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FALK AUDITORIUM

THE FISCAL-MONETARY MIX IN
AN ERA OF LOW INTEREST RATES

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P R O C E E D I N G S

MR. WESSEL: We are recording this, even though you can't see a camera, there is, so be aware of that. We are not live stream yet, but we may post it, and so you should feel -- you should know that you are on the record. There may be some reporters here. I don't see any, and I don't expect them, but you should be prepared for that.

We are really pleased to host this event. One of the things that when the Hutchins Center was formed, it was a deliberate focus to look at both fiscal and monetary policy, and it's become clear since then, in the last three years, just how important the interaction of fiscal and monetary policy is, particularly in an era in which we have a low R-star.

And so we've been looking for ways to bring people together who think about both those things, and to think about what it means to -- how should we think about the federal debt, in an era where we have very low interest rates, and perhaps low growth? And how

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should we think about the relationship between fiscal and monetary policy if we have every reason to expect, we will once again find ourselves at the effect of lower bound?

And so we thought it would -- we were really pleased to have these two papers, people who were thinking about these things. I'm not going to introduce the paper, there are copies outside, and I'm sure you can read them, and will hear about them soon.

As you can see from the agenda, we are going to simply start with one paper and then go to the other, and then have a discussion in which Ben will participate.

This is a small group by design, and all people who are familiar with the issues so -- I haven't cleared this with any of the presenters -- but I think if you have something you want to interject with, this is the kind of situation where we can allow that. Louise and I will manage the thing, the usually, you know, put up your card if you have something to say. Do you have anything to add?

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MS. SHEINER: Do you want us to shoot around the room?

MR. WESSEL: Yes. Why don't we? That's a good idea.

MS. SHEINER: Okay. I'm Louise Sheiner from the Hutchins Center.

MR. ENGLISH: I'm Bill English from the Board, and Yale University.

MR. ERCEG: Christopher Erceg, from the Federal Reserve Board.

MR. LOPEZ-SALIDO: David Lopez-Salido from the Board.

MR. BARRETT: Philip Barrett, IMF.

MS. GRANNIS: Kerry Grannis, Hutchins Center.

MR. HARRIS: Ben Harris, Rokos Capital.

MR. PRELL: Mike Prell, totally unaffiliated. (Laughter)

ATTENDEE: Where do you get your hair cut? Where do you get your hair cut, Prell? Do you still go to Lenny at the Federal Reserve Board?

MR. PRELL: No.

ATTENDEE: Yeah. You are totally unaffiliated.

ATTENDEE: (Inaudible), retired, I worked at Treasury, and Debt Management for (inaudible) years.

MR. WYSOCKI: Kevin Wysocki, Congress and Barr's Office, Financial Services Committee.

MR. GAYER: Ted Gayer, Brookings.

MR. BRYANT: Ralph Bryant, Brookings.

MR. MEHROTRA: Thanks very much for having me. Before I get started I have to give you the standard disclaimer. These are my views and do not necessarily represent the view of the Federal Reserve Bank of Minneapolis, or the Federal Reserve System.

So, I want with the premise that in a low-growth, low real interest rate world, it's not obvious how to think about the sustainable level of public debt. Typically we think about debt sustainability based on the cost of servicing the public debt. And the cost of servicing the public debt is the gap between the real interest rate and the growth rate of

the economy.

So, we can look at, historically, what the cost of servicing the debt has been for the U.S. over a fairly long-time horizon. So, what I'm plotting here is the real interest rate on government debt, so I'm taking the nominal interest rate on 10 years minus a 3-year moving average of inflation, minus the real GDP growth rate of the U.S., and so that's the measure of the cost of servicing the public debt. And if you smooth that out with the red line there is the five-year moving average, what you see is that there are extended periods of time in which the cost of servicing the public debt is quite negative for the U.S.

And so, if you just look at the post-war period, there is actually, for much of the post-war period the cost of servicing the public debt has been negative, and it's only sort of the 1980s to mid-1990s where the cost of servicing the debt turned positive. So, even though on average the cost of servicing the debt is negative there is some degree of volatility.

There are these periods in which the cost turns positive.

So, what I'm thinking about in this paper is this basic tradeoff between whether you want to try to take advantage of the fact that interest rates are low, and when interest rates are low we live in a world where r is less than $g + n$, that implies that increases in the debt-to-GDP ratio actually raise revenues for the government.

And so you might want to take advantage of that, but there's a drawback to that kind of policy, because if you have a large stock of public debt, then if the interest rate reverses, if real interest rates rise quite quickly, that can impose a -- that kind of reversal can impose a sizeable fiscal cost. It can require a sizeable fiscal contraction that's needed to bring the debt back to a sustainable level.

So, in this paper I'm going to look at that tradeoff, I'm going to empirically explore the evidence on the level and variability of debt-servicing cost, and then I'm going to employ a

quantitative model to study the implications of, if we think about what are the drivers of low growth, what effect do they have on the real interest rate, and the cost of servicing debt.

So just, again, to fix ideas, where does this R minus G thing come from, well, if you just look at the first equation that's just the government's flow budget constraint, taxes N -plus, new debt issued has to be used to finance government expenditures, plus repaying old debt, inclusive of interest. And in steady state, in trying to keep the debt-to-GDP ratio constant, it has to be the case that taxes cover government spending, plus that second term which is the cost of servicing the debt.

The cost of servicing the debt is going to depend on the relationship of real interest rates to the growth rate of the economy, and I've broken up the growth rate of the economy into GDP per capita growth, which is the little g , and n which is population growth rate. If r is greater than $g + n$, then the cost of servicing public debt is positive, higher

levels of the debt-to-GDP ratio means that you have to raise taxes in excess of government spending to cover the cost of servicing the debt, and the reverse holds when r is less than $g + n$.

So using a dataset of 17 advanced economies, I can ask the question about on average, or at the median: what is the cost of servicing the public debt? And it turns out that that cost is quite low. So, for all these countries from 1870 to 2013, the cost of servicing the public debt was just 8 basis points. In the post-war period that turns negative, negative-38 basis points, and it's actually more negative for the U.S. For the U.S. in the post-war period, the cost of servicing public debt is negative 1.35 percent.

There is a substantial -- there is a substantial variability though, so if you look at the interquartile range, that interquartile range is not small, there's a 5 percentage point interquartile range, it's a bit narrower for the U.S., but there's a substantial variability in the cost of servicing the debt.

Nevertheless, countries will spend significant periods of time in an r less than $g + n$ world. So about 50 percent of the time real interest rates are less than the growth rate of economy, and some 20 to 30 percent of the time they are significantly negative. So, from this perspective it might seem like it would make sense to have high debt-to-GDP ratios in order to raise real revenues.

So, as I mentioned, we currently live in a world where r is less than $g + n$, but we might want to think about what's the probability over the next five or 10 years that we revert to a world in which r turns greater than $g + n$. And so the way I think about this, is I run a probit regression, and this probit regression is trying to measure, what's the likelihood in the next 5 or 10 years that the cost of servicing the debt turns positive?

And I can base that on current level of the cost of servicing the debt, the debt-to-GDP ratio, the population growth rate, I can use those as covariates to see: what's the predicted likelihood over the next

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5 or 10 years of reverting to a positive cost of servicing the debt.

And those probabilities are given here.

That first line says that there's about 50 percent probability that over the next 5 or 10 years, given the current configuration of the cost of servicing the debt, et cetera, that we will revert to a state in which the cost of servicing the debt turns positive.

Now, if we think that the underlying growth rate of real GDP per capita is somewhat higher than what it is today, those probabilities drop a little bit. If we are more pessimistic about real GDP growth, those probabilities rise a bit, but nevertheless they are around 50 percent.

