WESSEL: I thought basically the point was that there's this relatively constant gap between the Swiss interest rates and the European Central Banks' interest rates, and that Switzerland in

order to maintain that margin had to push rates down, and European Central Bank rates got so low that the only way you could maintain that was as negative, right?

MR. DANTHINE: Absolutely. But you're right. But this is not inconsistent with the question which is answered exactly by the fact that there (inaudible) premium, and so it's not -- safe haven currency is bringing something else than pure return. It's an insurance (inaudible) events and people that we need to pay for it.

And that's a (inaudible) of the Swiss franc.

MR. WESSEL: Okay. We're going to take a break for about 10 minutes. There's coffee out here. Come back in 10 minutes, and we'll start again at about seven minutes after eleven. Thank you.

(COFFEE BREAK)

MS. WESSEL: If I could ask everybody to take your seats, we'll get restarted here in a moment.

So we're going to turn now to Denmark and the European Central Bank. And I want to particularly thank our participants who came from abroad. It turns out it wasn't a great weekend to be flying anywhere in the world.

We're going to start with Niels Hansen who is the heal of the Economics Departments at the Danish National Bank), and the discussant will be Alex Roever, who is head on interest rate, U.S. Interest Rate Strategy at J.P. Morgan Securities. We wanted to kind of have a perspective from the markets as well as the central banks.

And then will be followed by Massimo Rostagno, who really did make the heroic trip here. He's the Director General for Monetary Policy at the European Central Bank presenting a paper that he has coauthored with a number of other people. I'm sure he'll describe that. And the discussant on that one will be Tortsen Slok from Deutsche Banks.

So, Niels, the podium is yours.

MR. HANSEN: Thank you. So thank you for the invitation to come and talk here. It's an honor for me. I would also start by making a disclaimer that the views that I express here are my own and not necessarily those of the Danish, of Danmarks Nationalbank.

So we have already heard two presentations, and you'll see there are certainly similarities to the Swiss experience, but there are also differences, I think. Yeah.

So as you heard before, we went into negative rates almost four years ago, and apart from some months in 2014, rates have been negative ever since. If I should say, our experience in just one sentence that would be they are a continuation of low but positive rates, and briefly speaking, that would be maybe somehow different from what we already heard, but here are at least some of the key lessons I just carry on.

So I would explain the first something about our monetary policy machine in Denmark. We have had a fixed exchange rate policy since '82. Since '87 the central rate has been unchanged. You can see that here. This is a policy that is well understood by the public and the market, and it implies a distribution of labor in economic policies. That means that monetary policy is solely aimed at keeping exchange rate fixed and so the stabilization of the economy must be up to other policies, in particular fiscal policy.

This is political decision. It has strong support in the Danish public amongst, in the business sector amongst economists and so on, and that means, of course, that the central bank has a very strong mandate running this policy that we have done for so many years.

You can see we have, we are having a band of plus minus 2 and a quarter percent, but in reality fluctuations are much smaller than that.

So what does that mean? So when there are pressures on the Danish krone, we don't see that in exchange rates, so that pops up in other places in foreign reserves, and in the interest rate.

Here I'm showing the interest rate (inaudible) economies. That is, in the first place German Bundesbank until '98, and then from '99 the European Central Bank. And you can see the different events here coming up in the interest spread. In the beginning of nineties there was Iran crisis, there was the Asian crisis. In the late nineties, we had a referendum in the euro. In 2000, you had the financial crisis.

Every time we have seen the interest rate going up, that means when something happen there was a tendency for an outflow of capital from Denmark.

Recently, this has changed. First with the sovereign debt crisis in some of the euro area countries, and lately here in 2015.

But, yeah, you can say that when there is an up or downward pressure on the Krone, there are limits to how much we can intervene. That's limited by foreign research, but interest rates can go up.

When it goes in the other direction, there can be a limit to how low the interest rate can go, but in that case, we can intervene unlimitedly because we can just supply the krone. Denmark has a big (indiscernible current account surplus. Has had for some years now. It is actually right now around 7 percent. It goes back to 1990. Before that, we had a period as long with deficits. And we had the net foreign debt of 45 percent of GDP in the eighties, or in the mid-eighties.

This has changed now to net foreign assets of a similar proportion recently. And this, of course, gets us net capital income of 3 to 4 percent which is part of the current account surplus.

Some of this is cyclical. Some is structural given the fact that we have buildup (inaudible) pension system and want sound public finances, and so on.

But what it means for monetary policy I think going forward is that the spread to the ECB is going to be low. And I think it's also likely that when things occur, capital flow can go in both direction, both inflows and outflows.

So just to expand little bit more about monetary policy, you can see here periods with capital outflow, that's the light gray areas, and with capital inflow, that's the dark gray areas.

So take first in 2014 there was some capital outflow, and what we see there in the first page we will, we do intervene buy Danish Krone, and also increasing Danish interest rates vis-a-vis those are CCPs so we see the spread going up.

The opposite is the case when capital is flowing in, and that's exactly what happened in January of 2015 when the Swiss Central Bank lifted the floor against the euro. We saw massive capital inflow of a size that we haven't experienced before.

We intervened. We reduced interest rate. It continues, and we ended up by reducing interest rate in four steps to minus 75 basis points. We also at January announced a suspension of the issuance of government bond which also to curb the capital inflow.

In the beginning of February, 6th of February, we made our last reduction of interest rate and said that in this situation when capital is coming in, we can intervene unlimitedly.

And after that the thing changed, and we have seen capital flowing out gradually in the remaining part of 2015. In December, when the ECB reduced their rates, we decided not to go with them, so the spread was reduced.

And again, in January we increased our rates and, again, in March the ECP, we didn't go with ECP when they reduced their rate, so the spread had been reduced in three steps by 30 basis points now down to 25 basis points.

But what this shows is that we were able with our policy tools to keep the exchange rate fixed.

So now let me talk to the (inaudible) to lending and deposit rates, and look at the last seven, eight, years. So there's been three periods with decreases in interest. First one was the financial crisis, then the sovereign debt crisis, and lately the ECB response to low inflation and, yeah.

So you can see the green one is one month money market rate, and it has decreased significantly. But you can also see that deposit rates of Danish banks have come down on all three occasions. But the decrease in deposit and lending rates has been only gradual and there has not been a full pass through.

So after the financial crisis you can see that from having deposit rates that are typically lower than the policy rates, they turned into being higher than the monetary policy rates. And likewise rending rates also went down but less than the money market rate.

The same is the case for the sovereign debt crisis, and more lately here. We can see now that deposit rate (inaudible) a restraint by the (inaudible). And you can see that for households deposit rates are actually positive. They are more positive than, I mean, one reason why they're positive is that you have in a bank a mortgage loan where if you don't dispose of the money, you could put it on a deposit scheme at the same interest.

When you correct for that you get down to something here, the bottom line, which is close to zero. So you can see now that the deposit rates are constrained by (inaudible)

However, for large depositors, financial firms, insurance and pension funds, and large firms, actually, banks have quoted negative deposit rates.

And interestingly, actually, the lending rate more recently since last year actually have come down by as much as the money market rate. So there has been actually a full pass through in this recent episode.

The interest margin has also shrinked a little bit, not so much, but a little bit. But it's still, if you look carefully at this above the level it had before the financial crisis.

In Denmark, our real estate is financed by mortgage bonds, by the issuance of mortgage bonds, and that means, and that's actually the biggest credit to the household sector, and also to the corporates goes actually through the mortgage credit banks.

And so these mortgage rates are determined in the financial markets. And that means that they can actually, there's no lower bound to these. And you can see that here in mortgage yields with short maturity have actually gone into negative just like short-term government, the yield on short-term government bonds. Long-term mortgage yields are still positive and so are long-term government bond yields.

But as we've heard before, it means that the mortgage rates can actually turn into negative. But you should keep in mind here that not only do people pay these yields but there's also a fee on that. But there have been occasions where actually some of this mortgage rate and the fee has been negative. I'll come back to that.

So here just looking at deposit rates in a bit more detail here, these are recent data on how different customer types see their deposit rates with banks, and you can see that insurance and pension funds actually have negative rates on most of their deposits. (inaudible).

The same goes for some firms, in particular the larger corporations, also have negative deposit rates. And that's actually something that we appreciate because, I mean, that's part of the monetary policy transmission mechanism that it's important for the transmission to the exchange rate.

However, smaller firms and individuals, they have not seen negative deposit rates, so you have here individuals to the right, and they have positive rates on time deposits and on those lending related deposits that I talk about later, but on the demand deposits, most of it is actually at zero interest rate.

So the (inaudible) lower bound at least you have been (inaudible) vis-a-vis, (inaudible), smaller firms and households.

So now a little bit about potential side effects that we have also already heard about, I talk about cash. Also bank (inaudible), the risk of an acid bubble, or concerns about (inaudible), and also a little bit about legal and technical issues.

First, cash. I mean, we heard from Jean-Pierre before that there has been an increase in the situation of cash in Denmark. That's right. But it's not an unusual development. It has been going on for longer time.

And we must say that we haven't seen any tendency for cash holding in Denmark. And this, of course, reflects that the financial companies on the pension zone, large firms, it's very costly to deal with cash, and that's one important thing here.

And then also given that (inaudible) have not faced negative deposit rates also is, of course, important for them not to hoard cash.

We also heard some of the reasons why banks would be reluctant to do that. I mean, Denmark is not a very cash-based society, and both banks, households, the authorities, firms, and so on actually have a preference for not using cash, and that's I think a reason here.

We don't have cash with the same large denomination as, for instance, the Swiss have either for that also.

But we also heard that there could be fixed costs to handling cash, so it's probably not only a question of the level of interest rates, but also of the horizon over which they are expected to prevail.

So here I have depicted the area of between zero and expected short-term rates here for Denmark and for the euro areas, and you will see this area at least for Denmark has come down from compared to when the whole thing started, the pressure started in the beginning of 2015.

It has increased again since last summer, but still we are not at the level that we were in the beginning of 2015. So the incentive to switch to cash was larger at that time. But I think that there is a time dimension that one you keep in mind here.

On banks profitability, as we've heard in the other presentations, but also in Denmark there is some, I mean, with negative rates pressure on bank's net interest income at least if you look at the blue bar here, it seems to have leveled off. But at the same time as you can see here, if you go back to last year, the result here of systemic Danish banks was the best since the financial crisis.

And what does that reflect? One is that net fee income has been rising gradually so they have been able to compensate for this leveling off of net interest income.

And you have seen also loan impairment charges going down reflecting that the economy is stronger now than it was a few years ago. So that plays also an effect here.

And then beyond that, banks also made revenue from foreign exchange trading last year, and remortgaging activities.

So there has been an impact on, from negative rates on bank profitability, but I believe it's small and it's partial. And I will say it's more due to the interest rates being low rather than negative as such, and it has been compensated by fees, raising fees, reduction in loan impairment charges, and other things.

So regarding asset prices, we haven't seen a bubble in asset prices. Here I show house prices in Denmark. They have increased little bit in recent years, but they are still below what our model would predict reflecting growth in income and also low interest rates, of course, but it's definitely a matter of concern both regarding financial and real assets (inaudible) economic (inaudible) and very low interest rates in combination one should be concerned about systemic risk building up, and we haven't seen that so far.

And if you allow me, just briefly on some legal and technical challenges that we have addressed and which might be relevant also in other cases, regarding mortgages with negative interest rates, we need to find a solution to how do we deal with situations where the creditor would have to pay the borrower.

Their tax issues, this has been solved. IT issues as well. It had to do with existing loans where you had to find a solution, an also with new loans where you had to write this into the contract. This has been dealt with.

And then finally, on taxes, that's not a curiosity, but, I mean, all our laws and so on I don't think they predicted when they were written that interest rates could become negative.

So we have had to face that, and that means that, for instance, first, tax accounts with the tax authorities where they can pay in money also in advance at an interest rate that could not be negative. They had, of course, an incentive to do that when they had only negative rates in the bank, but this has been dealt with now in our tax laws. Just to mention that there are some issues here also to be dealt with.

So I've come to the end. So I will not read this. You can read it yourself. But these are I think lessons from our experience with almost four years of negative interest rates. Thank you.

(Applause)

MR. ROEVER: Hi, everybody. Thanks for, it's a pleasure to be here today. I want to thank David for the invite, and I want to thank Niels for his excellent presentation on the Danish experience with negative interest rates.

I think it's, you know, Denmark provides a really interesting case study in negative interest rates policy. I think one of the things that strike me about Niels' presentation, well, the last points struck me about Niels's presentation when he was talking about the tax changes that went through in order to accommodate negative interest rates.

I think in the U.S. that tells us there's a chance for tax reform one day. (inaudible) negative interest rates first.

(Laughter)

MR. ROEVER: Hopefully, it doesn't come to that, but I think the other thing that I think is interesting is, you know, from a monetary policy perspective, they have this explicit mandate to maintain the exchange rate peg with the euro. And as somebody who spends a lot of time parsing Federal Reserve communication strategy, how refreshing it would be just to be able to look at the exchange rate and say, hey, we're doing okay. Little bit of a different sort of story anyway.

But let me figure out where the -- is this right one? I did want to comment a little bit more at length at a couple different aspects of the presentation.

And really, I wanted to focus mostly sort of on the deposit rate aspect of what was happening here. And if you're remember sort of back in Niels's slides there's, it's around Slide 11, there's a comment on sort of negative interest rates applied to different classes of depositors. So think of it as three bar graphs. There's a nonfinancial corporation's bar graph. There's an insurance company and pension's bar graph. And then there's a household sort of employee and retirement bar graph.

And sort of the big takeaways there are, you know, there's, if you look at sort of the nonfinancial corporations, they have probably about 30 percent of their deposits at a negative rate, and most of the balance of it at a zero rate.

The employees/retiree's households, effectively they're exposed to flat interest rates of zero interest rate, or slightly positive interest rates in the case they're time deposits.

And then in the middle, you sort of have this big, this other category which is the insurance and the pension funds which is largely at negative interest rates, and I think is sort of a proxy for other another financial sector in general.

And one of the things that I'm struck by with respect to sort of the deposit rates here is there's a bit of a tooth paste issue. And what I mean tooth paste is if you think about a tube of tooth paste, and you pick it up and you squeeze it in the middle, you know, the past goes into either side of the paste.

And money, I think, is a lot like that in the economy, and so it's sort of interesting to watch what the differential and interest hearing tiering, you know, what sort of impacts that has on the markets.

In this particular case, I think, you know, when we think about sort of, you know, how nonfinancial corporations are reacting to the low interest rates, there is, you know, a couple of different incentives, I think, working on them to try to minimize the amount of cash they have on deposit at banks because they don't necessarily want to be exposed to those negative interest rates.

So one of those incentives is to try to pass on excess cash down the road to shareholders by dividend, by share buyback. I think that's something that we see not only in Denmark, but also other markets in the word. And, in fact, in Denmark, Niels didn't discuss this, but in the background papers that I

reviewed for this presentation, there's been, you know, a significant increase in dividends over the time of negative interest rates in the Copenhagen stock market, and so you can sort of see, you know, that's part of this mechanism of the nonfinancials trying to push money out.

It's also the case, I believe, that if you look at sort of the yield starved role we live in today, that there's an incentive on company managements to try to, you know, to try to increase the amount of their payouts, the size of their dividends that actually comes in terms of a higher PE ratio in a lot of cases. And so I sort of think that that's sort of been the case here.

So take the negative yielding asset, try to pass it to a place in the economy that isn't necessarily, or is a higher yielding place so money sort of move in that direction.
So think about cash moving more in the direction of household.

The place in the middle that I think suffers is sort of the insurance and pension fund, the sort of financial sector. We think about sort of the financials are the most exposed to negative rates, and I think part of this is by design, or maybe all of it's by design.

If you consider, for instance, Basel 3, and some of the incentives that exist in there, there's effectively a mechanism in there that's trying to minimize interconnectivity issues between financial institutions, and so we see this, I think, both in terms of the rate positioning here. We also see it, you know, not in this particular nominal rate space, but we see it in terms of costs that are passed on by banks to depositors' fees, you know, that sort of discourage the use of certain types of nonoperating deposits.

In the case of sort of the insurance companies and pension funds, you know, their incentivised, I think, by the negative rates that they have to try to go out and pursue higher yielding assets with the balance of their investments. Not that they're particularly focused on short-term deposits in the first place, but the rise of negative interest rates has definitely had an impact in terms of lowering, you know, yields across the curve, and, I think, causes these institutions who primarily are sort of paying off insurance policies which may have an embedded return to the policyholder, or pensions that have an embedded rate that has to be met, it creates a problem for them because they've got to go out and pursue increasing, has been sort of increasingly following yields, or increasingly sort of scarce supply of yield the assets.

And yet, at the end of the end of the day, they have these liabilities that they're going to have to make. And largely, these liabilities go to the household sector, be it either through the insurance policy or the pensions.

So maybe the depositors, the households aren't experiencing negative deposits up front, but down the road, they're going to have potentially issues with pensions or insurance returns when it comes time for retirement.

And that gets me to the point that I wanted to sort of get into a little bit about bond yields because I am a fixed income person. Of course, I had to bring bonds into this.

So I'll just share a couple of quick snapshots here. We have seen as negative interest rates have become a more used strategy across central banks, we have seen increasingly a demand for fixed income. And if we look at a broad-based index of global bond yields such as the J.P. Morgan Global Government Bond Index, you can see sort of the downward pressure on yields here on the right-hand side.

The average yield on this index is currently around, is currently running about 1 percent. If I look at that index and I look at sort of the percentage of that index that is comprised of negative yielding bonds, it's currently about 28 percent of the entire index which is pretty significant.

To bring this back to sort of Denmark and their particular situation, we've actually sort of mapped what the negative yield universe looks like, and this is across the countries that are on our GBT broad indexes, our broad government bond index, you can see listed down the side is the size of their negative yield holdings.

Now, I would tell you in aggregate that we're just shy of $6 trillion of negative yield assets in this index. The total index is just over, just shy of $21 billion, so again, that's your 28 percent number coming up there.

You can see Denmark is contributing about 48 billion U.S. equivalents to that, so less than 1 percent is their representation. But I think it's sort of interesting to look at, you know, coming back to this issue of investment and trying to find yields if you're a Danish institution, you have the distribution across the different parts of the yield curve, 1 to 3, 3 to 5, 5 to 7, you know, we've really sort of seen over time the negative yields move further out the curve, and I think that's been experienced in other parts of the world as

well, most predominantly in Japan where you can see basically, the entire yield curve is effectively at negative interest rates. And, oh, by the way, they're about 3.2 trillion of the nearly 6 trillion.

And so the big bond market in Japan, but Denmark relatively small. And I think the Danish Central Bank has certainly has their work cut out for them trying to run their own economy and trying to stay balanced between the ECB and the other sort of Nordic countries, and their issues as well.

So I guess that's sort of it. I mean, one of the things I think that we've seen from a markets perspective as we've seen more prevalence of negative rates is it's increasingly difficult for investors to try to find the yields that they want to. So if you sort of think about all of this, if you think about, if you take the sum of all the government debt outstanding, and you subtract out what's held by central banks, and figure out sort of what's left that's positive yielding, about 48 percent of the positive yielding debt not held by central banks in the world is U.S. Treasuries. So the negative impacts, the impact of negative rates also is where it's definitely being felt.

If you happen to be an investor in the front end of the of the curve, you can see just sort of looking at the zero is going up and down the 1 to 3 year column, you have relatively few options available to you. And so I would say Treasury that probably makes up something closer to three-quarters of the supply of the world (inaudible).

I'll stop my comments there, and thanks.

(Applause).

MR. ROSTAGNO: Thank you David and the organizers for inviting us. We are very grateful. It gave us a very opportunity to sit down and try (inaudible) our thinking about these policies that have kept us busy for a while.

When I say we, these people there, or me and my colleagues at the ECB doesn't implicate at all the people who are mentioned down there in red. And that's very important for you to appreciate.

Now, let me start from this chart because it gives you the backdrop against which these policies were adopted and the main massage of my presentation is that this policy is really failing, at least in our perceptions, mine and my coauthor's perceptions into a credit easing package that ECB has been adopting since two years, for three years now, and is motivated by these pictures.

So you have here a central bank that has a price stability objective. Is mandated to stabilize inflation. In that definition the blue line, the light blue line that you see on the left, is the preferred definition of inflation for measuring whether the DCP is delivering on its objective.

And DCP has declared that it wants to bring inflation to not too far from 2 percent, so below but close to 2 percent. So that's the objective.

You see also in that line, the blue line, as falling short of this horizontal 2 percent line now consistently for a number of years.

Now, that situation was not judged to be if particular concern at the beginning because it was a reflection of disinflationary forces that were imported from overseas as oil and fuel nonfuel prices were collapsing they started contributing negatively to the inflation index so that was not seen as particularly concerning. But at some point, those green bars that you see which is the contribution of underlying factors to the main index (inaudible) to become more and more important in explaining this drawn out process of disinflation.

And so that was a time when this process started becoming very heightened for CDB. And also because that process is sort of infected or inflation expectations, the inflation expectations, market based in this purple line that (inaudible) out to 2 percent even at (inaudible).

And in a situation in which the economies was struggling or getting back to the level of real GDP that it had at the beginning of the crisis only this quarter, probably last quarter we again managed to achieve that level, that situation became very concerning.

Now, if that is the situation as somebody said this morning, I mean, this is, a negative rate policy is natural continuation of what you would do in other circumstances if you need to inject more accommodation. So you just cut interest rates. If those interest rates are also at zero, you cut to negative rates.

So this is the chart. This is the first steps of the transmission mechanism. This is money market, overnight money market. You see we have corridor systems so we can bracket the volatility of this red line, or orange line which is the operating objective of DCS is an overnight interbank money market index for borrowing conditions across banks. And if you pull down the floors of the deposit facilities so the rate that

ECB pays banks, when the deposit liquidity with the euro system then you attract, you pull down this green line, this red line also to negative.

And it is only after these four small steps into the negative that ECB took since June two years ago now is trading quite stably in the negative territory, in fact, quite close to the lower end of this corridor.

So I will be very selective because I have very many slides, and very little time so I will not go very far here in this overview.

But I will start, and that's probably most important thing I'm going to say from my perspective is that the way we, I and my coauthor view this policy is that it rehabilitates somehow. It re-empowers policy in conditions in which policies obstructed as you know by a number of no limitations that one encounters when interest rates are already very low.

And we have a simple model way to show this now. It's even simpler what I am going to present here. So, really, you need only a couple of equations to sort of convey the idea why this policy may somehow empower monetary policy.

Then I will ask what happens to transmission, particularly bank based transmissions which is so important in your area. Banks suffer, thought to suffer very much in this environment so what happens there is important for transmitting stimulus.

And then one thing on bank profits, if I may get there. Now, the primary reason that we see, we, again, authors, for this policy is that this policy is not a calamitous misadventure as it was portrayed, it was characterized in this commentaries, nice commentaries that we were getting at the beginning of this year from press, from reports and so on for market participants.

It is not a calamitous misadventure, but it is, in fact, a way that could (inaudible) to again, as I said, (inaudible) monetary policy in very difficult situations.

And the main reason is probably conveyed visually in this chart. So it's a phenomenon that was started since the very beginning when advanced economies bumped into this problem of low, very low interest rates, zero interest rates. Keynes was writing about this.

So it's a phenomenon that when a bank, central bank brings short-term rates to zero, then investors start suspecting that interest rates, short-term interest rates cannot fall further, so they cannot increase from that level.

And so they start fearing that if they invest long-terms that the interest rate is so low that they are not going to compensate them for the risk, no interest rate risk they're going to expose themselves if they invest long. So they rather keep liquid, and so that's the main rationale, the main description of a liquidity trap.

And, I mean, this not innocuous for the central bank's purpose. It runs against the central bank purpose because the central bank wants to cut rates, wants to cut long-term rates because those are important for demand, but it cannot because of these mechanisms, so the markets moves against the central bank.

And so it manifests itself now that we have these instruments, this a de factor arbitrage free shadow rate mode of the last generation so you can study the predicted distribution of interest rates when there is money, central bank policy actions, and that is what we saw when the ECB cut interest rates first was zero in July, '12, four years ago that the oil distribution became very much upward, asymmetric, and ECB realized the rate at the long end of the curve were not coming down at the same pace at which it was it was cutting rates in the short-term. So there was this, like I say, perverse effect running against.

Now, if this problem can be solved or can be somehow ameliorated by convincing investors that there is no negative restriction on interest rates, then that thing is, of course, becomes better. That phenomenon becomes less severe, and you can move, in fact. And this is the picture that we can, we took on the basis of this model, same model, when the ECB cut second time into negative to minus 20 basis points that the oil distribution collapsed, came down very sharply.

So this is important because you can in a sense make banks internalize this, say, pecuniary externality that they have because they take a rational decision. They want to hedge against interest rate risk. But by doing so, they are (inaudible) power and monetary policy so they are having a repercussion, negative repercussion on the pricing on long-term assets. If you wanted to cure that, then probably the negative interest rate is an option.

Let me skip that and go to this very, very simple thing. Now, it's a two-period economy. Investors, I mean, various investors, there are two securities. One is a short-term security has a secure interest rate (inaudible) and is fixed now so that's very, very certain, and there is a long-term security that pay into periods as a yield to maturity now, but the return, a positive return will not necessarily be equal to the yield to maturity if it's subject to volatility. I know the central bank (inaudible) because of its monetary policy.

Now, in this economy, you have the yield to maturity today of the second of the two periods the security is given by a very, very simple formula, you see that there is a (inaudible) also showing up because these are (inaudible) investors.

If there is a positive supply of long-term securities that is going to show up in the pricing of long-term rates.

Now, we have a central bank. The central bank as a rule is a very simple thing. By the way, (inaudible), but it doesn't change at all any substance of what I'm going to say, so I suggest for representational purposes it makes things easier.

If there is no consideration (inaudible), for example, because you are starting from a starting position where it is way above zero, and nobody even understands or cares about the lower bank, then all agent, all investors take that reaction (inaudible) into consideration when forming expectations about the long-term rates, and they just say, well, the central bank is a preferred rate to set, and the right target that (inaudible) and so I just take expectations of inflation surprises. Central bank will react. Inflation surprises next time. And on the basis of that (inaudible) or probability function inflation surprises that you see there is the best shape the normal distribution, I just take the (inaudible) of that distribution. Very simple.

But if you start from a very, very low interest rate situation already, then agents start internalize the banks that the central bank may not go below zero if there is communication about a lower bank.

And so the next time interest rate is not necessarily the preferred interest rate of the central bank, but is the lower (inaudible) and the lower bank itself.

So there is a constraint and informing expectations they don't use the oil distribution on inflation surprises for next time, but just a portion of it. So they take an expectation, an expected value of a sense or a normal in our case distribution which you see there.

So that is what keeps interest rate. And what is very important I think and nice for us to see that is so easy to sort of demonstrate, is that the reaction of long-term rates to central bank actions changes very much from a situation where you are way above the lower bank, and a situation where you are very, very close to the lower bank.

So if you are way above the lower bank, and the central bank cuts the rates, that is going to have a linear negative response, trigger a linear negative response in the expectation next year or next period long-term interest rates.

Whereas, a closer in the vicinity of the lower bank, that is not going to be the case because that relation that links today's monetary policy decisions and tomorrow's, expectations of tomorrow's monetary policy decisions becomes (inaudible).

So there is a weaker and weaker impact on rates.

Now, what are the options? One is the (inaudible) by now (inaudible) prescriptions of our profession just slash interest rate to zero promise to keep it there for long, probably an eternity.

So it's sort of, has been called, ODC, an ODC (inaudible) guidance. So the central bank in this very simply model says, okay, I will not react to inflation surprise the next time. So be happy and very relaxed. I will keep interest rate at zero for two periods.

That gets you a very flat term stature. Now, if the central bank cares about the term stature wants the long-term rates to be as low as possible, probably this is not the best it can achieve. If it adopts NIRP, a Negative Interest Rate Policy, it doesn't have to commit to anything. It just slash now interest rate to below zero, and then it keeps reacting to events like according to its standard reaction functions, but in certain conditions that can be the policy that you saw before, so it can go better. I can make things better, at least if its intermediate target is one to keep the long-term rate as low as possible.

So you see that it can be an efficient policy. Now, not necessarily, I mean, you have to assume many things, but if that is the objective, it can be very efficient.

Now, what was the impact in reality? Well, the impact in reality you see there you see the pre June, '14 quasi risk free curve in the euro area and see you see now in the yellow, a very recent snapshot of the that curve. You see it has, well, first of all, it has fallen very much, quite a bit. It does not necessarily flatten a lot, and so that's also something that one should keep in mind.

But probably the best test of the efficacy of this policy is to see what happens on the bank lending channel because that is very important for the euro area. You know before that those policy, this policies were not only the NIRP, but (inaudible) credit easing or various forms that has been adopted since two years ago.

Before those policies there was a very notable, very disturbing pull back in the provision of credit supply, and very disturbing, very damaging, also downstream, no effects to the borrowing conditions of houses and firms in euro area, particularly in some countries. You see there the average lending rate per country. And you see there was a huge increase in the dispersion, increase also in levels in some countries despite the fact that (inaudible) easing policies also very, very consistently before.

Now, instantly after the announcement of this policy, and you see when this light gray time window starts, interest rates started falling like rocks in euro area.

Now, again, that was not the only policy announced. There was also another longer-term refinancing operation targeted for banks not to target the borrowers, so many other things, but, I mean, visually, it's quite amazing to see that picture because now there's been a reintegration of this market, this credit markets across euro area. And also the levels are at historical lows.

Now, an interesting question is to disentangle the impact of a pure negative interest rate policy this is what some colleague of ours, one is also a quarter of this presentation I've tried to do, just using micro data so by a bank, individual bank balance sheet data, and using a (inaudible) model to extract really the impact, isolate the effect of the NIRP on lending, on lending condition.

What they find is that because there is a very big degree of cross section of variation in how liquid banks are in euro area, for example, in the (inaudible) banks tend to be a lot more liquid than in the periphery so they retain a lot of this liquidity that is being created, and the (inaudible) policies of the ECB.

And so you can explore this cross section of variation in liquidity distribution, and see, and the match those liquidity holdings with other characteristic of banks and see whether the fact that a bank that has a lot of negative, sorry, a lot of liquidity, and so it's paying a lot of charge, very, very big charge to the ECB to maintain those liquid balances is explained (inaudible).