Now, so what's the cost of moving into a world where r is greater than $g + n$? Well, if I think about the median cost of servicing the debt when in a world where real interest rates exceed the economic growth rate, that median cost is about 1.7 percent, if I apply that to a debt-to-GDP ratio of 70 percent that means that the cost of servicing the debt would go to

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1.2 percent of GDP.

So, we currently have a negative fiscal cost of servicing the debt, going to a positive fiscal cost, we are talking about 2 percentage point of GDP swing, that's fairly large when we think about deficit reduction proposals. Deficit reduction is typically not -- at least in the recent last 20, 30 years -- that's at the upper end of deficit reduction.

So far I've just talked about this object, R minus G minus N is sort of just this exogenous object in the data, but macro theories suggest that there are strong connections between whatever the underlying drivers are of growth, and the real interest rate. So, in the second part of the paper I use a quantitative model to endogenous the behavior of the real interest rates, and I ask the question that if we have -- if we think about what are the drivers of low growth in the U.S. economy, what impact does that have on the real interest rate, and on the cost of servicing the debt.

Now to give you an example, in my model it's

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going to be the case that, for example: lower population growth, is going reduce the real interest rate, but lower population growth has an ambiguous effect on the cost of servicing the debt.

Why is that the case? Well, notice that lower population growth is going to directly affect economic growth, lower population growth is going to directly affect economic growth, lower population growth means lower economic growth rates, but it also lowers the real interest rates, and so its effect on this gap between r and $g + n$ is not obvious. So, it may improve the cost of servicing the debt, it may worsen the cost of servicing the debt.

For the same reason, too, it's not obvious that an increase in the public debt, will always yield more revenues in a world where r is less than $g + n$, it's possible that an increase in public debt it has indirect effects on the real interest rate that may offset the direct effect of a higher stock of public debt.

So, to pursue this question I'm going to use

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a quantitative 56-period lifecycle model, households are going to face a realistic lifecycle profile of income, they are going to save for retirement, they face some mortality risks. And I'm going to use that model to explore the underlying drivers of low interest rates, low population growth, low productivity growth, and I'm also going to include this term ω which is a stand-in for flight to safety, or for a desire to hold government debt relative to other types of assets.

I'm going to try to make this model as realistic as possible so it matches the U.S. labor share, it matches the investment to output ratio, it matches the measure of the real interest rate, and the measure of the risk premium.

So, from my model I can look at what's the effect of changes in population growth rates, and changes in productivity growth rates on the real interest rate. So, what I plotted here is essentially the sensitivity of the real interest rate to changes in population growth, changes in productivity growth.

The grey line here is just a 45-degree line that goes through the point at which I calibrate the model, and what you'll notice is that that line for population growth is flatter and it has slope of less than 1, and the line for productivity growth is steeper and has slope greater than 1.

Why is this important? Well, if you think about a slowdown in population growth, a slowdown in population growth is going to lower the real interest rate, but it lowers the real interest rate at less than 1 for 1. And so that that means is that, if you go back to this equation up here, the direct effect of slower population growth dominates the indirect effect on the real interest rate, and so slower population growth worsens the cost of servicing the debt. It makes it more expensive to service the debt.

But the opposite holds for productivity growth, slower productivity growth has a stronger effect on the real interest rate than it does on its direct effect on growth, and so it actually improves the fiscal situation, which kind of counterintuitive.

Now, all those conclusions are reversed when you go in the opposite direction.

So the punch line here is that we can then think about different scenarios, like: if productivity growth accelerated back to its sort of 1990s levels, we are not entirely sure why it slowed down; if it accelerated back to its 1990s levels, what would that imply for the fiscal cost of servicing the debt, given a debt-to-GDP ratio of 70 percent?

Now, what I find from the model is that would imply, the implied change in the real interest rate would require a 0.5 to 0.8 percent fiscal consolidation, which is sizeable but not extraordinarily large. By contrast, the population growth which is currently 0.7 percent, a slight slowdown in population growth would imply a relatively small fiscal consolidation.

So when we think about the risk perspectives what really matters is whether we think that real GDP per capita or productivity growth is going to suddenly accelerate or further decelerate.

A further slowdown in productivity growth is beneficial from a fiscal standpoint; a rise in population growth is also beneficial from a fiscal standpoint. This is again a very way of looking at it, but that's what comes out of the model. And if you have a decline in risk premia, if risk premia revert to sort of the average that they had from 1980 to pre-Great Recession, that's going to tend to raise the real interest rate, that will also require a small fiscal consolidation.

It's worth emphasizing here that the current sort of configuration of policy, in terms of the immigration policy, in terms of tax policy, and so forth, is very much geared towards increasing G if we take it at that stated aims, and decreasing N . And so that particular combination of policy from a fiscal perspective is one that's likely to move interest rates in a way that is not beneficial for debt sustainability.

So lastly, as I mentioned, a change in the debt-to-GDP ratio will also -- will have two effects

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on the amount of revenue that the government raises from -- in a world where the real interest rate is less than the growth rate of the economy.

So what the blue line shows you is that there is a level of debt that maximizes sort of the gains that you can exploit from a low interest rate world. So that level of debt is actually lower than the current level of debt. The current level of debt as I said, is 70 percent of GDP, the revenue maximizing level of debt, again from a very narrow perspective of just maximizing the amount of revenues that you get from issuing debt, is actually a little bit lower.

And that might be counterintuitive from what I said earlier, the reason for that is that the direct effect of a decline in the debt-to-GDP ratio is dominated by the indirect effect on the real interest rate. Lower debt-to-GDP ratio will lower the real interest rate and so it maximizes sort of the unit benefits per unit of debt.

The other thing that's true in this model is

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there's still a crowding out effect of debt, so a lower debt-to-GDP ratio will tend to increase the investment to output ratio, and that's going to be beneficial in this world because there's no capital accumulation due to the presence of intermediation frictions and markups in my model.

All right, so I'm going to leave you then with these takeaways. On average the cost of servicing debt is frequently negative across the U.S. and other the U.S. and other advanced economies, the servicing cost, however, shows substantial variability and a moderate likelihood of reversion over the medium term.

It's important here, my model suggests that population growth and productivity growth will carry opposite implications for the cost of servicing the debt, and even though we live in a world in which r is less than $g + n$, the revenue maximizing level of debt in my model is actually lower.

There's important limitations to this approach that I think we'll talk more about, there's

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no reason to think that this measure of cost of servicing the debt is a sufficient statistic for the optimal level of debt, and the optimal level of debt in the context my model is going to depend on quite a few things that are worth thinking about.

MS. SHEINER: Emmanuel?

MR. FARHI: Thank you for inviting me to discuss this paper, it was a pleasure to read it, and overall I thought it was a very interesting paper. For me one of the most interesting results that I haven't fully absorbed is just an empirical fact how often the net fiscal cost of sourcing the debt is negative. And you see that it's true in the U.S., a very long horizon, and it's true across countries also. So I thought that was just very interesting.

I have some comments on some of the results in the paper, that's going to be the main focus of my discussion. So, for example, there is one surprising result that Neil talked about, which is that if you have an increase in productivity growth, okay, it's actually going to worsen the net fiscal cost. Or if

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you flip it around, and you had a decrease in productivity growth, that would be good for the cost of servicing the debt.

And I think that's a result that relies on a pretty strong assumption which is very low, mechanically in the model, very low intertemporal elasticity of substitution, and I think that empirically, my understanding is that there is not a very strong documented empirical connection between growth and interest rates, and there's a very strong line in the model which is responsible for that result. So I would take that one with a grain of salt. But overall I thought it was a very interesting analysis.

I'm going to focus my discussion on some considerations that are missing, and I think could be important and could be incorporated perhaps in the next version of the draft.