Now, what they see is the following. That, indeed, those banks that get lot of liquidity are those banks that have more incentive of cutting rates, so expanding loans, or paid down debt, market debts. European banks have a lot of market data that wholesale funding so they can always paid down that debt either because they buy back, or because just they, those are securities redeemed, and so in this way they can substitute funding that is very, still very expensive to maintain on the balance sheet with funding that is very inexpensive to maintain.

Now, one word and then I stop on bank profitability. Now, of course, this is not the policies that if you maintain this policy for a number of years can be beneficial to banks. Everybody can understand this.

But for the time being, and when I say for the time being also including projections, including, for example, what we expect to see in 2017, this is an analysis that was done forward looking with some assumption and some projections, you see that there are factors that are pulling up return on assets in this case. So factor that are pulling up return on assets and factors they are pulling down return on assets, and those are averages across banks in various countries and in the euro area.

And you see that, for example, whereas the net interest margin is, of course, a factor that cannot contribute positively to banks' profitability, not at all, this is not the only thing that is at play here. There are others. And one particular is the fair value revaluation of portfolios, and banks not only in the periphery, but also in the (inaudible), particularly German banks have a lot of securities on their books. So those securities got revalued because short-term rates have collapsed, and long-term rates have collapsed. So that to the extent that they sell those securities or they value the securities to market prices, this is beneficial.

This is very short-term, but there is more longer term effect that in fact is picking up as we look further and further out in the horizon which is this yellow thing, the credit (inaudible). And the credit

(inaudible) a better economy, the better capacity for borrowers to pay back their loans improves, these are already very visible in banks' accounts. In 2015, for example, that was a very big factor keeping up, in fact, increasing profitability of a euro area banks because there was a declining impairments, declining provisions for bad loans.

So that is something as attractive. It is very important for the periphery not so much for the core, but you see it's increasing.

Thank you.

(Applause)

MR. SLOK: Thank you so much, and thanks to David also for both inviting us all and putting this together.

I feel that a summary of the presentation so far is that we could put a band out here negative interest rates, mission accomplished. The question is, is it really true that we can make that conclusion the reasons why we should be worried.

And I can tell you from what I do in my job, I go out and talk to investors everywhere in the world. I have hundreds of client meetings every year, and I have up to this point not met yet a single portfolio manager who says this is a really great idea.

Most people who sit with their monies and basically manage and think about what they should do and where they should invest come to the conclusion that this is just really broadly speaking annoying, and is something that's really difficult to deal with, and therefore, the most important conclusion in my view is that there are actually some confidence costs that are extremely important not only for investors, but also as we talked about earlier, for corporates. How do corporates think about this? This is a very nonlinear effect in terms of corporates behavior. How do household think about this?

One important fact that's indisputable is that for the last several years, we've seen the wealth effect on the consumption function basically being cut in half.

Why is it that consumers are so cautious? Why does it need to take such a significant increase in asset prices, most importantly, stock price and home prices before we will see the positive impact on the economy?

Does that mean that we need to see much bigger increases in the S&P 500 and home prices before we'll get that recovery that has been so unfortunately long to what we've seen earlier?

And the problem is that quantifying these (inaudible) effects is very, very difficult. Well, what I tried to is just to add to Massimo's excellent analysis some attempts of showing some charts and data for why we have not really accomplished this mission, and why there are all these issues still that are outstanding, whether this is actually working.

Most importantly in my view if this is really such a good idea, why don't we just lower interest rates to minus five tomorrow, and then we'll have a very quick recovery and everything should be good? Well, there must be some reasons why we have some other issues. Why this is not such a good idea. In other words, maybe there are some (inaudible) when we do get close to zero which are worth thinking about. And all those (inaudible) in the camp of (inaudible) relative to the, it's not that the economic benefits are zero. Maybe there are some small benefits, but are they really worthwhile relative to what we see in terms of the costs?

So therefore, the starting point, of course, is to ask what is the problem for Europe at the moment. Of course, other discussions similar for Denmark and Switzerland, and Sweden, you would ask similar questions, but one issue, of course, for Europe is that, well, of course, headline inflation is low, and this is very important by all Massimo's charts shows also this that the core inflation has been around. One, it's actually going up a bit more recently. In fact, headline inflation only started falling in 2014 when oil prices started falling, so you could say, well, maybe we shouldn't do negative interest rates. Maybe we just charge our target.

This is not revolutionary. I mean, the Fed is targeting core inflation; many other central banks are targeting core inflation. We're not even proposing as we did in the Geneva Report to raise the inflation target just to say maybe the justification for doing negative interest rates was completely wrong. Maybe we should just have looked at core and aid and said, well, this is all solving itself over time so maybe we should not be so worried and, therefore attempt to deploy all these alternatives measures.

Another issue, of course, which gets to a whole different discussion, but maybe it's not only inflation that's the problem. In several southern European countries we've had a big problem with youth

unemployment. This is a very serious issue. And is the solution to that to lower interest rates? To do more QE? To do credit easing?

I mean, the obvious answer is absolutely not. A much better solution to that is just to give tax subsidies to firms hiring young people. Or to basically give higher transfers to incentivised people to take more education?

A very important issue here is that there are a number of other options that we can do than monetary policy, and we just silently accept that, oh, well, fiscal policy and structural policy is not working so, of course, we just have to do all the work ourselves. And the question is, is this really the right way to look at it.

Another chart that illustrates this is this one here where the access to finance survey asks smaller and medium-sized enterprises, "What is the most important for you as a company at the moment?" And as you could see to the right, they do say 10 percent of them that it is a problem with access to finance.

But this is the smallest problem of everything. The other problems you have here, regulations, finding customers, skilled, the availability of skilled labor, competition, cost of production. This is all fiscal and structural policy. What's happening on that front? Basically nothing. So that also comes to the solution here is that really that we do monetary policy as a response to the problems that we're have in Europe? It's not that those problems are small. They are very, very big, and very serious. I'm not saying this lightly. I think some of these issues should have been addressed a long time ago, but the question is again, and this is a very important issue particularly for Europe.

Should we just say, okay, well, the other type of economic policy. As you know too well, there's fiscal policy, structural policy, and monetary policy, and the other two types, oh, just not working, so we'll just do everything we can to try to not quite bail out, but at least do something to support as long as the other type of policies are not functioning very well.

So the issue, of course, then becomes, well, if the ECB and central banks elsewhere, of course, basically continue to push as hard as they can, what does that then do to the willingness to reform, and the willingness to try to support your economy?

And I used to work at the OCD, and the OCD has a number of different measures of structural reform and structural reform and momentum. And on the X axis here you have for different countries the responsiveness rate, which is a very diplomatic way of saying countries that have done something on structural reform, and from 2011 to 2012 a number of countries did a lot on structural reform including those that I have circled there to the right.

What I had done on the X axis is to change in momentum from 2011 to 2013, '14, and as you could see, momentum has just basically stalled in a number of areas, and basically most prominently in the periphery. But also in other countries that you saw a lot of reform momentum in 2011 and 2012 just after the European crisis.

But I'm not saying that the ECP is causing this stalling of the momentum and reform, but I'm just saying that there is a very, very, as much as it's clearly unpleasant for all of us, there is a very, very important link between what monetary policy is actually doing, and what fiscal policy is not doing, and that's a very important thing to continue to keep in mind that economic policy in every economics textbook is not only monetary policy, but is also policies elsewhere, and this chart, unfortunately, suggests that momentum on the structural reform side has basically been stalling more recently.

The most serious issue in a broad perspective is, of course, the ECP is then experiencing quite a decline in trust. You could then say, well, why does that really matter, and it may not matter that much, but what this at least telling you is that the trend is not your friend in broad terms where when the population cross countries basically starts losing confidence in you as a central bank, and this, of course, is something that also needs to not be taken very lightly that the impact of policies, and I'm not saying this is negative interest rates. There are a lot of issues that go into this. You could also ask do people who actually understand what the question is, and do they understand what their responding is. Do they trust that they will succeed? Do they trust that they're doing the right thing?

I should also add that this is not only for the ECB. This is also for the Parliament and the European Commission. So this is a European issue more broadly, but I'm just saying that there are still also some issues here in terms of (inaudible) the way that we think about how these alternative policies are working and pushing things forward.

Another issue when they start thinking about, well, are these negative interest rates specifically something that has changed behavior in the banking sector, and the ECP has a great bank lending survey where they ask banks, as you the bolts, the subtitle there, "Direct and indirect contribution of negative deposit rate on lending volume." In other words, you go out and ask have negative interest rates had any impact on your lending, and to the left you could see (inaudible) Enterprises, and the light blue are banks that basically say it's basically unchanged. In other words, it's basically had no impact whatsoever.

The red is somewhat or considerably lower, which is, of course, somewhat surprising. But the dark blue is where you start to see some impact in the banks that are saying, yes, negative interest rates have actually had somewhat or considerably higher impact on our lending volume.

But again, I understand, of course, fully that we have low interest rates just slightly, but the issue here is that if 80 percent of respondents say this has no impact whatsoever, then you should probably be a little bit worried that maybe this policy is not as useful.

I understand it has an impact on market rates, and that's also very important. But generally speaking, if the response both a loan to enterprises and to households is that the banks are saying this is not working, then this is probably also something that's critical for how we think about this policy.

Just for completeness, there's also a similar question where they ask for QE, so this is the if you read again the bold text below here. "Share of banks for which increased liquidity due to QE had basically no impact on lending," and again, we are in the 80 percent of respondents saying this basically doesn't really work, or at least it doesn't impact our lending decisions.

So again, this also suggests that it's not just lower interest rates to minor 3 and then go out and out and play golf for a few months and everything will solve itself.

There are a lot of issues involved in, that you cut through the threshold then what I would say again confidence it takes for calling (inaudible) that are very important in terms of people changing behavior.

And finally, an issue that we also have talked about earlier is, of course, what does this mean for the test of the world. This chart here shows you negative interest rates in different countries. 1 to 10 is the maturity of different government bond. In Switzerland, we also talked about this earlier, (inaudible)

interest rates up to 10 years. Japan the whole yield curve also. German, 8 years. Austria, Belgium, Netherlands, 5, 6, 7. You get the idea.

The whole point of this chart is that the ECP probably would love to see this chart. The more red the better, because the idea is to ease financial conditions, and the more red this is, the more easy financial conditions are, and the more it will support the economy.

But if you are a real money manager in Europe and you look at this as your investment universe, and you say where should I put my money, it's not a surprise that many people in Europe basically vote with their feet and go somewhere else.

The red line here is the net portfolio investment of fixed income for Europe, so this means not only European money managers where do they put their money, also are foreigners investing in European fixed income.

And as you can see here, we have never seen such a significant outflow of money from European fixed income because who wants to have negative interest rates? If you are an insurance company, if you are whatever pension fund, of course, you would decide to go somewhere else, and we're seeing that to the tune of around 600 billion at the moment, which is by any metric going back in history bigger than what we had ever seen before. And who's the main beneficiary of this? Of course, U.S. treasuries are one of the main beneficiaries partly because the market is so big. But the blue line here, this is from the TIC data. As you read the bold text here, "Net foreign purchasers of U.S Treasuries," and the blue line shows you private buyers of U.S. Treasuries.

If you look at the beginning of 2015, at the time I was traveling in Germany and in Amsterdam, and when you met money managers there that's exactly when bonds, 10-year bonds hit zero. Everyone basically said I've had enough. I just don't any to have European bonds anymore. Just give me some Treasuries. No matter what the outlooks is for the U.S. economy, I would much rather have high yield elsewhere, and you could show the exact same chart also for corporate bonds, investment grade high yield that's been a significant inflow into U.S. spread product meaning investment grade high yield as a result of negative interest rates not only euro area, but also in the U.S. which basically as a footnote opens the door for the U.S. and U.S. financial markets.

All these tourists that came into U.S. fixed income, but didn't come because they worried about what the (indiscernible) for U.S. rates, but they basically only came because of this chart here.

How worried should we be about that if we do start to see inflation in the U.S., if we do start to see the economy reaching full capacity.

And that's the final chart that I have here. What is the main problem with this, and why should we worry about this from a financial stability perspective? This chart is embarrassingly simple. It just shows you the unemployment rate. The blue line is in the U.S., and the red line is in euro area.

The blue line is the unemployment rate. Today, as you know, is 4.7. This is very close to the 2005 level which you could say this is probably some estimate of the NIRU. In other words, some estimate of when you should start to see (inaudible) inflation and consumer price inflation. There are also much more sophisticated ways of calculating that, as you know, but the bottom line is the U.S. is probably very close to full employment. This is also what (inaudible) was saying. So in that sense, it probably makes sense that the Fed is starting to think, starting thinking about hiking rates.

But look at the red line. In the euro area (inaudible) rate today is 10. But where is the (inaudible) area? There's various estimate that says that it's a little bit higher than the 2005, but let's just say that it's around 9 where it was in 2005 where we had high wage inflation in the euro area, we also had high consumer price inflation.

But that tells you if you put your ruler down on that, and as you know, in the economics toolbox that's one of the best tools we have, you end up saying when will we hit full employment in the euro area? And one answer is, okay, maybe the ruler is not fantastic here, but let's just say in the next one or two years. Think about what that really means. That means in the next one or two years we'll see Iggy Matell start asking for high wage increases. We'll see upward pressure on inflation across the board, and particular in the euro goes down again, which is what everyone expects, then you should also see more inflationary pressure.

So think about what that really tells you. That in the next one or two years, we could see inflation in the euro area, but how (inaudible) precision for this, look at Germany. Investors now believe that interest rates will be negative for the next eight years. In other word, the risk is that all investors will come

back big time out of the same door which will be very narrow, and therefore this will turn blue very, very quickly the day we start to see inflation.

So in my view, I think the main problem really here is that we are at significant risk that the slightest hint of inflation first in the U.S., and in the next one or two years in the euro area could basically reverse these policies and create an enormous amount of financial instability in the worst case simply because a lot of people have invested in products now not because they like the underlying cash flow of those companies or whatever assets they had bought, but simply because they did it under the expectation that the (inaudible) trade would continue for the next eight years.

So on that note, let me stop there.

(Laugher and applause)

MR. WESSEL: Okay, we'll now be serving drinks.

(Laugher)

MR. WESSEL: I think I'm just going to ask a question or two, and then we'll go to the audience so we can stop, and I'm hopeful that we can broadcast the Janet Yellen remarks beginning at 12:35.

Massimo, do you want to, when you get a mic, do you want to say anything in response to Tortsen's indictment about how the ECB is completely playing Russian roulette with the American and the European economies?

MR. ROSTAGNO: No, am many things. Many things. One thing I'm totally in agreement is the fact that we see very little in terms of structural reforms. There we see some stalemate in the knowing the dive for governments to adopt structural measures that may not repair those economies in a lasting manner.

And that's just something by the way that ECB is always emphasizing. Perhaps somebody I'm sure for American taste is even too much. And all the scores on other policies, I don't think the Fed would ever (inaudible) prescription to fiscal policies or even (inaudible) labor market policymakers.

What ECB does very often, because the governing council clearly and genuinely believes that in a more flexible economy, in a better functioning economy, monetary policy would be really more effective.

And there would be less need for monetary policy as Tortsen has said. Where I don't agree, however, is the fact that we, central bank that has a very narrow monetary policy mandate. It's very, very narrow. If you read the treat we say, we have been given a hierarchical mandate. First insure that price stability is there. And then do whatever maybe beneficial from the point of view of the general economic objectives of the European Union. This is the way (inaudible) has been structured in the hierarchical.

So it would be very difficult for us to get involved in any quit pro quo type of game with other policies whereby we say we don't, we don't ease policies although inflation is falling, just because we don't see so much coming from your side, that would be really unlawful. And so that's the answer. By the way, it's not eloquently enough to say, to claim. It's not only a matter of oil. It's not only a matter of oil. It has been a matter of oil at the beginning. So the winding of the positive contribution of high oil prices to headline inflation has proceeded for a number of (inaudible), I would say where ECB was by the way very patient in responding to that situation because it saw the causing, the factors being, again, (inaudible) inflation so not so worrying.

It became very worrying when the ECB and staff realized that the core was starting (inaudible) was starting to react big time to that situation. In fact, now it is not increasing. It, in fact, is decreasing. It was around, hovering around 1 percent for a couple of, I think for a year, an entire year. Now is lower. Now has been very much lower. In April, it went up a little bit to 2.8 in May. These are rates that if are maintained, and by the way, we have evidence that inflation is attracted in the medium term by the core, which is what everybody should expect, when oil and Iraqi will have their way, what will prevail would the core, the fundamental drivers.

If that is the situation that we are moving into knowing in two years' time, that's not satisfactory. That's not consistent with our mandate. Our mandate is to stabilize inflation at medium term horizon not too far from 2 percent. It’s definitely too far from 2 percent.

MR. WESSEL: Niels, let me ask you a question. A couple of people have mentioned that while there may be benefits to negative interest rates, particularly if you take fiscal and structural policies given, but there are (inaudible) to confidence. Do you see that in Denmark? Does it shake people up that, this weird situation where rates are less than zero?

MR. SLOK: I don't think so. Oh, sorry.

MR. ROSTAGNO: I'm sorry.

MR. SLOK: I think, and as I stressed in my presentation, the Danish monetary policy is, has been in place for many years. It's very well understood what it takes. The central bank (inaudible) as its sole objective so we do what it takes, and that has been well understood also in recent years, and politicians know that as well. So they know they have to do their part of the job. But, no, I don't think --

MR. WESSEL: Politicians know they have to do their part of the job. That must be a Scandinavian thing.

(Laughter)

MR. WESSEL: Alex, are you as terrified as Torsten is about they're playing with matches here?

MR. ROEVER: I don't, I wouldn't say terrified. I think there are a lot of unknowns about how the negative rates manifest themselves, and, yeah, you know, Torsten talked about sort of the international flows in one of his charts.

Yeah, it's a really powerful thing. It's, you know, the fed, you know, it doesn't have an explicit mandate to manage the level of the dollar, yet, we continue having, every time it thinks like it's getting ready to move interest rates higher, seems like to have a surge in the dollar, and that seems to put the brakes on on what's happening here.

So I'm not entirely sure that, you know, as the world's reserve currency with an increasingly large part of the world's sovereign debt moving into negative territory that we completely have control of what's going on.

MR. WESSEL: But that's on condition of if we're gonna have easier money abroad because they have weaker economies, and tighter money here because we have a stronger economy, yields will be

higher, money will flow, and exchange rate will go up. That's not a condition of negative rates. That's what happens when you have countries --

MR. ROEVER: It's being on the receiving side of it. I mean, I think there is received effect of negative interest rates from (inaudible) and the world --

MR. WESSEL: Right. So it seems to me -- let me just ask one question of Tortsen and we'll go to the audience. I don't care about portfolio managers being unhappy. The objective of fiscal and monetary policy --

MR. SLOK: They're managing your pensions.

MR. WESSEL: -- is not to make portfolio managers happy. The point of fiscal monetary policy is to get us closer to reduce the output gap, encourage investment. So by that standard, do you also think that this is a failure?

MR. SLOK: No. So, no, I completely agree the idea is not to make portfolio managers happy. I mean, I think the most serious issue is, as I mentioned, the wealth effect has fallen.

MR. WESSEL: Right.

MR. SLOK: Corporates have basically also enormous amount of cash, and you really ask why -- this is not only negative interest rates, but you really ask why they're hoarding cash to such a significant degree.

So a lot of issues that go into what are the implications of having such a weak recovery that's taking so long. And this is not only a European issue. This is also very U.S.-oriented issue.

MR. WESSEL: So if I heard you right, it's not that you think that negative interest rates are causing this. You think that we have something wrong with the economy. Better policies would be fiscal and structural. And given that we're not getting more fiscal and structural policy, you wonder whether the benefits of negative rates are worth the cost?

MR. SLOK: Yes. But I would also add that if you look at them, you saw the chart with European money flows, that happened exactly when the negative interest rate came that people just completely lost confidence in European fixed income.

So it's not just that European negative interest rates are sort of an innocent thing and it hasn't really done much. It has changed the whole game of how people think about things, and that's why the flows of money out of European fixed income is happening at this enormous rate and is holding U.S. rates down in a very significant way. A complicated way of saying that all Mickey Mouse models of 10-year rates in the U.S. would basically say that U.S. 10-year rates should be a lot higher than where they are.

So if this is dragging down U.S. rates, it simply means that U.S. rates are down basically because European rates are so low. So if European inflation goes up, we could have a huge move up also in U.S. rates.

So in other words, the (inaudible) U.S. rates coming from Europe is very substantial at the moment. So that's why 50 percent of treasuries are held by foreigners, and 50 percent domestically. So that means that whatever happens abroad has actually become really important including negative interest rates for U.S. rates.

MR. WESSEL: Peter (inaudible).

SPEAKER: Two questions if I might. The comparison between Denmark and Switzerland is instructive in various ways, and I think will see a difference. Niels is very confident that intervention would basically be sufficient to deal with the problem. Well, you saw in the case of Switzerland that it was not, and it blew the exchange rate (inaudible).

What's the difference between the two? The difference between the two is the scale of capital inflows being a faced. (inaudible) proportionately in Denmark, much bigger proportionately in Switzerland.

So an obvious question to ask, therefore, of both cases, if there were to be repeat of surge of capital perhaps larger than you've seen in Denmark more recently, would the problems that you've seen in Switzerland where there's concern about the political resistance to lowering interest rates appear now in Denmark? Would some of those confidence effects that have not been apparent, say, from Denmark, appear simply because of the scale of the shock?

And, indeed, a follow-up question in the case of Switzerland if there were to be another big (inaudible)m and people were presented with alternatives, if you're not going to lower nominal interest rates

further, what would you do instead? Would that actually relax the political constraints when they're faced with the actual concrete alternative? That's my first question.

MR. WESSEL: Okay, can we pause there first?

(Laughter)

MR. WESSEL: What if you had Swiss size capital inflows our outflows?

SPEAKER: What if, I mean, this a hypothetical question. It's very difficult for me to answer. We are not Switzerland, and for obvious reasons I will not go deeper into that because it's speculation.

MR. WESSEL: You want to respond, Jean-Pierre? Peter, can we get -- oh, Brendan, can you bring the mic to Jean-Pierre?

MR. DANTHINE: Let me answer partially. I think it's a good question. There is a bit of a contradiction in my speech where I said I think we have to be very careful with reaction of the public in selling negative interest rates. You know, the same time I say in Switzerland we may have a way. Right?

But it comes exactly from your question, the answer to your question, Switzerland has more at stake in a sense, which is the (inaudible). We absolutely need these negative interests (inaudible). And if there was more shock, I would think this is one domain where we could potentially convince the people and the politicians that, yes, we have to go lower in a passion way, the way that I have described. And, yes, there will be possibility, I hope, I think to change the mind of people.

MR. WESSEL: Thank you for your second question. Can you give the mic to this gentleman over here? I just want to get a few more people.

SPEAKER: Good morning, (inaudible) Corporation Canada. Could it be that commercial bank reaction to negative interest rate was also largely influenced by the fact that as central bank were introducing negative interest rates, European banks regulators were introducing (inaudible) concerning (inaudible) liquidity risk, and operational risk, and in that context on the liability side, the commercial banks were putting a lot of value to personal deposits which was credit on the (inaudible) side. And on the other side of balance sheet making more risky loan was also (inaudible).

So in a sense, we have so many things happening at the same time, the left hand doing the other thing than the right hand was doing, I wonder if the experience was a real one.

MR. WESSEL: Anybody want -- was regulatory policy and monetary policy at odds here?

SPEAKER: I can tell about in the U.S. context. I mean, I think, and I think it's generally true. And I think a lot of adjustments to sort of the structure of the banks, more capital, more liquidity, so more cost, fewer assets, and lower yielding assets to sort of spread that higher cost over.

So in the U.S., you know, one of the things we've seen from the U.S. data is, yes, indeed, the largest banks have tended to shift more of their deposits onto retail deposits which have a lower cost, and we've seen sort of a pickup in commercial deposits, more expensive deposits in sort of mid-tier institutions.

So it's definitely the two, the two of them are definitely sort of having, you know, compressing effects. It's not just the NIM. It's also what comes after the NIM.

MR. WESSEL: NIM, Net Interest Market?

SPEAKER: Net Interest Market.

MR. WESSEL: This is an acronym free zone.

SPEAKER: (inaudible). A question for Torsten. You said that confidence went down, but wouldn't people move their funds to the U.S. even if confidence were the same just because rates were lower? So are you using the word, "confidence," to imply simply level of rates?

MR. SLOK: So, yeah, that's a good question. Confidence, of course, means, but not only that the confidence among investors was declining that this would be working or functioning because if your job as a money manager is to try to generate a stable cash flow, and you're suddenly told that the bonds that you're investing in are now paying negative, outrageous -- the confidence (inaudible) we've got to have a whole new look at our portfolio. So that's for the investors.

The other confidence (inaudible) for consumers that if we turn, quote/unquote, Japanese and say, gee, I have very little confidence in my future income so maybe that's why the wealth effect has declined so much.

And same thing for corporates if the confidence effect that corporates say, well, why should we invest anytime soon because we just don't -- this is a signal that the central bank is telling us that this is just not functioning. That this will take a long time.

We were all hoping that negative interest rates would only be temporary, but these things have now been here for quite some time, and that's just --

MR. WESSEL: Do you think that if interest rates were at 50 basis points suddenly that this move to negative rates is nonlinear psychologically?

MR. SLOK: So for portfolio managers, I'm absolutely convinced that it is.

MR. WESSEL: (inaudible).

MR. SLOK: Yeah, that's true. But for, I mean, consumers and for corporates then I think it would be much less convincing in that sense. I don't think that there will be the negative confidence effects as a result of that.

We simply (inaudible) a new regime and that new regime has some implications that people have changed their behavior. So put schematically, I mean, the behavioral coefficients, if you will, in your whole purpose model just have a much lower coefficient, people are just much more risk averse.

MR. WESSEL: Ma'am, did you have a quick question?

Okay. This will be the last one, but we'll have more --

SPEAKER: (inaudible). I have a questions specific to Denmark. Do you see any impact from the negative mortgage rates on the banking system through covered bonds and they're used as collateral?

SPEAKER: No. No, I don't see that.

MR. WESSEL: Okay. All right. So, Carrie, can you come to the mic and tell people what happens next so I don't screw it up? I don't want to undermine confidence.

(Laughter)

SPEAKER: We're going to break for lunch now, and we're going to reconvene at 1:45 back here. Please help yourself. There are sandwiches out in the hallway, and beverages. We also have a cafeteria down on the other end if you find a place to sit with your lunch.

We'll start back for our afternoon session at 1:45. In the meantime, we're going to try to broadcast Janet Yellen's speech in here. Thanks.

MR. WESSEL: Hopefully, with audio as well.

(Laughter)

(Applause)

MR. WESSEL: So welcome back. For those of you who weren't here this morning, I'm David Wessel from the Hutchins Center here and all the slides and the video -- all the slides from this morning are online and the video, if it isn't, will be on later. But now for something completely different.

Miles Kimball is an economist at the University of Michigan who fortunately -- I sometimes think he must be paid by the word, and he must get double for each word he talks about negative interest rates. So he has some pretty strong views about this. And he'll be followed by my colleague, Don Kohn, who is the Robert Kerr senior fellow here at Brookings and a former vice chair of the Board of Governors. And then after that we'll have a panel where we'll try and draw some conclusions from this with Ben Bernanke, also at Brookings, formerly at the Fed; and Narayana Kocherlakota, formerly of the Minneapolis Fed, now at the University of Rochester; Beth Hammack, whose bio is in here but whose name is left off the thing from Goldman Sachs; and Jamie McAndrews from the New York Fed.

So Miles, the floor is yours.

MR. KIMBALL: All right. Well, this has been just a fascinating conference, and I think great kudos are due to David and everyone here who put this together. And there are just so many things we've talked about already that are really important. One, for example, this point about what the markets perceive the effective lower bound to be, having a big effect on policy, the fact that the need to tighten the BASEL standards even further means that we better have other things in our arsenal in order to stimulate -- to get the aggregate demand. And we had some talk about transmission mechanisms. You know, and on transmission mechanisms, let me just say every borrower-lender relationship in the economy creates a transmission mechanism and so there are three times as many transmission mechanisms that are as important as the ones people have talked about today. Those are important but nobody's talked about car loans. There's just the fact that the Treasury bill market where if the interest rate goes down it mechanically makes deficit numbers go down so that probably governments tend to spend more money. So there are just a huge number of things and there's a lot of transmission mechanisms, even if some are occluded or blocked, the negative interest rates will have an effect on the economy.

So this is -- let me just turn to these slides. So this is work with Ruchir Agarwal. Ruchir, wave your hand. There's Ruchir, who is at the IMF, and this certainly isn't an IMF view I should say. And I'll give the disclaimer for Ruchir. And this is -- so you can see the title, "Enabling deeper negatives rates by managing the side effects of a zero pay per currency interest rate." This is a sequel to the paper that Ruchir and I have as an IMF working paper, "Breaking through the zero lower bound," and I also have a paper, a published paper, in the National Institute Economic Review, "Negative interest rate policy as conventional monetary policy." And both of these are conveniently available along with much more from links on my bibliographic post on my blog. So as David was saying, I've written a lot on my blog about negative interest rates and I have it all conveniently arranged for you here. But probably the most important are these two academic policy papers. I say academic but I think they are a lot more readable than many academic papers that are out there.

So this graph is meant to show that historically central banks tend to drop interest rates 600 basis points or so in order to deal with recessions. And so think of the next time around. Suppose the U.S. might be lucky to get plus 1.5 percent interest rate before the next recession strikes, even if that's five years from now. If you want to drop 600 basis points from that, you're down to minus 4.5 percent. So you can see that the zero lower bound is really quite a big issue.

And a lot of countries have fairly low interest rates. Here the OECD countries. A lot of them are familiar. A few non-OECD countries have fairly low interest rates now and some might have a zero lower bounds problem. And as we've seen, there are quite a few countries -- to the countries we've talked about today, Hungary has one overnight deposit rate that's now slightly negative. I know some of the other eastern European countries are starting to move towards negative interest rates.

Okay, so I think it's useful to have more than one approach to enabling lower rates. You know, a lower bound on interest rates can be a serious obstacle to monetary policy. We do want new tools, but as many of us discussed this morning, the politics matter, the legal issues matter. Monetary politics and law differ from one nation to another, so you need a menu of different tools so that the technical approaches can be adapted to the political and legal situation in different nations.

Now, despite the title of this session, I'm not coming at it as primarily being about the U.S.