I don't have a lot of time, so I'll go rather quickly, but I want to talk about debt maturity, about inflation, about the fact that the

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exercise is carried in a closed economy, and I think there's a case to look at these things in the context of an open economy with a very open capital account like, I think, describes the U.S. I'll talk a bit about some other drivers of interest rates, like self-fulfilling crises, and panics, and things like that. And I'll wrap up, and if I have time, by speculating in the special role of the dollar and the way to think about the consequences, perhaps, of these shifts in fiscal cost.

So, I want to start with a thought experiment, and I'm going to take -- I'm going to construct from the paper, so I'm going to start with the current situation, so debt to GDP is about 70 percent, the interest rate that Neil uses is 0.5 percent, G is 0.7 percent and N is 0.7 percent.

So, if you look at the current situation the net fiscal cost is negative, minus-0.9 percent and if you multiply that by debt to GDP, that gives you a net cost of servicing the debt of minus-0.6 percent of GDP. Okay? So, you get net revenues in some sense

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from sustaining this level of debt.

And I want to think about the sort of experiments that Neil has in mind, which is, deterioration in this net fiscal cost, so there is the risk that we might revert to a situation to a situation where the net fiscal cost is very different, and is very positive. And I'm going to take quite a big chart just for illustration. So, it's a reversion to the 75th percentile of net fiscal cost.

And so that would bring it up to 4.1 percent, so we go from minus-0.9 to 4.9, that's a 5 percent shift in the net fiscal cost, it's a big one, but one that's there in the data, in some -- it's not crazy. So that would increase the net cost of servicing the debt close to 3 percent of GDP, so that's pretty substantial, you would have to raise taxes by 3 percent of GDP.

Now, let me think about maturity in this context. So, in the model there's not much talk about debt maturity, it's pretty much ignored, and if you look -- or another way to think about it is that the

paper operates as if debt was completely short term, so there's no fiscal hedging through maturity. But if you have a long maturity, then when interest rates increase, say, and then the value of the debt is going to decrease, and it's going to provide some fiscal hedging.

So your net fiscal cost increases but the value of your debt decreases, and so that absorbs part of the shock. The question is how much is in there in the data, and what could we do about this?

So, suppose all the increase in the net fiscal cost is driven by an increase in interest rates, so interest rates increase by 500 basis points, so if you take into account the fact that the duration of U.S. debt is approximately four years, you find that the reduction in the value of debt from such a shift is about 20 percent, so it's very sizeable.

And just to, looking back to the sort of calculations that Neil is doing, that would reduce the cost of servicing the debt from 3 percent of GDP to something closer to 2.2 percent of GDP. So, already

if you take into account the maturity structure of government debt, there is quite a bit of fiscal hedging, and something that will protect the U.S. against such adverse shifts, and I think that's something I could easily be taking into account in the paper.

Of course you could ask, if you go at it from this perspective, what should we do, and perhaps we could manage the maturity of the debt. So there are a lot of considerations that go into that, and I'm going to focus narrowly on the one at hand here.

So, suppose that you lengthen the maturity of government debt to have more fiscal hedging in response to these kinds of shocks, so let's say we lengthen the duration from 4 years to 10 years, so it's a very substantial lengthening of the maturity.

Then you see that the amount of fiscal hedging is much larger, okay, so there's a very bad shift in net fiscal cost, and you have to increase taxes by 3 percent of GDP, but if you have this shock absorber built in there, then you only need to

increase taxes by 1.4 percent of GDP. Of course maturity is going to work only for shocks to interest rates, not to other drivers of net fiscal costs, so you would have to use other things to get at that.

Another thing you could look at is inflation as a shock absorber, so it doesn't have to all go through taxes, and obviously that's not the way we like to think that we conduct monetary policy, we usually have monetary dominance, but sometimes bad things happen, and you can have shifts to fiscal dominance. So, let's imagine that we have something like that, okay, and that allows some inflation to go through, and I'm going to consider a large increase in inflation, let's say 1 percent.

So, in response to this very bad fiscal shock inflation increase by 1 percent, so it's a pretty bad scenario. What would be the reduction in the value of debt if you take into account the current maturity? It would (inaudible), something like 4 percent. So, if you want to get much more fiscal hedging through inflation, you would either need to

drastically increase the maturity of the debt, or to allow much more inflation or much worse things.

Another consideration that's not taken into account in the paper, and I think it could, is the fact that the U.S. really has open capital account, and it's very misleading to look at the size of the current account, or the size of the trade balance to assess how open the U.S. is. So, let's assume a completely (inaudible) assumption to that that Neil made, that the capital account is completely open and, you know, there's good reasons to think that that monetary (inaudible) approximately if you just look at that, 30 percent of this 12 years debt is held abroad.

Well, that changes completely the way you want to think about the shocks, okay. So if you have domestic changes in B, in G and in N, they are going to be reflected in capital flows and exchange rates, not so much in interest rates. So they wouldn't be necessarily the drivers of the increases or decreases in net fiscal cost, so it's going to shift your focus away from local domestic changes, and towards global

changes.

And if you doubt that perspective then you see that other sustainability questions are raised, like external sustainability which can be analyzed with very much the same kind of math that Neil was organizing. Of course there are a lot of differences because there's something on the asset side of the balance sheet of the U.S., but that's something that could be taken into account.

And finally, I want to talk a bit about self-fulfilling crisis, so I think you probably all understand how this is possible, it's when investors start doubting that the government will behave, either by not defaulting, or by not inflating away the debt or things like that, they start charging higher interest rates, and the very fact that they charge higher interest rates increases the net fiscal costs for the government, and pushes the government to do exactly what the investors were worrying about.

So, that's how it works, and there are a lot of instances in history where we think this sort of

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logic captures the mechanics of certain events that increase net fiscal cost. Well, that's going to reintroduce a link between domestic developments and net fiscal costs, because the risk of such a crisis is now going to depend on domestic issuance. So there's a new link between debt and interest rates that it should be interest rates that incorporate whatever risk premia investors have in mind. So, that's a link that would be there and a tradeoff that could be explored even with an uphold on capital account.

And finally, let me just wrap up by perhaps thinking a bit more broadly about what could be consequences of a bad fiscal event to deterioration in the fiscal situation of the U.S. So the U.S., as you all know, has a very special role in the world and the international monetary system, 60 percent of world reserves are denominated in dollars, a large share of goods are denominated in dollars, and there are reasons to believe that the U.S. is reaping large benefits from the situation.

And one question that's been posed in

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history , and perhaps poses itself again, is whether some of these benefits could be lost if there was a negative fiscal event of this sort that Neil considers.

So, back in the Bretton Woods days, there was a prominent economist, Robert Triffin, who speculated about this kind of possibilities, and sort of foresaw the unraveling of Bretton Woods, and the question is whether we could have something that looks like a Triffin event in the future.

MS. SHEINER: Thank you so very much. That was great. I had all these questions for him; do you want to go through all of them? If you have questions put your cards up, please, and we'll go around. Like I said, most were talked about, but I want to talk them about them again. So, one of the very strongly counterintuitive results you've had was this relationship between growth and debt sustainability.

So, in the recent Trump budget, people are saying they double-counted the effects of growth, I think you are saying they have the wrong sign, even on

the effects of growth. And have you looked at two things, one, have you played with the model to change that elasticity substitution and see kind of how sensitive it is, because I assume it is quite sensitive, and also what do you think -- you know, is there any empirical -- it's all coming from this OLG model where we are just taking some parameters, or is there any empirical work that backs up what you are finding?

MR. MEHROTRA: All right, so yeah, I think that was -- I find that surprising too, but it's also -- it is driven by, as Emmanuel said, the U.S. elasticity of intertemporal substitution. My understanding is of, and I'm just looking at the literature, that that elasticity of substitution is typically thought of as less than 1, and if it's less than 1 then approximately it's going to be -- the closer it is to 1, the closer the movement is 1 to 1, and there's no real benefit of cost either way.