The monetary policy toolkit is really an international one, and what one nation does really does help provide additional thinkable tools for other countries. And so I think the reason that I'm optimistic about an expansion of the monetary policy toolkit is that there are enough different central banks that think about things in different ways and have a willingness to experiment that I think we will see a substantial expansion in the monetary policy toolkit over the next five years or so, and hopefully, it'll be five years before the U.S. needs negative rates.

There are two paths that Ruchir and I want to talk about in terms of paths to deep negative rates. So think of minus three percent, minus four percent. The papers that are written already I'm going to call the clean approach. An electronic money system that generates a negative rate of return on paper currency and it's going to get into all the nooks and crannies, it doesn't matter where that paper currency is, using the central bank's power to determine exchange rates between different forms of money under its jurisdiction.

So when I went to the Chicago Fed recently I asked, hey, where's your cash window? And the economist there I was talking to said, well, we don't know. Well, the cash window is actually a very crucial part of the central bank. You know, that's where the banks that actually interact with the Fed bring their cash and they say, here, we're going to give you this cash. Please credit it to our reserve account, or they want to withdraw stuff from the reserve account. This is a very powerful, very important part of the monetary system that I think is neglected in money and banking textbooks. They ought to have pictures of the cash window in every money and banking textbook and discuss what it does because that's where the exchange rate between the electronic dollar and the paper dollar is determined. It's been at par for a long time. That's the standard policy. But it's because it's treated at par at the cash window that it's at par.

The dirty approach, which is what this talk is really about, is using a variety of regulations to make it difficult to earn anything close to a zero return on any substantial amount of paper currency while maintaining paper currency officially at par relative to electronic money. And I say officially at par because, of course, as soon as you don't have absolutely free conversion, then there can be a kind of grey market price that drifts away from par, but you want to at least have the official policy of it being par stay the same in this approach.

And just to remind you, we've had changes in monetary policy, monetary systems before that of similar magnitude, and the big one is going off the gold standard, Bretton Woods or going off fixed exchange rate with the Nixon shock was a pretty big deal. Going to negative interest (inaudible). Okay, oh, sorry.

SPEAKER: (Inaudible) can't hear you.

MR. KIMBALL: Oh, right. So, and you know, we could someday have a cashless economy, but all of the things I'm going to talk about today could be done in very short order. I think getting rid of cash entirely, that might take a decade or two to do right.

So let's talk about the zero lower bound itself. What does it take to get a safe return that creates an effective lower bound on interest rates? Assuming all government-controlled electronic rates are negative, paper currency really is the issue. Why? First of all, private firms don't have the disregard for profits and the deep profits needed to pay an above-market rate on an equilibrium rate altering quality of funds. So in blue there you can see the relevant blog post there, how negative interest rates prevail in market equilibrium. You know, you've got trillions and trillions of dollars at negative rates. It's not easy. You've got to think of trying to run those all through cash. That's a nontrivial task, or cash, or whatever it is. But the bigger issue, the bigger point is that assets whose price can vary freely, including notably existing debts whose secondary market price can very freely, can't create an effective lower bound. You're going to tend to get a capital gain, but in any case, a capital gain then expected depreciation, and in any case, there's a lot of risk to anything that can change its price. So the thing that's special about paper currency is that it has a government-controlled price of par relative to electronic money.

What if you do think about cash? Again, you still need the quantities it's going to take to create zero lower bound are going to be a lot. I think it's useful to focus on -- and how you go from electronic money -- that is money in the regular financials, money in the bank, to money in the bank, which is what's going to be exciting to the folks in the financial markets. To get zero from money in the bank to money in the bank, you've got to withdraw paper currency freely at par, store large quantities of paper currency legally and safely, re-deposit paper currency freely at par, and you have to do all of this in decisively equilibrium rate altering quantities. That's trillions of dollars' worth of paper currency storage to do that.

Now, just very briefly on the clean mechanism, if you have a time varying deposit fee at the cash window of the central bank, then that effectively creates an exchange rate when you have it be on net deposits. That time varying deposit fee is only between the central bank and the private sector bank, so it's very much focused on the price system. No regulations beyond the deposit fee are needed. It has to grow when the target interest rate is negative. It can shrink again when it's positive, so you go back to par at normal as long as your nominal interest rate is positive.

This is a chart just showing that there's no arbitrage then because what you've done is suppose you have negative short rates for a while, minus two percent. Suppose we'd had minus two percent in 2009 and 2010 in the electronic short rates, and then plus two percent from 2012 on, then you can basically get the same effective rate of return on paper currency by having it depreciate. So a paper dollar would be worth one electronic dollar in 2009 in this counterfactual, then 98 cents, then 96 cents in 2011. It would have to stay at 96 cents in 2012 and then it would gradually come back up to par. So I can't dwell on this because I need to go to talk about the dirty approach.

So what I want to do now is say just suppose as a political constraint we're not allowed to take paper currency off par. At any rate, we can't do that for a while. Here's a set of policies that will help you go to deeper negative rates without bad side effects. You're going to manage the side effects. And let me talk about each of these in turn.

The main thing I want to emphasize is this is an a la carte menu. You don't have to do them all. Any one of them individually will be helpful. There's a bit of complementarity but each one will be helpful. And I'd have to say I think the first two are probably the most important. So in discussing these, let me have some background assumptions. You know, unless you have all of the ways that people can lend to the government in unlimited amounts negative, other than cash, it's not even worth dealing with the cash problems. So let's assume you have a negative target rate, a negative interest rate on marginal additions in reserves, and you might as well include vault cash. Might as well have a negative lending rate. That's not absolutely essential but I think it's a very good policy, current ECB policy. It helps support bank profits, too, and it certainly helps get lending rates down. And also, interestingly enough, you need to have a negative between your rate and the tax system. That's actually current law. You know, the current law says that

between your interest rate and the tax system is supposed to be set according to other short-term rates like the Treasury bill rate. And so the Treasury secretary is supposed to set it negative if the Fed goes negative. And the within year zero rate doesn't matter because you can't run through all the trillions of dollars you need to just based on that within year zero tax rate.

So the first policy, and again, this is an a la carte menu, but this one I think is actually surprisingly easy. Ban electrification of paper currency. What do I mean by that? In the formal models, the zero lower bound I think of as being enforced in these formal models by people setting up money market mutual funds backed by paper currency. And so there's this clean arbitrage. And the thing is though that's not easy to do when the government doesn't want you to do it. Even moral suasion saying, look, we frown upon this, don't do it, is going to go a significant distance towards preventing folks from doing this, but I think it's a pretty reasonable thing to do. I mean, it's not like people are doing massive paper currency storage now. Stopping them from doing something unusual that they haven't been doing in the past is not necessarily the hardest kind of regulation to do. Now, interestingly enough, although the clean approach I think is -- I would argue that that's within the legal authority of the Fed, this one is a matter for the SEC. And so that's one of the interesting features here. Although the Fed might have some authority if it's inside a bank holding company.

Now, a big point I want to make is if you don't let people set up money market mutual funds or some other kind of fund that creates these convenient electronic liabilities that are backed by paper currency, which I think is pretty easy to do, then what is the zero lower bound made of? The big concern after that is really about bank profits. And so that's the thing we want to go to next. So as long as you outlaw the electrification of paper currency or make it difficult in some way, which I think is pretty easy, then we have to worry about bank profits.

Now, don't exaggerate how bad that concern is yet, but I think there's a very, very attractive and simple -- not simple but easy policy that is very much along the lines that Jean-Pierre Danthine was suggesting this morning. What you can do is you can use the interest on reserves formula to subsidize zero rates for small household accounts, but it also holds the banks harmless for providing a zero interest rate for the small accounts. If you do that, it has a lot of advantages. It helps keep up the bank profits. It helps

insulate you from some of the political costs of the negative interest rates, and it also means quite crucially that the households with small accounts don't have much incentive to withdraw paper currency to store the paper currency themselves. So you can go after the large scale storage by making illegal the electrification of paper currency, and then you try to avoid the small scale storage by making it so that a typical household doesn't have much incentive to do that.

So again, at the bottom I've got the name of a blog post here that really addresses this, but I think this -- Europe should be doing this right now, is to really attune the interest-on-reserves formula to explicitly provide these incentives, but also to set a marker saying, look, we'd like you to have a negative rate on the large household accounts but up to this level please do a zero. I think it would be easier for the banks to have a negative rate on the large household accounts if the central bank was sort of suggesting what the size of household accounts that should be exempted should be.

And by the way, interest-on-reserves formula can be quite complicated. So this is not complicating it beyond the kinds of things that have already been done, just tuning it up.

Now, a very interesting thing that is actually the current policy in both Switzerland and Japan is to charge banks for excess paper currency withdrawals from the cash window. This is a very interesting policy because basically, because as a central bank you know when the private banks are taking out paper currency, you can effectively charge negative interest rates to banks. Now, it's a little tricky how banks pass that on but I think you can let the private banks figure that out, but the very interesting thing is you can discourage over withdrawal of paper currency simply by assessing the negative interest rates, and then you'd want to let the banks pass that on as they thought appropriate.

Now, again, this is an a la carte menu. You don't have to do this, but it's helpful if you retire large denomination notes of paper currency. This is very much in the current policy discussions, so this is not beyond what people are talking about.

Now, this fifth one is a bigger deal, and again, even if you just do the first four, that's pretty powerful, but I think at some point you want to ban storage of paper currency as a business. Now, here what you're worried about is the household sort of taking out the maximum amount they're allowed to take out of paper currency every month without incurring the fees for their banks which the banks would pass on, so you

have an exemption amount for withdrawing paper currency. And what you don't want is for somebody to kind of vacuum up all this maximum withdrawal from all the households and then collect it and store it. But I think again, it's not that easy to do that without being noticed. And one powerful tool is saying not only can you not be paid for storing someone else's paper currency, but you can't openly pay above par for somebody's paper currency. That makes it hard to vacuum up the paper currency.

And finally, just because it's so close to what happens now and it's quite easy, you can put restrictions on flow of cash in and out of the country just so people don't get around these regulations just by trying to do it abroad. I think that's pretty easy. There's a lot of restrictions on cash moving abroad.

So in conclusion, the electronic money approach is attractive. I think the dirty approach may also work. In any case, there's quite a large menu of policy options to enable deeper negative rates, and I would hope that there wouldn't be too many people in the room that wouldn't find at least one thing on this menu as an attractive thing to consider. Thank you.

(Applause)

MR. KOHN: Thanks, Miles. That was really informative and stimulating. And I think you've identified a very important issue here. The currency demand or the availability of currency, zero interest rate, does put -- will eventually put -- we don't know where -- an effective lower bound on the policy interest rates that central banks can impose on the economy, can target in the economy. Arguably, there are maybe some central banks in the world today who would like to keep pushing those negative rates and find out where that limit is and maybe go through. I think there's a lot of appeal to using an interest rate tool, even in highly unusual situations such as the kind we -- the global economy is finding itself in right now that's the sort of tool that central banks are used to using. There's a lot of empirical evidence about how declines in interest rates and easing of financial conditions feeds through to the economy. It avoids some of the credit allocation and risk issues involved with quantitative easing. And in any event, aggressively using interest rates together with quantitative easing might be a more successful kind of tool.

As you saw, Miles has two ways of dealing with this zero interest rate on currency. One, the clean way, which would be just having the central bank have an exchange rate between currency and deposits, and that exchange rate would vary with the negative interest rates, and presumably as the value of

currency went down relative to the value of deposits at the Federal Reserve, that would be passed on to its customers.

The second way was what he called the "dirty way," and that's trying to enforce some of the same kinds of differences but doing it without this official exchange rate change.

So I think the way I've been thinking about this is a little bit of reverse Bernanke. So Ben famously said QE was something that shouldn't work in theory but did work in practice. I see this as something that might work in theory but will never be tried in practice. So a negative Bernanke here.

So I think this is a major change and a very big deal. The way Miles portrays this is kind of a natural extension of a lot of things that are going on today, and just like getting off the gold standard or the Smithsonian floating exchange rates, it's just another change. But all those other changes were about the relationship of money defined to be both deposits and currency to goods and services and how that might evolve over time. And so far we've stayed away from or haven't tried having one type of money convert to another type of money by a floating exchange rate. And we've heard already this morning political resistance to negative interest rates, and I would think that there would be quite a bit of resistance to having one of the things I carry around in my pocket, currency exchange to a different exchange at varying exchange rates, or have a penalty to something else I carry around in my pocket, which is a checkbook and/or a credit card.

And the complexity and difficulty of doing this I think is nicely illustrated by the components of the dirty approach and how difficult this would be. So in the dirty version, you'll have to change a lot of law and regulations to change the relationship of currency and deposits, and you want to allow maybe individuals, as Miles said, to have small amounts of currency, withdraw small amounts of currency without penalty, but you want to have enough penalties and enough walls and enough restrictions that those conversions can't be done in large size. So you need to have those walls be tight enough that other, the non-households can't overcome the restriction on converting or the price, the extra price for converting currency to deposits.

So it's complex. It's difficult. It strikes me as a little bit like credit controls or capital controls. People will find ways around them. And look at what you have to do there. And I know this is a menu but

you've got to be able to do some of these things -- ban electrification of paper currency. So, you need the SEC to do something in the U.S. anyhow about money market funds and to restrict money market funds. You can subsidize zero rates for small household accounts but you better keep track of those household account and who's withdrawing what and how that adds up for each bank so that the banks don't use that to get around the restrictions and the extra cost of converting currency to deposits.

Charge banks for excess currency withdrawals. I think that might be possible. I don't know the legal limits on things. People are already questioning whether the Federal Reserve has the legal authority to do negative interest rates. So here we're sort of upping the ante and having them charge banks for excess currency withdrawals. Retire large denominations. So this would be unprecedented. I can remember when we converted, when we put new types of $100 bills out there. One of the things we said was don't worry about your old $100 bills. They'll always be good. The United States has never, never negated one of the denominations of currencies that it had issued. So you'll always be able to trade it in. You don't have to worry about invalidating the currency you have. So this would change that. This isn't just don't issue $100 bills; it's to take some of the $100 bills or all of them that are outstanding and say they're not valid anymore after a certain point. This is a very big deal and would require at least the Treasury, if not the Congress, to agree to it. Ban storage of paper currency as a business. So, I mean, that presumably would take legislation and take a law.

I think all these things aren't as routine as they might seem when Miles is talking about them. They would change the way people did business. There would be pressure on the exemptions. Would small businesses be exempt as well as small households? People would exercise a lot of ingenuity getting around it the way they had in the past on deposit insurance. Breaking up big deposits and putting them in smaller bundles.

Even if there's legal authority to do some of these things in central bank mandates and central bank laws, I think that's almost less important than the discussion that the central banks would have with the public and with the legislatures.

A central bank would be very short-sighted to implement some legal authorities that it might have to make currency more expensive than deposits without a very extensive conversation with the

Congress about why it was doing this, why it was penalizing people who were walking around with currency in their pockets, and what the implications were, and it would need to make sure that the public, the legislature were comfortable with what it was doing. So I'm less worried about the legal authority than I am about the acceptance of this by the public at large?

So I don't see this happening. I could say not in my lifetime, but I'm 73 and that doesn't mean so much anymore. (Laughter) But I would say maybe not even in Miles's lifetime, absent a major depression and having other things tried and the central bank coming to the Congress and the president of the United States and saying the only way to get out of this depression is to discourage people from holding currency so we can charge them for having deposits, so we can charge businesses and others for having deposits at commercial banks. That's going to be a very difficult conversation, but the only way I can see this happening would be under those circumstances. Everything else had been tried. This was the only thing left and now maybe it should be given some consideration.