The farther it is from -- the more that it's less than 1, then you get this effect of productivity

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growth moving the interest rate more than it moves -- than its direct effect on growth.

So, on something like the Trump budget, or how we should think about productivity-enhancing policies, I think that it's important to realize that I was just looking at steady states, right. And so it could be the case that you have a policy that has a level effect on productivity, there is an important transition there, and that once you take into account that transition, that the sort of minor change in fiscal cost in the long run is -- well, there would be no change in fiscal in the long run, because there is not long run effect on the growth rate of productivity, there's this level effect on productivity that's beneficial.

And I think most of the policies that we have in mind are more of this sort of level shift than actually changing the underlying growth rate of productivity. I'm not aware of much in the way that fiscal policy -- much that fiscal policy can do about the long-term growth rate of productivity.

And so my experiment there is much more -- we don't know quite know why productivity accelerated in the 1990s, slowed down -- has slowed down so much today, so if I was to think about sort of the balance of risks, my guess would be it seems feasible that productivity growth could accelerate back to 1990s levels. Through the lens of my model that suggests that the interest rate effect would be quite sizeable. So, that's sort of how I think about those.

MS. SHEINER: Yes. So, two questions actually. And if anybody has -- you have, good -- and I'm going to follow up on that, and then I'll pass it to Bill. So, you're thinking about, there are two issues, one is you are thinking about it very much from the perspective of federal government kind of as a private borrower, right. Like you are not thinking about the social welfare, you are not thinking about -- So from that perspective, if you think you do -- you should think a little bit possibly more carefully about the effects of productivity growth on the federal budget, because I think you probably have a

liner, you have a tax rate but, you know, to the extent that poverty goes down, and being that the programs go down, and we have progressive tax rates, and so productivity growth actually boosts revenue more than 1 for 1, that could offset it, right.

So when you are thinking about, really, let's model the fiscal situation, then I think, or being a little more careful of what we think of that, you know, relationship between productivity and revenues and spending is worthwhile. And then again, you know, thinking about -- obviously productivity growth is good. You know, and what is the taxing capacity? Like so with current tax rates maybe, you know, we are in a bad situation. But it's also a lot easier to raise taxes when people are richer; and so both of those things, kind of, I think.

MR. MEHROTRA: So, just my -- I think my prior is that, while the view in Washington is that there's a whole set of policies that would enhance productivity and productivity growth, I don't know that that's -- I think that's possibly true, it's not

clear that the set of policies that are being considered will do that, and it's not clear that the doubt is all that strong, that you can really move productivity all that much.

So, the way I treated it in the model is that, you know, it's moving around for reasons that are exogenous to policy, and to a first approximation I think of that as the most defensible way to think about it, but I think that it's certainly possible to think about a lot of these channels, public investment channels effects on human capital, and so forth, that would clearly be beneficial from an --

MS. SHEINER: Yeah. I wasn't in (inaudible), I was just saying that like if people are richer, then you can change taxes to make fiscal debt sustainable, not because -- not even a cause, but you know. Bill?

MR. ENGLISH: So, I'm going to go in a different direction, I thought the initial empirical (inaudible) elsewhere, and probably I wouldn't have guessed, we had such long periods of negative fiscal

costs. But looking at the U.S. graph, it struck me, it will be really interesting to know more about what seems to trigger these transitions from negative to positive -- or from positive effect to negative for that matter, but trying to understand better what's driving those changes.

So, looking at the U.S. graph that you have, Figure 1 in the paper, the striking thing is in the post-war period there's like one event, and it's the Volcker disinflation, it looks like to me. So, we had this long period actually from before World War II, through to about 1980 with negative fiscal costs, and then an abrupt rise, which I assume reflects higher real interest rates mostly, and then that kind of slowly tapers off. And so it looks like, you know, one story would be, inflation expectations are really sluggish, and that's really important somehow to the story.

But anyway, I guess I would be really interested to learn more about, in other countries, what do these transitions look like, and is there a

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story we can tell about those transitions.

MR. MEHROTRA: Yeah. I definitely think it would be -- I didn't try to make an effort to explain the transitions or explain in some deeper way, what we see in the U.S. case, it is worth noting that across countries there is a strong common component in the behavior, sort of, net fiscal cost which I guess gets to some of what Emmanuel was saying about thinking about the open economy dimensions.

But I agree that it would be quite interesting, I think, what are the drivers? But just on average it just seems like, you know, the cost of servicing the debt is typically quite low or negative.

MR. ERCEG: So, it's a couple thoughts. One is the issue of the intertemporal elasticity being very low, it would be interesting to simply run your model through the period of the productivity acceleration of the late '90s and early 2000s, and to see what it implies for the real interest rates, as real interest rates go to, say, 10 percent in your model, you know, rather than, you know, the date of

being in the 3.5 percent range.

The second is, just to build on Bill's observation, it will be interesting to strip out the periods following World War I and World War II, because those are periods where ex-post real interest rates were extremely low, so in the late '40s and early '50s we allowed the price level to increase pretty dramatically, and you know, it's interesting that investors seem to regard that as a one-time event in the aftermath of war.

But it had, you know, (inaudible) in bringing down the stock of debt. And so if you struck out those two periods, you know, it just would be interesting to see how that shifts your results. I presume those are fairly substantial thoughts

MR. MEHROTRA: Yes.

MR. WESSEL: I would just let people go on with a round.

MR. MEHROTRA: Oh, sure. Okay.

MR. WESSEL: Emi.

MS. NAKAMURA: So, my comments, right, was

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related to Chris'. I would say there's a huge debate on the value of the value of intertemporal elasticity substitution asset pricing, and in particular the experiment he's describing of looking at how interest rates respond to changes in expected growth rate, is essentially the experiment that people do in this literature that goes by the name of the (Inaudible) Risk Literature.

And in that literature as well as the disasters literature, the view is that if you have intertemporal elasticity substitution of less than one, then you get strange predictions. Like, for example, there is a disaster and people go into a disaster and you expect growth to fall, and the incentive to save, to smooth consumption is so great that you've got a stock market boom. You go into a disaster and you get a stock market boom.

Or, you know, you expect high future growth, and the stock market crashes. You know, or there is an uncertainty stock, and the stock market booms, you know, because there's kind of an intuitive sense that

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uncertainty is bad for the stock market, but in these models, although, you know, maybe recent events, I don't know, (laughter), but theoretically the value of the intertemporal elasticity substitution matters well for that.

Now that is not to say that you are not right, that there's other evidence, you know, in particular Hall's classic paper, where he just does a scatter plot of risk-free interest rates versus consumption growth, and there's just not much there.

So, I think there really is some question as to what the debate -- what the value of this is, but there are major issues with the standard model, with the intertemporal elasticity substitution of less than 1 including -- you know, that they are very closely related to what you are looking at, including, for example, very related to what Chris was describing, you know, the puzzle of how you get with a very low intertemporal elasticity substitution simultaneously growth, expected growth, and a very low risk-free interest rate. So, anyway, I think those issues might

be interesting to think about more.

MS. SHEINER: Okay. Philip?

PHILIP: So I have a brief comment, and then a question I'd like to ask. And the comment I'd like to make is that it's somewhat in defense of the argument that Neil has made, and this slightly surprising result we see, growth is only about the impacted growth, that I'd like to emphasize that. And if you think about the growth of the entire economy, relating to population growth, then you take the average of those substantive lines, if you think growth is roughly, say, half of that tax or in the entire population, then the average of those two lines are sort of (inaudible).

So, you are thinking of growth in a more general sense, then you are slightly surprising yourself, and it does go away. And I think the more general point is if you take from Neil's paper, assuming that, I think it's very useful for policymakers, and it's going to R and G (inaudible), then you also hear the quality events about interest

rates being low, or growth being low, and people not realizing the two have are connected, and then you (inaudible). So, that I think is really important.

So, the questions I've got to ask you now, it's the incentive for more, about how that -- in government you have the great swings in the model, those two lines with slightly different slopes. I was given some (inaudible) in response to the changes within the debt, because that's going to determine how the different parts move around as (inaudible) of the debt. And that's the key mechanism I think and you (inaudible) would like to understand that --

MS. SHEINER: Any more questions before we turn it back to Neil? Neil, a couple minutes.

MR. MEHROTRA: So, on the question about the late 1990s productivity acceleration. So, in my paper with Gauti Eggertsson, we do an experiment like that where we think about the productivity -- we are trying to assess the contribution of slow productivity growth to the decline in the real interest rate, and it is true that now, I mean there is drawbacks to this

analysis, and that it's perfect foresight, so people anticipate that there's going to be a productivity boom in the late 1990s, and then it's going to fall off in the mid-2000s, so that tends to temper the effect, but you still -- but you do get some rise in real interest rates from higher productivity growth, but it's not anything like at -- you know, it goes up to 10 percentage points or something like that.

So it's not a massive swing, you just get a small sort of hump-shaped, maybe, 0.5 percentage point or something like that. Now, whether that's being driven by -- and in that paper we have a similar low elasticity of intertemporal substitution. Whether that's driven by these perfect foresight effects, or whether it's driven -- or whether it's consistent if you expected that to be permanent, I think is an interesting question to investigate.

And I completely agree with Emi's point about trying to think more about alternative evidence on the intertemporal elasticity substitution, and how that affects my conclusions. On your question about

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how total debt moves around the elasticity of the interest rate to population growth and to productivity growth, I think it's just a level thing. So, increase in public debt is going to increase the real interest rate, but it doesn't change that slope very much in those graphs.

Because I mean, what's the experiment in those graphs, the experiment in those graphs is just changing population growth holding the debt-to-GDP ratio constant. So, if you simultaneously -- if you increase the debt-to-GDP ratio and then vary the population growth rate, you just get this sort of -- it doesn't change the elasticity all that much. There are some interaction effects, but it's not all that strong.

MS. SHEINER: Awesome. Thank you so very much. We'll have more time to talk about both papers together at the end. Let's move on to -- Are you presenting, Bill?

MR. ENGLISH: Yeah.

MS. SHEINER: Go.

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MR. ENGLISH: Okay. Thanks very much for inviting us to the Hutchins Center today. This is joint work with my colleagues Chris Erceg and David Lopez-Salido with The Board, and we, too, have a disclaimer that says these are our views, and not those of anybody of actual importance at the Federal Reserve.

So, our topic today is Money-Financed Fiscal Programs, or colloquially, helicopter money, there's been lots of recent discussion about the topic, and that interest reflects concerns about the ability of monetary policy to address persistent economic weakness given the effective lower bound, as is demonstrated by the Japanese experience over the last couple of decades, and experienced in other advanced economies post-crisis, as well as concerns about a very low neutral real interest rate going forward, if secular stagnation or concerns pan out.

So, in particular, money-financed fiscal policy might offer a useful tool to provide additional stimulus, or if you are in a situation with a

persistently weak economy, a very low inflation or deflation, a monetary policy constrained by the effective lower bound and fiscal policy constrained by high debt levels.

And just to preview our results, we find that money-financed fiscal programs can be a very powerful tool, at least in theory, boosting up within inflation substantially. However, such programs require a radical change in the monetary policy reaction function in the receptacle, and this sector change can be communicated clearly incredibly in many circumstances.

But if the policy isn't well understood by the public, and believed, then the effects on output in inflation will be smaller or at least delayed, and that makes it a much less attractive tool for countercyclical policy. And as a consequence we'll argue that monetary fiscal cooperation, involving more limited changes in monetary policy, may be easier to communicate, and more credible, and so might be more effective in addressing difficult policy situations.

Before I turn to our model, I want to address a preliminary complication, which is the payment of interest on reserves. In the kind of standard textbook helicopter dropped story, which I think drives everyone's intuition; now the Central Bank pays for a fiscal expansion either with currency or with non-interest bearing reserves, but with non-interest bearing Central Bank liabilities.

And then so long as the Central Bank doesn't reverse that increase later on, or doesn't begin to pay interest on reserves later on, in some sense you automatically get the seigniorage to pay for the fiscal expansion. Now, but with interest on reserves, things aren't so simple, the Central Bank can pay for fiscal expansion with the permanent increase in reserves, but then they can use interest on reserves or other tools to implement an unchanged monetary policy rule, and if it does so, then you don't get the seigniorage revenue to pay for the fiscal expansion.

So, with interest on reserves, basically we see a money-financed fiscal program, as consisting of

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three pieces, there's the fiscal action, there's an asset purchased by the Central Bank to provide finance for the fiscal action, and there is a commitment by the Central Bank to a much more accommodative monetary policy. That's necessary to generate the increase in the price level that boosts nominal currency demand that provides the seigniorage that then pays for the fiscal expansion.

So turning to our benchmark model, we construct a fairly standard New Keynesian model, households choose consumption, they choose hours worked, they choose money balances, money is just currency in our model. And the way we set things up, the nominal currency demand looks pretty standard, it just depends on the short-term nominal interest rate, and the level of nominal income.

Firms choose the level output of employment, the set prices following the standard (inaudible) pricing setup; and the government chooses spending in taxation. The non-standard part of the model is monetary policy, where rather than the typical Taylor

Rule, or something like that, we assume that monetary policy is chosen so that the government spending shock, GP here, is paid for, at least partially, with seigniorage, SP , and that coefficient fee tells you what fraction of the government-spending shock is paid for with seigniorage.

If fee is one, for example, then the full monetary financing; and we spend most of our time talking about that. Then using the household money demand function, we can rewrite the monetary policy rule, as we have in the middle here, and as a rule for the Central Bank is setting the nominal interest rates based on a price level -- deviation from a price-level target, P^* (inaudible), and consumption's deviation from its steady-state value.

So, you basically get monetary policy rule that say price-level targeting rule, but importantly that price-level target moves, and it moves, and if fee is 1, it moves up fully to reflect the increase in government spending.

So, in terms of the model's expectations,

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for now I'll assume rational expectations, and the changes in policy are fully understood by the public, and have seen this completely credible. Those are important assumptions, and I'll come back to those later.

So we use the model to simulate the effects of a money-financed fiscal program. In the simulation we assume government spending rises by a total of 1 percent of GDP over several quarters, and the Central Bank pays for the spending with seigniorage using the policy rule I just described. And given our calibration, seigniorage is roughly 10 percent of outstanding currency, so ultimately the price level is going to rise by 10 percent, which is a fair amount given the fairly small fiscal action.

The results are shown in Figure 1 in the paper, and basically this policy is very effective in the model. Output rises about 1.5 percent relative to baseline, that's the top left panel, inflation rises nearly 2.5 percentage points, shown by the blue lines. The blue lines are the monetary financed fiscal

program.

Most of these reflect the change in the monetary policy reaction function. If monetary policy follows the Taylor Rule, that's the dashed red lines here, you get much smaller effects on output, much smaller effects on inflation, and the reason for the big difference is that with the money-financed fiscal program the Central Bank has to move the price level up to the desired level, and to do that, it lowers the real interest rates by about 0.75 of a percentage point, and it keeps that real interest rate low for a long time, for several years.

And the low real interest rate boosts the aggregate demand and gives you the big effects on output. In terms of seigniorage, you can see in the left-hand panel here that seigniorage rises sharply, with the introduction of the program, basically that seigniorage line exactly matches the government spending line in the previous panel, as it should by design, that's the idea. You are paying for the fiscal action with seigniorage.