So Miles, thank you for provoking a lot of thought and interest in my mind and thinking about this very important subject some more. I hope that what we do as policy folks is think about ways of avoiding getting into the situation, both with monetary policy, fiscal policy, regulatory policy, et cetera. I wouldn't count on using Miles's machine for getting out of the bad situation. Thank you.

(Applause)

MR. WESSEL: Thank you, Don.

I'm going to give, Miles, you get like three minutes and I'm cutting you off after three minutes.

MR. KIMBALL: That's fine.

So I actually only want to say two things in response to what Don said. I think first of all, you know, think of the difficulty on the other side. To get a zero interest rate, you've got trillions and trillions of dollars' worth that in the circumstance we're talking about would be at negative rates. Already the world has trillions of dollars' worth. If the U.S. were at negative rates it would be many more. You're talking about trillions of dollars' worth of paper currency that you have to store. So getting in the way of that a little bit might be enough. We don't know. But I think you don't want to underestimate the difficulty of the person

who wants to get the safe return on the paper currency. I think it's simply unknown how difficult that is if the government is trying to get in the way a little bit.

The second thing I want to emphasize is this really is -- I really do see this as an international thing. How difficult these things are differs dramatically from country to country. In the U.S., the Fed is under political siege. I mean, Ben, who is a hero, was called a traitor by a presidential candidate not too many years ago, and you know, it's tougher in the U.S. than it is in some other places. So I don't expect the U.S. to be the first place to do these things. I think quite honestly the U.S. is dependent on the goodness of strangers, namely, the Fed is dependent on other central banks leading the way for it to ever be able to do these kinds of things.

MR. WESSEL: So I think we have time for a couple questions. If you guys can just put the mics on.

You know, Don, I was a little worried when you said "not in my lifetime." If 10 years ago I had told you the Fed is going to have a $4 trillion balance sheet you probably would have said not in my lifetime. So I'm not sure that's a good -- I think you want to think about that.

MR. KOHN: Maybe I should be older before I say that again.

There are a couple questions? Oh, come on. Yes. And there's one in the back.

SPEAKER: Hi, this is a question for Don. Just because I wanted to maybe pivot off of something you said about avoiding the need with something (inaudible) had done, work that she had presented that showed how frequently you hit the zero lower bound, particularly with inflation targets set at two percent. What do you think -- given that -- assume Miles has got the right prescription, right, but it is impossible, then why not change the inflation targets? Do you think there would be less political resistance to that? And what then would be the appropriate inflation target to set?

MR. KOHN: So I'm very hesitant to change the inflation target. I recognize that if you could get inflation to four percent and have that be a credible target -- those are big "ifs"; right? It's hard getting to two percent these days, and Japan in particular, but other places, too, that presumably nominal interest rates would be higher and you'd have further to go.

What I worry about in that discussion, and what I'd like to see more discussion of, is the

costs of inflation. So people don't like inflation, and it's not just some of the technical, economic, shoe leather tax system, that kind of thing costs. I think inflation, higher inflation makes it harder to plan. It confuses market signals. It probably, because people have trouble interpreting market prices as to whether it's real or nominal at these higher rates of inflation, I think there's probably resource misallocation. So I wouldn't rule out going to a higher target, but I don't think the discussion of those targets has fully incorporated all the potential costs. And I think the economists who advocate going from two to four just to avoid the zero lower bound are, I mean, that's a good reason, but there are other costs involved. So I think we need a fuller discussion.

MR. KIMBALL: I can answer that question, too. I think one of the big benefits of developing the monetary policy toolkit so that we can have a robust negative interest rate policy with fairly deep negative rates is that then over time, once we are confident of that new toolkit, we could bring down the inflation target to zero. Now, I say over time, but in Switzerland where the current inflation is fairly close to zero, simply having people get comfortable with a negative rate policy that could go fairly deep would enable Switzerland to maintain an inflation target at zero. So I think that's a benefit of negative interest rates that's actually important politically, as well as practically.

MR. WESSEL: (Inaudible), do you want to make the case for raising the -- oh, sorry, Narayana?

MR. KOCHERLAKOTA: Yeah. I have one quick comment on Miles's presentation, which is that I think that actually it's easier to make the case for the clean approach than the dirty approach. I think the clean approach, that's a great starting point at least for a conversation. The dirty approach makes it seem like you're interfering in every aspect of people's lives, whereas the clean approach, it's just the cash window. It's some small thing that's not even pictured in the money banking textbook. So that would be my piece of advice in terms of selling this agenda.

MR. WESSEL: Pierre? Jean-Pierre?

MR. DANTHINE: I just wanted to complete that because I fully agree. And in fact, it looks like the clean approach make a lot of sense. The dirty approach, it's like trying to slide through the back door, and I think that's the wrong approach actually because it's something that needs to be discussed, and

if people agree that this is worth doing, let's do it cleanly.

MR. WESSEL: There's a gentleman way in the back and then we'll -- I'm going to segue to the panel.

MR. TAKAS: Hi, this is for Miles. I was surprised --

MR. WESSEL: Tell us who you are.

MR. TAKAS: Nathan Takas. I'm surprised that you didn't mention a precedent for the clean approach in American history which is the American colonial period where there's a positive interest rate on currency and the tax offices are accepting the currency issued now at a discount now and on face value, and at par on face value three, four, five years down the line. So there's like an extensive history. Antiquarian history, but an extensive history where you're just doing the reverse, where you make it at par now when you issue it and at discounts in the future.

MR. Kimball: I think it is time to revisit the history of monetary systems, and so you know, Ken Rogoff has a book called The Curse of Cash that's coming about in January. I was a reviewer for that book and I really liked it and said, "Oh, can't you get it to come out sooner?" But one of the things he talks about there is a Genghis Khan system for paper currency as a precedent for having a non-par exchange rate. There they had a par exchange rate when you took the paper currency out but you'd get 50 percent or you'd get only half the value if you tried to put the paper currency back in. And that was quite important for making the paper currency such a big thing.

MR. WESSEL: So just a simple marketing idea here. Calling it the Genghis Khan approach -- (Laughter)

MR. KIMBALL: This is not my marketing.

MR. WESSEL: -- is not a good idea. Just a little tip.

MR. KIMBALL: Well, maybe I shouldn't have advertised Ken Rogoff as saying that. I don't in fact market it that way but look, I'm very -- look, I'm delighted to have people agree with Ruchir and me that the clean approach is much, much better. And so we're, you know, it's an effort to try to understand what resistances people might have to the clean approach to really lay out how you could do it piecemeal.

MR. WESSEL: Good. Great. Can I get you to leave your mics and we'll change and the

people on the panel come up?

(Applause)

So here's how I think we're going to do this. Before we get negative rates we're going to get wireless mics here.

So I think what we'll do is I'll have a conversation with this distinguished panel up here I'll introduce in a moment. Then I'm going to ask any of the other people who have presented if they want to weigh in on something because people have been very disciplined. And then we're going to open it up to the audience.

Of course, I'm joined here by Ben Bernanke, the former Fed chairman, now at Brookings; Narayana Kocherlakota, the former Minneapolis Fed chairman -- Fed president, now at University of Rochester; Beth Hammack, who is the head of short-term trading. Is that right? Head of --

MS. HAMMACK: Short-term rate strategy.

MR. WESSEL: Short-term rate strategy at Goldman Sachs. And Jamie McAndrews, who is the research director of the Federal Reserve Bank of New York.

So I think what I'd like to do is see if we can make some sense of all the stuff we've discussed in the last couple of hours and draw some conclusions. And Beth, I'd like to start with you because I'd like to ask you what effect you think negative rates have had or might have if we tried them in the U.S. on the actual behavior of people in markets and businesses.

MS. HAMMACK: So I think there's a couple important things that we teased out this morning that are worth mentioning. I'm not going to try to get into the economics behind whether negative rates do or don't work because I'm massively outclassed on the economics side. I'm just a homo markets person here. But I do think that there is a real impact on the market psychology and on expectations when you look at negative rates. And I think one of the things that's really critical when I think about negative rates is that whether there is or isn't an effective lower bound, markets perceived there to be an effective lower bound. And so once you start moving below zero, markets are taking a signal that you're in a very stressed period and that you're nearing the end of what you can do in monetary policy. And so unlike QE and the LSAP programs where you can continually keep buying -- now, maybe there are extremes to that, and I think

Japan certainly looks like an extreme there, once you start going negative, you're sending actually a bad signal about the state of the health of the economy and your ability to stimulate it from a fundamental perspective.

MR. WESSEL: And do you think that that's happened already in Europe?

MS. HAMMACK: I think it's happened more so in Japan than in Europe, but I think there is a question as to whether or not you're getting real fundamental growth. So I think negative rates seem to me as a market participant like they're more effective as a currency control than they are as a stimulus.

MR. WESSEL: Exchange rate you mean?

MS. HAMMACK: As exchange rate. Yeah.

MR. WESSEL: Right. Right.

And if the Federal Reserve faced a situation where we have a recession and they have to do something and they don't get as much help from the fiscal authorities as they might like, something we'll talk about in a moment, how would you weigh the pros and cons of negative rates versus another trillion dollars of QE?

MR. BERNANKE: Well, so let's first stipulate once more two things. One is that the best thing would be to get the fiscal support. We've been relying way too much on monetary innovation, and so I don't want to make the presumption that that's the direction to go. So that's important.

Secondly, for now, we're going to assume Miles's plans are in place, and so we're dealing with sort of the current institutional set up. So I don't know. I think there was a Federal staff memo in 2010 which looked at this in some detail, and my sense is that putting aside for the moment psychological issues that Beth just raised, I think it's a kind of moderate benefit, moderate cost tool in the sense that undercurrent institutional arrangements probably we could only get 30-40 basis points negative, and that would involve some manageable but still concerning institutional impacts. So in a situation, and clearly without fiscal help and in a serious downturn, we don't have a lot of space, so clearly we're looking at everything. So I'm not saying you shouldn't look at it, but it wouldn't be a panacea, obviously. And the benefit of quantitative easing, which has many disadvantages, but the advantage is it doesn't have an obvious natural limit. So I've kind of vacillated on sort of what the right sequencing is. And I guess given at this point that QE has been

used with some success, I guess that would be my first step.

MR. WESSEL: And how much do you worry about the effect of the banking system of a flatter yield curve?

MR. BERNANKE: I think there's a little bit of a shell game here which is they're talking about the differences -- the effects of low interest rates versus negative interest rates. Okay, so given that interest rates are already very low, how much would a few additional basis points into the negative region affect banks, particularly given that you can do the tiering and other things to insulate banks to some extent? Moreover, the profits of banks are not what you're mainly interested in. You're interested in lending and it's not obvious that on the margin the lending decisions, banks have to decide whether to lend or to hold reserves. On the margin it's clear that some reduction in bank profits, and I think it would be modest, is going to affect willingness to lend. Moreover, I don't want to get too far into this, but the share of bank funding, which is sort of small retail deposits, is actually not that big, et cetera. So I don't find that to be as big a problem as some of the commentary has it. And in particular, the Fed memo in 2010, the staff memo barely mentioned bank profits as an issue. They were more concerned about money market funds ranking the buck.

MS. WESSEL: Narayana, has what we've seen in Europe and Japan, would that make you more or less willing to try negative rates here if we had to think about that?

MR. KOCHERLAKOTA: So I think there's a couple ways to answer that question. I think that, first of all, the experiences in a bunch of the European countries really opened my eyes to the idea that negative rates could be an effective tool. The way I think about it is really they're an enhancement to foreguidance. So that foreguidance, if you're at the zero lower bound, or 25 basis point lower bound, that tells you something about how low interest rates can be over say the next three or four years if you're in a pronounced crisis, pronounced recession, whereas, if you're able to lower those rates by 50 to 100 basis points, that will accumulate that over that four-year period. When people are thinking about should I spend now or four years from now, well, we've got a real kick. So that's in theory, but I think we've seen some of that play out in practice in Europe.

I think the Japanese experience really highlighted Beth's point about expectations; that if you

sit there as a central banker and you talk about negative rates as being, well, this is something we'd only go to if the world was really collapsing, well, if you go to it then, you're sending the signal that the world is really collapsing. So I think that -- and that's a problem that should be solved right now by the Fed talking really openly about we've got a bunch of tools we might use. And there was an article in The New York Times yesterday by Justin Wolfers about, what would central banks and other institutions do if we had a recession? Well, I think the Fed should be talking about that. And I think it shouldn't be talking about negative rates as being something you would only use in the extremist event because then, as I say, you're sending a signal that, boy, you've reached the end of all the tools and now we're turning to negative rates.

MR. WESSEL: Well, that's what helicopter money is for. That's the desperate one; right?

MR. KOCHERLAKOTA: That one I actually would leave to Congress myself.

MR. WESSEL: But Ben, you've made the point that you think there's some benefit to the public thinking that the Fed has some ammunition because that'll give them the confidence and we might never have to use it essentially.

MR. BERNANKE: Yeah. No, Narayana made the point that what matters sort of in the low probability event, even if we never have that, what people think about that possibility, actually influences their behavior under even more normal circumstances. So if they have the confidence, for example, that even under extreme circumstances the Fed, maybe with a little bit of help from the fiscal authority, can address deflation, that affects their thinking and it affects the setting of interest rates today, long-term bond yields today, for example.

MS. HAMMACK: While I think that's true, I do think you have to be a little bit concerned about -- and I think it's fair to say that you don't want negative rates to be this really horrific tool that you use only when things are extreme, but by the same token, I think the general populous doesn't really understand negative rates and I think this concept of negative nominal rates and trying to talk to people about real rates and what that means is very complicated. And so the average American -- and frankly, I think even the average corporate executive doesn't necessarily understand that and so maybe doesn't make the same spending decisions or investment, capital investment decisions in a very low or negative environment.

MR. WESSEL: Right. So Jamie, what do you think would be the problems if we actually

tried it here, in addition -- besides, forget Miles's thing for a minute?

MR. MCANDREWS: Well, again, my comments don't reflect the views of the Federal Reserve Bank of New York or the Federal Reserve System.

MR. WESSEL: Narayana's and Ben's also do not reflect.

MR. MCANDREWS: Beth's do.

MS. HAMMACK: Mine don't reflect Goldman Sachs's either. How about that?

MR. MCANDREWS: I think there's kind of two, you know, two levels, whether we're, you know, in this mildly negative environment that Ben was talking about minus 30 basis points or, you know, beyond 50 basis points and so on. Beyond -- if we get into more severely negative rates, we could expect a lot of institutional innovation, and I think that people would want to pay their bills earlier to credit worthy counterparties and receive their payments later, and this is just a complete reversal of how trade credit has worked for years and for, you know (inaudible). And there are many social conventions. One of the things that I think Miles Kimball's list of potential policies kind of overlook is that there are a lot of zero interest rate deals out there in society and people can find them and find ways of exploiting them in time. So I think it does lead to a lot of fixed costs for society to rearrange practices, long-held practices that are consistent with a positive interest rate, positive nominal interest rate environment.