And then the results for government debt is a sharp reduction in the debt-to-GDP ratio, that's because the seigniorage pays for the fiscal expansion, but then you have very low real interest rates for a time, and that results in the reduction in the debt burden, and the stronger economy that results from the policy boosts tax income for the government, and that also reduces the debt-to-income ratio.

So, in Figure 3 in the paper, we show what happens if you change to price-level targeting, but you don't move to the higher price-level target, that's the green dashed lines in this chart. So, as you can see in the top-right, the price level stays basically flat, with the green dashed lines, you've adopted price-level targeting, but with no change in the desired price level, and the effects of that are basically the same as the Taylor Rule, you get very small differences in the effects on output, for example, as shown in the top-left.

So the big factor, the big difference in the money-financed fiscal program effects, is that you

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have this higher price-level target as shown on the top-right, the dashed black lines, and the actual price level, because of the accommodative monetary policy moving to that price-level target over time.

In the paper we examine two factors that influenced our model results, I'll just touch on them briefly. First, currency demand could prove higher or lower than expected, if money demand is significantly lower than expected, for example, then inflation has to be higher, to generate the seigniorage to pay for the fiscal expansion. And second, the mix of the effects of the policy and output in inflation will depend on the slope of the Phillips Curve.

We assumed a relatively flat Phillips Curve consistent with recent U.S. experience, but if the Phillips Curve was steeper, then the boost output would be smaller, and the rise in inflation would be even larger, as we show in the paper.

Now, and obvious the question is what would happen if the money-financed fiscal program either wasn't understood, or wasn't seen as fully credible?

To explore this, we consider a reversion of our model with learning. So, instead of full information and full credibility, we assume the public initially believes the Central Bank is unlikely to actually change its monetary policy rule.

Presumably because the Central Bank has a reputation for desiring low and stable inflation, but over time the public will see the Central Bank's actions, and can update its view of the Central Bank's intentions, so if the Central Bank sticks to the new policy for a while, then the public will gradually come to believe that the monetary policy rule has changed and take that into account in forming expectations.

So, to implement this approach we assume the public can only see the stock of money which is subject to random noise, so the public can't be sure just by looking at the money supply at a point in time, whether the Central Bank has changed its policy rule or not, instead it's going to update its beliefs over time, and formerly remodel that using a common

filter.

So, here are the results with learning, and they are not surprising, given that learning takes place over time, the effects of the policy on output and inflation are pushed back in time as the learning takes place you get bigger effects. So, as you can see by comparing the red dashed lines, which are rather simulations with the model with learning, to the blue lines that is the earlier version of the model, with complete credibility; basically, the peak effects of the policy are pushed back several years under our calibration.

These long lags mean that the policy is less attractive, as the countercyclical tools since the largest effects are likely to come after the economy has already recovered. And the latent protracted effects of the policy, may also make it more time inconsistent, and so undermine its credibility further.

So, given the communications difficulties, as well as the large inflationary effects that we find

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for even a relatively small money-financed fiscal program, we thought it would be useful to consider a more modest form of cooperation between monetary and fiscal policy.

So, we consider two possibilities in the paper. On the one hand the temporary shift to a more aggressive Taylor Rule, and on the other is, I'll show in a moment, a shift to price-level targeting, but with a smaller hike in the price-level target than in the case of kind of the full, the full Monty of monetization.

So, in this case we are showing the effects of the monetary fiscal cooperation starting from the situation where there's a large aggregate demand shock, and that's left to monetary policy constrained at the zero bound. This is going to be a last monetary accommodation, not full monetization, we assume a larger fiscal expansion.

So we are going to increase government spending by a total of 2.5 percent over time, and we show three possible monetary policy rules, so the

black lines shows the standard Taylor Rule, the red-dashed lines, flexible price-level targeting but with no change in the price level, and the blue-dashed lines, flexible price-level targeting, with the target price level that's 5 percent higher as a result of the fiscal monetary cooperation.

Now, at full monetization you get an increase in the price level of 25 percent, so this is a much smaller increase than that. We think it would be easier to communicate and make it credible to the public as a result.

As shown in the charts, a move to price-level targeting alone does help to support the recovery, as others have discussed. But the effects with the higher price level target are considerably larger, so you can see from the difference between the red-dashed line, and the blue-dashed line.

In addition, as you can see at the bottom-right, the higher price level target generates a decline in the debt-to-GDP ratio rather than the rise you'd get with the other policy rules. And that may

be important if the initial debt-to-GDP ratio is very high.

So let me end with just a few practical issues. First, you might wonder, given that most of the muscle from these monetary fiscal policies is coming from the monetary side, why do you have to use the fiscal policy at all? We think there are three reasons why the combination policy may be effective.

First, it may help to make the change in monetary policy more credible sooner. If monetary policy is constrained by zero bound, for example, then the public may not see that the policy rule has changed until the economy gets to a point where, with the old policy rules, you'd be lifting off, and you are not lifting off, because of the new policy rule. So that would make it more obvious that there's been a change.

Second, the fiscal streams and the possibility of default and associated costs may make the policy rule more credible. Now that is, it may help the Central Bank to commit to being

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irresponsible, which is useful at the zero bound.

And finally, a joint program may improve the clarity of communications, if you have all the policymakers, fiscal and monetary policymakers announcing a program together, that suggests policymakers are united and committed to doing whatever it takes, and that may be helpful in making the communication clear, and also making it credible.

I'm out of time, so I'll just briefly on, we talked about some history in the paper. I think the lesson there is, sometimes these sorts of policies seem to have big effects, sometimes they don't, and there are a number of complications, but I think the history overall is consistent with our thought. The communication and credibility really are problems with these sorts of policies.

And finally, monetary fiscal cooperation naturally raises issues about Central Bank independence, and I think that gets you into kind of designing structures for how to implement these sorts of policies, if you are thinking of implementing them.

That's beyond the scope of our paper, but we point to a kind of dual key approach that Ben Bernanke pointed to in a blog post as one possibility.

Thanks very much. I'll stop there.

MS. SHEINER: Thanks so much. Emi Nakamura from Columbia?

MS. NAKAMURA: Thank you. Thank you to the organizers for inviting me to discuss this interesting paper. So, I want to start by talking about what helicopter money actually is. And I was sitting here I was thing to myself: how is it possible that neither I nor Bill thought to show the picture of Ben Bernanke in a helicopter dropping money on the world that I always show when I talk about Quantitative Easing and unconventional monetary policy in the context of teaching. So that was definitely an omission, because that would have answered the question of course; but since --

MR. BERNANKE: But it's one that is much appreciated.

MS. NAKAMURA: (Laughter) But since I don't

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have that, let me try to make some alternative commentary on this. So, this paper gives us one precise definition, I'm not sure it's the only definition, but there's one precise definition which is, they are going to think about a situation where there's some government spending, so that's the fiscal policy part, and it is entirely financed by seigniorage. In the narrow sense of the word seigniorage that we teach to undergraduates, like: you print the money and it's the amount of that in terms of real money balances. And you use that to pay for the government spending.

So, one of the implications of this definition, is that because, you know, there literally is just not that much money around, it actually does imply a pretty big change in monetary policy; because if you are going to pay for this whole fiscal expansion using seigniorage, you need to print a lot of money. So that's just one -- You know, that's one comment and I'll come back to that.

But one implication of that, is that in the
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context of the smaller where monetary policy does have effects, there's quite a large stimulus to output and debt to GDP can actually go down, because there's so much stimulus that, you know, there's a sense in which it sort of pays for itself in some sense.

So, why is it a cautionary tale, it's the title of the paper? Well, one thing I thought was super interesting in this paper was this discussion of credibility, so this a figure that Bill showed, which is illustrating the output boom, under two scenarios, the blue line is the case of perfect credibility, the dashed red line is the case where people are learning about the policy in real time.

And of course what's so problematic from the perspective of the Fed about the dashed red line, is that if there trying to engineer boom as a matter of some kind of stabilization policy, it would sort of be a problem if the boom doesn't show up until five years after they plan on doing.

So, that I felt was a very interesting point about -- you know, as a cautionary tale, that maybe

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it's hard to figure these things out, and that this imperfect credibility would really cause a problem in terms of the implementation of this policy. And I think that this idea of credibility and communication is sort of a running theme behind -- the way the authors are thinking about these issues.

So, now let me come to how the authors frame the pros and cons of helicopter money, in the context of this particular definition of what helicopter money is. So, the authors and I had some back and forth on this, and so I'll overlap a little bit with what Bill said about this, but there's an interesting question of why these two policies, the fiscal part and the monetary part would necessarily be combined in the same policy that is the helicopter money policy.

Because in principle, in their paper one of the things they show is that it's really the monetary part that's kind of doing all the work. They have this huge monetary stimulus, that's leading to like a 10 percent increase in the price level, something like that, and as a consequence there's a huge stimulus to

the economy, but of course in principle, you could just think about doing that, and not even combining it with the fiscal part.

So, one question is whether these two things, the monetary and fiscal parts are bedfellows by chance, you know, are we putting them together just like a sandwich, you know, the sum of their parts? Or, is there some sense in which they interact with each other. I guess the sandwich, it does interact with the different parts.

So, that's an interesting question. One response to that, a very interesting response to that, is going to Eggertsson's paper from 2006 called, Committing to be Irresponsible, that Bill talked about. The basic idea of that paper is that, if you have central bank that is not so credible, then it might need some way of really committing to create inflation. And so of course the Bank of Japan at the time comes to mind, as maybe a case in point, and I think in Gauti's paper he may have actually talked about the case of Japan.

So the idea is that if spend a lot of money and increase your debt, you make it really painful for the government, and therefore you give them an extra incentive to inflate, and that serves as a committing mechanism to really make the inflation happen even when, ex-post, you might not have such an incentive to do it.

So, you know, most of you are probably economists in the room, you are familiar with this notion of commitment but, you know, if you are not, the analogy to everyday life is something like, you know, the situation of, if you are thinking about trying to get your kids not to eat cookies from the cookie jar, you know, ex-post after they've eaten the cookie, it may be very painful for you to lock them in their room for an hour, because they are screaming and you feel really bad for them.

So what you might need to do, is if you had some kind of time lock, where you could really commit in advance, yes you'll have to be in your room for an hour, then the idea would be that case the kids would

know that that was going to happen after they steal the cookies from the cookie jar, and they wouldn't steal them in the first place.

So, it's that kind of an idea here, that in principle this government spending, the fiscal part of the policy could help the Fed actually commit to this monetary stimulus. But in this context one question that I have is the extent to which the Fed really needs a commitment mechanism. So different central banks probably differ in this regard, and this is maybe a statement of confidence about the Fed about which, you know, some of the people in this room probably know much more, but there is evidence that the public does believe what the Fed says it's going to do, at least to some extent.

So if we look at cases of forward guidance, there is certainly evidence that when the Fed says stuff, about what it's going to do in the future, it's going to keep interest rates low, things like that, bond markets move. So, you know, there is some question as to how important this is, and I saw it in

Bill's presentation, he was kind of putting this second on his list to what might be important.

So, just as an example as I said, of where we see that the Fed does have some power of commitment, you can look at cases of forward guidance, like in September 2012, the Fed said, monetary policy would need to remain accommodative, for a considerable time after the economy strengthened, and this has been attributed, there is evidence for the view that you can view this as a form of what has been now referred to in the literature, as odyssey in -- odyssey in forward guidance in the sense that it's being interpreted by the markets as saying that the Fed is going to keep interest rates low, even when it might be in its interest purely from a static perspective to raise that.

And it looks like there's some evidence that the bond market really believed that the Fed was going to keep its word. So, maybe this commitment view is not so important for the Fed, but I think that's interesting question to debate.

So, why else might these things be combined in the same policy, the monetary part and the fiscal part? Well, I thought the authors' perspective on this was very interesting. They talked a lot about communication. So this was kind of an argument that I hadn't heard so much of before, but the basic idea was that if you just do a monetary policy particularly at the zero lower bound, maybe the people in the economy they just of don't notice.

You know, it takes a long time for monetary policy to have an effect, interest rates in terms of the headline, you know, interest rate maybe already zero, people just don't notice. So, I think one of the ideas they have is that possibly by combining it with the fiscal part, you just create a bigger bang, you know, it adds up with whatever stimulus effects there are, and potentially this leads people to notice the policy, and leaves people to respond more. So, I thought that was an interesting argument that I hadn't seen before.

So, let me talk about one last thing, which

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is about some additional fiscal benefits and cost of helicopter money that are not part of the authors' definition, and it might interesting to consider. So, one is that as they said at the beginning, they do have this sort of narrow definition, of how they think about the fiscal benefits of this helicopter money, because they are really thinking about seigniorage narrowly defined.

You know, when you print money, and then what are real money balances you get from that. But there are other fiscal consequences particularly in a world of long-term debt, so in a world of long-term you have changes in expected inflation potentially, at least from this kind of a policy that massively increases the price level that would affect the valuation of long-term bonds.

And particularly in a world where many of the U.S.'s long-term bonds are held by foreigners, that might be a fiscal consequence that is important to consider. And another thing that isn't part of the authors' framework is distortionary taxation, and in

the context distortionary taxation, it might be a benefit of this kind of a fiscal policy, potentially, through the evaluation of long-term bonds, that you would be able to have a reduction in distortionary taxation; so that's possibly a benefit that isn't there, if we only think about the fiscal consequences from the perspective of seigniorage.

On the other hand, you could worry about debt, and I think this comes back to some of the conversation about the previous paper. You know, our models aren't perfect; there's been a lot of debate, for example, about the effects of forward guidance on current output, whether our models implied that the effects are too strong, things like that.

And if the model is imperfect then you might worry that a big run-up in debt either for the purpose of stimulus, or for the purpose of -- or big increase in spending, sorry. Either for the purpose of stimulus or commitment, or communication, or whatever, could actually lead to an increase in debt as opposed to a decrease in debt as in the authors' simulation.

Because remember, in the authors' simulation there's so much stimulus coming from the policy that debt to GDP actually falls.

But if you get that wrong, and debt to GDP actually goes up, then you might worry that there are costs, potentially associated with, you know, concerns that the debt level isn't sustainable; and potential effects on borrowing costs. Thank you.

MS. SHEINER: Okay. Again, we are going to put up cards, and go around the room. Why don't we start with you and I'll --

ATTENDEE: Okay, thanks. I think Ruth Judson and Dick Porter have estimates, about two-thirds of U.S. currency is held abroad or more. If the helicopter drop is in fact currency you are thinking about, I was wondering how that impacted what you do. And I think what matters maybe, what pins down the U.S. price level, and for the total stock of currency then I think maybe you are fine.

If it's just the domestically-held stock of currency, then the increase you are thinking about, 10

percent is going to be much bigger relative to the domestically-held stock, assuming that's all distributed domestically. So, it might mean even get a way of having a smaller increase than having the same kind of bang for the buck. But I'm not sure, but it seems like something worth thinking about.

MS. SHEINER: Bill? I'll ask a question, and then I'll let you respond to Emi and to that question.

MR. ENGLISH: Okay.

MS. SHEINER: So, I have two questions, and maybe they are dumb questions because I don't know this step very well. So, one question I had is this idea of why you need the fiscal and monetary together, and you talked about this commitment advice that if you spend money, and you build up the debt, then you need to inflate in a way. But combining it with Neil's paper, and also what we've seen, you know, in a time when you are at the zero lower bound, and interest rates really low, actually a higher debt was actually making money for the federal government,

right, if the fiscal costs were negative.