MR. WESSEL: So Beth, that kind of goes to, so when the economists talk about negative rates, they act as if, well, there's not much difference between plus 10 basis points and minus 10 basis points, as in there's only 20 basis points difference. And we've had negative real rates before and this is no big deal. But I sense that you're more in the camp that it makes some big difference to the way consumers and businesses think, to have a little bit negative it's a big deal.

MS. HAMMACK: Yeah. I think it is. I think there's also a lot of non-leviarity as you get around that zero lower bound. So if you look at money market funds in the U.S., and maybe it's because we hadn't broken through zero yet, but if you look through, I don't know, 2010, '11, '12, '13 before you had the reverse repo purchase program put in place at the New York Fed, there was a lot of resistance as you get around that zero lower bound. And when you saw was money market funds in the U.S. were waiving fees, were giving things back, were trying to absorb all these costs so they could keep their funds at zero or as

close to something slightly positive as possible. When you go into Europe, once they moved aggressively negative, then those funds said, okay, well, if we're already at 40 negative basis points, we'll start charging fees again because it's acceptable. So there are these frictions, these real frictions in the market where you don't have this seamless pass-through of these (inaudible).

MR. WESSEL: I want to step back for a minute. This goes to the fiscal question. So in a way it seems to me just a frightening moment that we're talking about a world economy that is growing so slowly with so little inflation with such an excess of savings over investment that we have to even seriously contemplate negative rates. Is this just another way of saying that we really have to find a way to get the political authorities to do better fiscal, or if you like, maybe better structural policies?

MR. BERNANKE: Well, there's a fundamental fact, which is that independent of what central banks do, that underlying forces are such that interest rates around the world are very low. I mean, I guess inflation is a policy choice, that's true, although at this point it's hard to imagine getting it really high. But real returns are very low for a lot of fundamental reasons -- saving investment imbalances and secular stagnation, all these various factors that people have discussed. So given that these interest rates are very low, then that creates this, makes this negative interest rate problem much more relevant. And there was a time when we -- economist, we -- thought that under most circumstances the central bank could manage business cycle fluctuations with ordinary monetary policy. We're in a new world where for reasons I think which may be related to some extent to the crisis but were probably in play for a long time, and we see a long-term downward trend in long-term interest rates. Given the low level of equilibrium interest rates, then we are just much closer to that particular constraint.

So the advantage of very low interest rates is that fiscal policy becomes actually much less burdensome because governments can borrow at zero or even negative real interest rates and make socially constructive investments with that. Now, obviously, there are limits to that as well, but under these kinds of circumstances -- and we're talking hypothetically now about another slowdown, I think we really ought to be -- the best thing maybe that central bank governors could do would be, you know, the first thing would be talking to legislators and trying to persuade them of the importance of (inaudible) policy.

MR. WESSEL: Given where we are now in whatever the mainstream forecast is, if the next

president came in and said I'd like to increase the deficit by say $50 billion or $100 million and do these socially-productive investments, even though I know it'll increase the deficit, would you say thanks?

MR. BERNANKE: Well, deficits are not necessarily a great measure of fiscal responsibility, for example. So if the real rate of interest is zero, and particularly if there are unused resources in the economy and you can make socially-productive investments with that, that's not only a good deal from a business cycle point of view, it's a good idea from a long run investment point of view.

MR. WESSEL: Right.

MR. BERNANKE: So with low interest rates -- we're not always in that situation. I don't want to say unreservedly that under all circumstances the government should be doing more infrastructure. We know that that's also a source of pork barrel projects and the like, but under those circumstances it seems like it ought to be given consideration.

MR. WESSEL: Narayana, how would you look at it?

MR. KOCHERLAKOTA: Yeah, I mean, I think Ben hit the key points. You know, I think that there's two possible reasons why growth is low. One is purely that it's low because our rate of innovation has slowed. This is the viewpoint that Robert Gordon especially has espoused. We don't know much about how to influence rates of innovation and the rate of productivity growth in society. But on the other hand, I think it's also clear, at least to me, that given how low interest rates are, there would be gains to investing in infrastructure and investing in education. Now, those gains are enhanced by the fact that the interest rates being as low as they are. If governments were to do that, if governments around the world were to issue more pieces of paper that society is clamoring for, I think the prices on those pieces of paper would decline. And so that would be an upward pressure on interest rates beyond -- that would be especially helpful given how low interest rates are.

MR. WESSEL: So let's say that -- help me see how the markets would look at this. If I go to negative interest rates, that doesn't immediately show up on the Federal government's cash flow thing, although I suppose at some point it'll reduce the profits that the Fed gives to the Treasury. But if, instead, I said -- Congress passes a law that says we're going to subsidize every loan, that would increase the deficit, do the markets distinguish between those two things? Do they strike them as totally different or do they

understand them to be economically equivalent?

MS. HAMMACK: I think that the markets, when they look at the LSAP programs, I think there's a view that over time those purchases should help funnel money back into the economy and give policymakers the confidence to go out and spend and put some money into these socially constructive programs. I think the fact that that hasn't happened is again another one of the realities of kind of economic friction that it's hard to get these policies through. I think markets generally want to see any amount of investment right now because I think markets are at a place where they realize monetary policy has frankly been the hero over the last six, eight, 10 years, and needs to be met with a more robust framework around it and can't just be acting alone in perpetuity. That's why --

MR. WESSEL: Yeah, so you think markets wouldn't freak out if the reported deficit got a little bigger in the near term given where we are now?

MS. HAMMACK: Not in the U.S. per se because --

MR. WESSEL: In the U.S.

MS. HAMMACK: -- when you look at it in other countries, in the U.S. you always have the ability to print more dollars. So no one is going to be worried about the creditworthiness of the U.S. because you can print more dollars and pay off that deficit.

MR. WESSEL: As long as we raise the debt ceiling.

Ms. HAMMACK: That's right. If you're looking at other places where they're borrowing not just in their home currency, then you could end up in some of those places.

MR. WESSEL: Jamie, when you think about Japan, do you think, I think there's two possibilities. One is, wow, we should do everything possible so we never get in a situation like they're in, that we want to fix our banks sooner, we want to do more aggressive fiscal and monetary policy so that we never get there? Or the second thing is that all this stuff has diminishing marginal returns and we're really at the end of some really bad -- the returns are substantially marginally diminished and we ought to be careful not to overuse these things? How do you look at the Japan experience?

MR. MCANDREWS: I don't see it as diminishing marginal returns. And I learned a lot from Ben's speech in Japan in -- was it 2003?

MR. WESSEL: He's kind of revised his views on that. It's not as easy as he thought it was.

MR. MCANDREWS: It's a terrific challenge that Japan is facing and that goes along with the demographic challenges they have. Their per capita income though has performed reasonably well over the last 20 years, but no, I think it shows the difficulty of getting policies designed correctly all the way along. Our colleagues, Ken Kuttner and Adam Posen had a great paper on looking at the Japanese fiscal and monetary policies. This was about in 2005 looking over the previous 15 years. And it was a story of push and pull, start and stop, both on the fiscal and monetary side and on the financial side as well in repairing their banks. So I think the policy coordination is very important and the policy sequencing is important to have the banks be well capitalized going into a situation after suffering a crisis is very important. And then to have supportive fiscal and monetary policies is very important and sustained. But I don't think there is evidence of diminishing marginal returns to policy.

MR. WESSEL: And I'll ask you one question before we turn to the audience. This morning, I don't think you were here, Torsten Slok made the point that when the central bank does a lot, it tends to take the pressure off the fiscal authorities. Kevin Warsh, a former Fed governor, has made this point as well from a different perspective. When you are making monetary policy decisions, when you are thinking about QE or when you're weighing whether to cut interest rates, let alone push them negative, do you think about what the likely fiscal response is going to be and think if you do less they might do a little more and you have a better mix? Or is that just illegitimate?

MR. BERNANKE: Well, there are different political situations. I mean, the European Central Bank is a somewhat different, more complex political environment than the Fed in the sense that it's answering to a number of different governments, and it's played a moreover political role in trying to manage the Eurozone and is relevant to the Fed. I think in the Fed's case, you know, the Fed has a mandate. The mandate doesn't say pursue these things only if you feel like it's theoretically correct to do so. I mean, it says pursue those objectives. I think that's the Fed's goal. The Fed tries to take the fiscal policy as given and I just don't think that either legally or in terms of the political economy it makes sense for the Fed to be playing chicken with the Congress. I just don't think that's, first of all, it wouldn't work because Congress would do what it does anyway. I don't think it would --

MR. WESSEL: Whatever that is.

MR. MCANDREWS: -- respond. I don't think -- I think what would happen would be if the Fed didn't do its job, the economy would worsen, whether the fiscal authorities would fully compensate for that is I think very dubious. So I'm not saying this is an illegitimate argument in all circumstances, but I think in the case of the United States, it's clearly illegitimate. It's not the Fed's job to tell the Congress what to do; it's the Fed's job to do what Congress told it to do, which is to pursue its mandate. And certainly, it can use the BOLI pulpit. You know, the chair and other leaders of the Fed certainly can argue that here's the reasons for such and such an approach, but I think to play chicken with Congress would not be a wise strategy.

MR. WESSEL: So let me start with -- are there any of the panelists who want to weigh in now or not?

Okay, Roberto Perli over here.

MR. PERLI: Thank you. Roberto Perli, Cornerstone Macro.

It seems to me that there are a couple of issues with negative rates. One is that it's politically difficult, even leaving aside Miles's democratically dubious dirty approach, but also from an economic perspective. So the transmission between negative rates and markets works, seems to work more or less as expected. It's the transmission between markets and the economy that seems to be weaker. Probably because it's hard to persuade people to do something with low interest rates if they don't want to.

So an alternative, Mr. Chairman, you brought up fiscal policy. Certainly a lot better. There might be deficit issues. But so, David, you brought up helicopter money. Your body language didn't suggest great enthusiasm for that idea --

MR. WESSEL: For what?

MR. PERLI: Helicopter money.

MR. WESSEL: No, that's not correct. I'm very enthusiastic. (Laughter)

MR. PERLI: Great. Thank you.

But so both negative rates and helicopter money are difficult, politically difficult, but it seems to me if we have to have this conversation with Congress, with Treasury, with whoever, aren't we better off

trying something that actually has a better chance of working, such as helicopter money? You made a great case, you know, (inaudible), for example. This might be a good idea. What do you think?

MR. KIMBALL: Can I make a comment about the politics there for just a second?

MR. WESSEL: Sure.

MR. KIMBALL: Which is just presumably the politics is different when you're dealing with the average person on Main Street versus say big corporations; right? So beyond a certain point, if you had minus 400 basis points negative rates, that would be very pervasive in society, but minus 75 basis points, depending on how you structure it, the guy in the street, because you have term premium, because you have risk premium, liquidity premium, the guy taking out a mortgage is just going to see a lower mortgage rate but a positive mortgage rate, probably not a negative mortgage rate. So I think, remember, in practice, we're only talking about the rate of return on bank returns held at the Central Bank. We're not talking about pervasive negative rates necessarily. So at least within some range I think the politics is mostly fostered by self-interested people who don't like negative rates, but the average guy in the street doesn't see it and wouldn't necessarily see it.

MR. WESSEL: I think Roberto was also saying negative rates are a hard sell. Helicopter money, that is the Fed agreeing to finance government spending or tax cuts, would be an easier sell.

MR. KIMBALL: Well, helicopter money is maybe one step beyond just ordering fiscal policy in some sense, so it's not like the Fed can do helicopter money by itself. It needs the fiscal approval.

SPEAKER: He was saying it might be easier to convince them. We're going to make it easy for you to cut taxes.

MR. WESSEL: Does everybody -- Roberto suggested that this doesn't get passed through to customers. So in Switzerland, it seems to be by policy it doesn't get passed through. But in Denmark it did, and Massimo showed how by lowering rates below zero other rates came down. It was not so different than a conventional easing, wasn't that your --

MR. KIMBALL: Well, I think that this is where the institutional structure makes such a difference because in Denmark they have the mortgage-backed securities that have the balance principle that what goes in one side has to come out the other side. So if it's being funded at -- these variable rate

mortgages funded at negative rates, then the borrower enjoys the negative rate. Whereas in Switzerland, it's a bank-based system. And so I think Narayana and I were talking outside. I think in the United States we have a very hybrid system but we do have over 6,000 banks in the United States that make a lot of loans. Now, a lot of the mortgages, of course, are then sold to Fannie Mae and Freddie Mac and they issue mortgage-backed securities. So it may well be that in the United States mortgage rates would enjoy quite a bit of benefit from lower interest rate policy.

MR. WESSEL: The gentleman right here? And then there's a gentleman on the aisle. Raise your hand so the woman can find you with the mic.

MR. DUGLEY: My name is Peter Dugley from Swiss Broadcasting. My question goes to Mr. Bernanke.

Of course, we've this experiment with negative rates for one and a half years now. Would you say it's a failure or a success? And my second question, could you elaborate a little bit on under what circumstances would you think helicopter money would be a good tool? Thank you.

MR. BERNANKE: Well, I defer to my European colleagues on failure and success. I mean, I think it's one element of the European Central Bank and the Swiss National Bank's overall strategy, and I think I'm supportive of the efforts of both the Swiss National Bank and European Central Bank to achieve their inflation targets. And I think as far as I can tell, that negative rates have been a constructive part of that process. So because these policies are made up of so many elements and because there are so many things affecting the economy it's hard to make a conclusive judgment at this point as far as I can tell and I think this morning we had discussion of this that they have affected rates and financial conditions which presumably are part of the reason that some progress is being made.

I had a blog post on helicopter money and I think that it's something that certainly not within the likely feasible set in the United States certainly I mean but it's important to discuss because as we were saying earlier it's important for people to understand that under extreme circumstances there are tools that could be constructive, that could be used. It's not something that I think is imminent.

MR. WESSEL: The other guy, yes, thank you.

SPEAKER: My name is (inaudible) from the IMF.

The question is a choice between negative rates and suppose another trillion dollar off QE down the road assuming the economy is still not moving. Do you think given the balance sheet constraints we have, both in the private sector because of regulations and now the official sector coming in and providing balance sheet space. For example, the reverse repo program for money market funds, et cetera, is a direct shortcut away from the plumbing, straight to the Fed? You have (inaudible) programs with central banks. Now you have deposits of CCPs directly with the Fed. And private or public balance sheets accommodate another trillion dollars of excess reserves down the road, or perhaps a little bit negative rates (inaudible). Because I assume the regulations are not going to tweak the leverage issue, et cetera, to provide more balance sheet space with the private banks.

MR. WESSEL: Do you want to take a crack at that, Narayana?

MR. KOCHERLAKOTA: Yeah, I think these are fun questions to kick around but I think it sets up a false dichotomy. There's a bunch of tools at the disposal of the Fed. I think there's certainly more room on the large scale asset purchase front that could be done if desired. I think there is more room to push interest rates lower -- clearly now, but even as December there was more room to push interest rates lower. I think going back on my own thinking over the last few years as a FOC participant, I think too often I frame choices for myself in terms of either/or as opposed to let's use both these tools because we're going to work in a complementary fashion to achieve our objectives. And I think the way you framed it just now, my response to that would be, no, if it's needed to get to where we want to go, let's do both things.

MR. WESSEL: The gentleman there? Yes, stand up so they can find you.

SPEAKER: My name is (inaudible) Group based on Tokyo.

My question is for Mr. Bernanke. (Inaudible) BOJ, Bank of Japan, adopted a negative interest rate policy. However, it seems that this policy doesn't have much impact on the Japanese economy at present. If you were an advisor to DOJ, what kind of policy would you recommend to the Japanese government? (Laughter)

MR. BERNANKE: Well, what I'm going to say is that I think there's been one move to negative rates, one 10 basis point move, and there were some issues about communication that Narayana pointed to. I think it's way too early to judge what effect that's going to have, and I'm basically very

supportive of the Bank of Japan and its strong efforts to end deflation. And while it certainly hasn't achieved its objective yet, it's also made progress. And so again I'm supportive of their efforts to end deflation.

MR. WESSEL: Narayana, what lesson should we draw from the Japanese experience?

MR. KOCHERLAKOTA: I think overall our experience, if we go back over the last three years, has been very positive relative to my own expectations going in. I think maybe it would have pushed inflation up higher than I might have anticipated. I think this particular episode in January, the communication could have been better around the rolling out of negative interest rates but I have to say you cut interest rates by 10 basis points in the central banking world, you actually don't expect a huge response from that. There's a bunch of other shocks that are hitting the system at the same time that are likely to swamp anything that's going on, and I think that's what we heard described earlier this morning from the empirical work is you actually saw the "policy change" having an effect within the typical window but then it's just getting overwhelmed by a bunch of other considerations.

MR. WESSEL: Beth, how well do you think central banks in general and the Fed specific do in communicating right now? How would you grade them on how well they communicate?

SPEAKER: As opposed to in the past. (Laughter)

MS. HAMMACK: Wow, that's a really --

MR. WESSEL: That was a carefully calibrated question.

MS. HAMMACK: I think it is a unique challenge right now as a banker.

MR. WESSEL: Are you auditioning for the Board of Governors?

MS. HAMMACK: I think it's a unique challenge right now because I think markets are very impatient. I think right now they're probably more impatient than they have ever been. And so let's go back and look at the case of Japan. So the policy was announced in January. It was effective in February. But because it was such a surprise, markets weren't prepared for it. You didn't actually see negative rate trading until April. And then it starts to actually permeate through. But already we're barely in June and people are saying, how come it's not working? How come it's not working? These things take time as you move through it. I think the challenge that I see for the Federal Reserve in New York in the U.S. right now is that it's moving between this fine line between wanting to put out a picture of optimism on the economy but not

wanting to see these overreactions where you get financial conditions tightening when they talk positively about the economy. So you see kind of this vicious loop going back and forth where they say things look good. We might be able to tighten. You know, we might look at not normalizing policy, taking some steps along that path. And then the market goes, okay 20 basis points. Let's raise it 20 basis points and you have the stock market doesn't like it so you get these really pro-cyclical effects from the financial conditions that ends up meaning you end up in a place where the Fed can't actually move if they wanted to move. And so I think there is a real challenge between this openness, which I think has been very good in terms of market participants trying to better understand what the reaction function of central bankers is going to be, but also kind of front-running to some extent those movements such that you can't actually see those impacts happening.

MR. WESSEL: I'm trying to get my head around the Fed being -- I mean, the markets being more impatient than ever. (Laughter)

Let me give Miles a shot here and then we'll go to some of the others.

MR. KIMBALL: So I think the discussion of helicopter money is interesting. Now, I don't want to sound too positive about helicopter money which I think is a mistake, but I think what Ben was saying there is important. I think we ought to be talking about deep negative interest rates in the same way we're talking about helicopter money because we should be saying things like, look, there is no lower bound. It's a matter of which policy choices you make. Obviously, the deeper interest rates you go, the bigger deal that is, but we can go as low as we need to to get the economy back. And I think that helps get you confidence. Also, we saw Massimo's very interesting presentation that if you can convince the markets that the lower bound is lower, you know, every 25 basis points you convince the market that the lower bound is lower, you get more room in what's happening in the long-term interest rates. So I think whatever you think about doing for real, I think we should be talking about in the tail events being able to go as low as we need to with negative interest rates. I think that's a very good thing for the world to hear.

MR. WESSEL: Okay. I want to give people who haven't asked. So there's a gentleman there behind Peter.

MR. SABO: Hi, my name is Stefan Sabo from the New York Fed.

I'm just wondering how you interpret in terms of market reactions to the move towards negative at the ECB and maybe even in Japan. You've had sovereign bond yield curves flatten. Is that, you know, why? And what does that really say about how the market is interpreting additional easing?

MR. BERNANKE: What is flattening?

MR. WESSEL: He said the sovereign yield curves have flattened. Is that right, Massimo? Have sovereign yield curves flattened since you went to negative rates?

MR. ROSTAGNO: Not really.

MR. WESSEL: Can you give the mic to --

MR. ROSTAGNO: I showed this curve, the swap-derived quasi free curve, and I think if you compare current curve to the pre-negative rate policy curve, one is, of course, a lot lower, but it has been more or less a parallel shift. It's not obviously flattening.

MS. HAMMACK: I would just say to the extent that we have seen any flattening in global bond markets, I would attribute that more to the bond-buying programs than to the negative rates. I mean, it's hard to tease out which is coming from which but I think the buying of the long parts of the market is more what's driven down that flattening than the negative rates.

MR. WESSEL: Right. That's a good point. It's very difficult to tease out the effect of negatives rates when so many other things are going on at the same time.

I'm going to take like three or four questions and then we'll give answers. So the gentleman there, and then there's one way in the back. Brandon, could you go give the mic to the guy way in the back?

MR. KOKKINAKIS: Hi, my name is Alex Kokkinakis with the FDIC.

You mentioned that banks have some sort of exemptions from negative rates, but I'm kind of worried about money market funds and what kind of impact they're having from the low interest rate environment. Maybe they're not in the same position as banks are, and you mentioned there's a reach for yield behavior probably going on with the low interest rates. So are we seeing a reduction in activity with money market funds, and if so, can they pass on negative rates to their investors as well or not?

MR. WESSEL: Okay, money market. The gentleman in the back?

MR. BASTA: Yeah, Karim Basta from III Capital.

I was just wondering about demographics. We know different age groups think differently about low rates where the elderly who rely more on interest income are generally more opposed versus younger people who borrow. And I wonder if that is sort of magnified several times over with negative rates. And again, you look at Japan with a rapidly aging population where the stock market value has been cut in half over the last 20-30 years. The currency is appreciated and now people are saying now you're going to tax my savings. That's really not acceptable. So are the challenges towards implementing negative rates greater given some of these demographic issues?

MR. WESSEL: Okay. I think those -- you had a question? And then my friend from T. Rowe Price, whose name I can't remember.

MR. KARR: (Inaudible) Karr, with Karr Capital.

I wonder if you think we could have reached a point where the traditional stimulative effect of reduced interest rates no longer applies. If you think about reduced cost of capital for one investor, that means a reduced return on capital for whomever is financing that. We've raised asset prices. That suggests a lower future return on capital. We've got a very low riskless interest rate, again, suggesting a low future return on capital. With all these factors it could influence a low future return on capital. That suggests it could be lower investment, which in fact, in the U.S. and Japan, with the longer experience we have with these ultra-low rates, we've got investment relative to GDP at or near historical levels. So could we possibly be in a zone where the interest rate stimulus doesn’t work any longer?

MR. WESSEL: So you think if we raised interest rates we'd get more investment?

MR. KARR: It depends how you do it. It's complicated.

MR. WESSEL: Over here on the aisle.

MR. MCDUNNA: Chris Focta McDunna with T. Rowe Price.

So one of the questions, as you've been batting around negative interest rate policy, one of the things that is crucial though in getting it to work is whether people actually choose to borrow. It's a flip side to the questions that just were asked, and that is what would be your best metric that even if you embarked on lower rates that people would be willing to actually borrow the money in order to embark on those projects? Just take as a sign post to this what's happened with oil prices. Oil prices have moved

lower. People have saved, not spent, more than what the traditional rules of thumb would have suggested. So they suggest households in the U.S. at least are still in balance sheet prepare mode. That would impede negative interest rate policy. So just what kind of considerations are you looking at and what are the signals or what kind of changes would you like to see in order to see the balance sheets are in position for taking on additional leverage?

MR. WESSEL: Jamie, let me start with you. Do you want to take the money market fund question? To what extent are they a constraint on negative rates, and should we worry about money market funds anyway?

MR. MCANDREWS: Yeah. And embedded in that question was also this notion that banks are exempt from the policy. It's important to understand how the policy works in Japan and Switzerland, for example. So banks inframarginal holdings of reserves, all but the last portion of reserves get paid zero, and then just the marginal part of reserves get paid a negative rate. Just because the inframarginal reserves are paid zero, that doesn't mean they have to pay their depositors zero. So there's really no relationship between what they charge their depositors. That's a separate decision. So the banks are charging depositors zero out of their own calculations of profit on loss. So I think that's an interesting behavior that we are seeing in these negative interest rate economies and they should make us think about why are they not charging their depositors less than zero.

With the money market mutual funds, there have been a lot of revisions to the policies for money market mutual funds -- Ben Bernanke pointed it out on his recent blog -- so that the prime funds are variable net asset funds now. They are on longer fixed assets, so they could potentially pay below a buck when one redeems one's share. That reduces the concern for money market mutual funds, but still, many of the government-only funds will be fixed net asset value funds, and so there still is the problem of breaking a buck on money market mutual funds.

MR. WESSEL: Narayana, two of the questions basically said is there anything that monetary policy can do to get people to borrow that it hasn't already done. Do you think that somehow we've reached the point where people won't borrow?

MR. KOCHERLAKOTA: I think on the margin of rates are lower, that induces people to

borrow more. You know, there's questions about is it as effective to go from say zero to minus 25 basis points as it is from three to two and three-quarters, three percent to two and three-quarters percent. You know, I think you can start to quibble about that. But on the margin, having lower interest rates encourages people to borrow. But it's not just about encouraging borrowing. It's about encouraging spending now as opposed to saving. In fact, you know, I often get emails from people who are saying you're forcing me to spend because the rate of return is so low. Yeah. That's the policy. That is what the policy is about. It's being effective when you're forced to spend as opposed to save.

Let me make one final comment about the investment question. I think this question is a great one because it just indicates the terrible challenge that we've introduced by using words in multiple ways. You used the word "investment" in two different ways in your question. One is in terms of physical investment, building factories, and then the other way is financial investment, which is buying pieces of paper that are paying a rate of return. The whole point of the policy is to make buying pieces of paper seem really, really bad, and that makes factories, which we're not really affecting a return to at all through monetary policy, seem an attractive thing. The fact that there's not more investment going on is because Miles has not been successful in getting his negative rates of return spreading through the financial system.

MR. WESSEL: Ben, do you --

MR. BERNANKE: I agree with that. And we don't know empirically in textbook terms how flat the IS curve or how much response there is at given levels of interest rates, but there's actually pretty good reason to think that if rates get negative enough, then almost anything will be a return. But yes, that's right. So the monetary policy doesn't affect the rate of return on physical investments in terms of how productive they would be in producing widgets or how many people could be housed or whatever. What they affect is the cost of funding those investments. So as the cost of funding goes down, then there might be more opportunities for real capital investments.

There's another similar logical error which says, oh, people aren't investing in capital things here. They're buying back shares instead. Those things are not alternatives. These are just alternative ways of structuring your balance sheet, but buying back shares or paying dividends does not mean that you still wouldn't want to make profitable capital investments. So those things are not alternatives. They could

be actually complementary under certain circumstances.

So, but just one more comment on the bigger picture though. I mean, it is still possible that within the range of feasible interest rates that monetary policy is not powerful enough to achieve your objectives within a reasonable timeframe which again is the reason why fiscal policy sometimes would be appropriate.

MR. WESSEL: So why do you think businesses seem to be so reluctant to invest given how easy credit terms are?

MR. BERNANKE: I think, well, there's two good reasons. One is the productivity gains for whatever reason. Now part of that is a result as opposed to a cause. But to the extent that whatever reason technological opportunities are more restricted, that reduces the return to investment. That's one possibility.

The other possibility is I think that the effective lower bound -- Miles's effective lower bound -- is even in the U.S. where we've moved a little bit away from it, we're still trading with the rest of the world where in many places it is still effective. You know, I think that has to some extent made aggregate demand weaker than otherwise it would be and clearly everything we know about capital investment says that at least as important as cost to capital is demand. So if demand is inadequate, firms are not going to invest very much even if the cost of capital is low.

MR. WESSEL: And Narayana, finally, there was one question about demographics. That's always an issue in monetary policy; right? There are savers and borrowers and lower interest rates favor one over the other?

MR. KOCHERLAKOTA: Yeah, I think that those kinds of disputes are always out there. They've certainly become more pointed, more heated I think as interest rates remain as low as they have for as long as they have. Public finance economists are fond of using the term "salient," which basically refers to what kind of information is really a particularly apparent to a decision maker. It sometime seems to me when I'm getting questions and comments from the public that low interest rates are much more salient to savers than they are to borrowers, and so I seem to hear a lot from how unusually low savers are. But I think it is true that a change in demographics across the world are going to be pushing for both higher interest rates and low inflation. So I think that's just something that's going to be played out all over the

world.

MR. WESSEL: Jean-Pierre?

MR. DANTHINE: Yes. Maybe come back to my question of democratic legitimacy. I think if you want to be serious about negative rate, and I think you want to be, it is a one percent potential option, we have got to be able to go lower than the minus 75 basis points. And we know we had a solution, which is a smart solution. I think it's implementable. But it has to be sold to the public and to the political. And I would like to know what prospects and what methods you envisage to get there in order to get really the ammunition if it is to be needed in the future.

SPEAKER: Are you talking to me?

MR. KIMBALL: I actually think the first step in all of this -- I'm intellectual (inaudible) and I think the first step is to sell it intellectually; that this is something that's important. I think actually many economists might say zero minus five, it doesn't matter. Monetary policy cannot do much to help speed a recovery from a deep recession. You have to solve that problem first. If you get a large enough intellectual push from the profession as a whole, or some wide swath of it, I think that makes the dialogue -- starts to make the dialogue easier. And then you have to reach out to congressmen and elected official who will be responsive to that kind of intellectual discourse. It's not a -- to go down the route that Miles described, I do not think it's something that's going to happen in five years. I don't see it as happening. And I think it would be a huge mistake, and this is what you were getting at, to wake up one morning and say let's go down to minus 200 basis points. And then go testify to Congress, the next Humphrey-Hawkins and tell them what we did. That's the point you're making. I agree with that complete.

MR. WESSEL: Do you want to add to that, Ben?

MR. BERNANKE: I don't have much to add except I think it is important to get your academic ducks in a row. It's important to have conferences and to think about and try to make sure people understand the issues. Then you want to do the best you can to explain it publicly. I would guess as Don suggested that something like this would probably be unlikely unless the circumstances were sufficiently adverse, that people were in a more experimental mood like FDR was obviously in the 1930s. But I don't know. I mean, there's no harm in trying to explain these ideas. And perhaps if we do end up in those

circumstances, which I hope we don't, at least some ground work would have been laid. I commend -- I want to say that I commend these discussions. I think it's useful to talk about them, particularly making the point that someone made earlier that if you wait until the crisis to start airing these ideas, that's probably the wrong time to start bringing in such different approaches.

MR. WESSEL: Okay. With that, I'm going to call this conference to a close. It's been a long day and I appreciate all of you. Please join me in thanking the speakers.

If I can ask you to look at your feet and do a negative draw of the paper and put it in the positive flow of the garbage can, I appreciate it.

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I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

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