So, does that work? And so building on to that, when we saw the huge rise in debt-to-GDP ratio, did we see a big increase in inflation expectations, that we saw going from 40 to 70 in just a few years, so that's an experiment where we did this; and how did inflation expectations change? I'll stop there.

JOHN: I'd just like to follow on, on what Emi said. I'm having a hard time understanding how we can plausibly think about helicopter money, if it relies on a whole lot of people putting \$50-bills under their bed. And it somehow doesn't seem at odds with the way people actually behave, so even in the thought experiment, how was it you were going to get people to hold all this currency. I mean, are you -- I just have a hard time understanding that kind of -- tell me story of how this is going to possibly work.

MR. ENGLISH: Yes. So, this is important and let's talk about it, because what we are trying to do is come up with a kind of a -- if you like, a real world counterpart to the kind of model experiment of

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dropping currency on a population where that's the only money supply, or something, you know, that they go out and they spend it, and that pushes up prices and so on.

So, the question is, what is the real world counterpart to that? And in our counterpart is that the fiscal authorities do some spending, they pay for that in the first instance by selling some bonds to the Central Bank, then the Central Bank provides a commitment to easier monetary policy that's going to boost the price level over time. That higher price level, as the price level goes up, whittles away the real value of the currency stock. People like to have some amount of currency relative to their real spending, and so they are going to replenish their currency stock over time, and they replenish it by taking more nominal currency from the Central Bank.

So, it's in some sense reversing the ordering that you have in your head, I think, which is, you know, the central government injects a whole bunch of currency that pushes prices up, in this case

what's happening is easier monetary policy is raising the price level, and that's leading to people demanding more currency.

But nonetheless, in the end, the public is holding more non-interest bearing liabilities of the Central Bank, and that's providing the seigniorage revenue which is by the way we set up the problem, equal to the fiscal spending that happened. And so I think it's important that you see it kind of right way around, it's a commitment to an easier monetary policy to price levels higher, and that's what generates the higher currency.

MS. NAKAMURA: I mean, one addendum is just that, the fact that there isn't that much cash, which might be partly what you're talking about, is scaling the magnitude of monetary experience?

MR. ENGLISH: Yes.

MS. NAKAMURA: Because the less cash you have, and as it approximates to zero, you know, then the (inaudible) the monetary experiment goes to infinity.

MR. ENGLISH: Absolutely! And so in our calibration, currency is about 10 percent of the consumption, and so if you have a fiscal expansion of 1 percent, you've got an increased currency by about 10 percent, and that was what drove the 10 percent increase in the price level, in our exercise. But if because of the rise of alternative transactions technology, the currency falls to 1 percent then, gee, you need a whole lot of inflation, much more.

And to come to your question, John; I think, the key question is how do the foreign holders of U.S. currency behave. If they, too, as the price level in the U.S. goes up, need to replenish their holdings of currency, then that's fine, and everything kind of plays out as in our model results.

If this maybe comes back to one of the things Emmanuel was saying earlier, if the foreigners say, gee, the U.S. just raised its price level a whole lot, might do that again, maybe I want to hold euros, or something else, you can get a shift out of dollars in use around the world, and into other currencies,

and them, you'd have a smaller stock of currency, and that would mean you'd have to have more inflation to get the seigniorage that you want.

MS. SHEINER: (Inaudible)?

ATTENDEE: A quick question, following up on the previous question. I was wondering if the program you had in mind is, if you try to compare it to monetary financing that's happened, my understanding is that in a lot of cases, when you manage to ramp across seigniorage revenues, it comes with some form of financial repression, and things like that; and so part of the seigniorage is coming from some forms of money that's not directly currency. And that's held by financial institutions.

MR. ENGLISH: Yes.

ATTENDEE: And that's not what you were thinking about.

MR. ENGLISH: That's right, it's not.

ATTENDEE: And so you are going to get a much bigger increase in --

MR. ENGLISH: Yes. Absolutely! So, for

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example, you could imagine the Central Bank imposes higher reserve requirements, and makes institutions hold a lot of non-interest bearing reserves, that will be another way to generate seigniorage that would not necessarily generate a lot of inflation. Instead it would in effect be a tax on banks, right, over time.

MS. SHEINER: Can I ask one question, I'm a little -- Go ahead.

ATTENDEE: Just to follow up on that. So, historically my understanding is that after World War I, or during and after World War I, we issued bonds and appealed patriotic -- mostly to purchases bonds, and the interest rates might have been a little below market even at the time, but then, you know, we had a big run up in the price level, and had we allowed that to persist, and say, had we devalued versus -- we are on the Gold Standard, if we had devalued the gold peg, that would have imposed large losses on those holders.

We ultimately went back with -- you know, went back to the original peg and adjusted interest rates to protect bondholders from those losses, but

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they bore them in France, so a comparable situation where a lot of bonds were issued in France to finance the war. In that case they depreciated relative to the original parity by a factor of 5. So the bondholders bore enormous losses.

ATTENDEE: That's not seigniorage?

ATTENDEE: Yes, but it would have similar consequences.

MR. ENGLISH: I'm not sure if you wanted us to respond to some of this?

MS. SHEINER: Yes.

MR. ENGLISH: So, let me take a whack, and then you guys can jump in and correct me. So, Emi asked about, does the Fed need a commitment mechanism for guidance was effective -- I guess it depends on how you read the forward guidance, and what did it mean, and to what extent was it a commitment to do something the Fed didn't want to do later on? And to what extent was it not committing to do something hard later on.

But simply communication about the policy

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reaction function that was helping the public to understand what the Committee was likely to do. My read would be, it was more the latter than the former, but we could discuss that further.

On the additional benefits and costs, I think I agree completely, that long-term debt means that the unexpected inflation in our program would have an even bigger effect on debt-to-GDP ratios, and would impose losses on foreigners which you might conceivably feel either better or worse about, but at least it would be different, it would be something you'd want to take into account.

And that it would also allow a reduction in distortionary taxes is exactly right. And in our model we are using lump sum taxes, and in some sense in transfers to make the government's budget constraint fit, but in a more general exercise, you could allow for that, and I agree for sure on that. We talked about the currency abroad.

Louise, on your questions, I guess it's right. So, I think your first question was basically,

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should fiscal policy necessarily be constrained by a higher level of debt to GDP? Maybe not, maybe a higher level of debt to GDP is perfectly financeable, but I think as Emmanuel maybe suggested, even if in the near term it's okay, people may be worried that later on it's not going to be okay, and so there may still be -- the fiscal authorities may feel constrained, even if in some sense, in the near term, at least they could spend more without it creating a problem.

And then as for how did inflation expectations change as the debt-to-GDP ratio went up by a lot, it basically didn't. I mean one of the striking things was inflation expectations remained well anchored around 2, and it didn't go up, also didn't go down, despite the fact that inflation was low for quite a long time.

MS. SHEINER: Yes.

MR. ENGLISH: But I think that's because the public understood that the Fed had a kind of a framework for policy, and we are sticking with that,

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and it wasn't changing to monetize any of this debt, and so that's just a different exercise than the exercise we had in mind in our paper.

MS. SHEINER: Yeah.

ATTENDEE: Yes. So, I think it is striking is that on the last point we had -- there was a lot of work done prior to the financial crisis assessing the impact of a given size rise in the debt-to-GDP ratio on long-term interest rates. And you know, suggesting pretty market effects, and as Bill, you know, indicated, you know, obviously it didn't go in line with those estimates so I think for the reason that Bill said, that the big run ups in debt were not associated in the in the minds of market participants with a shift in the monetary framework that would push towards monetizing that.

MR. LOPEZ-SALIDO: Actually the interaction into its own reserve; you can think of a convenient device because, you know, you are not going to think about changing your framework, you are not going to monetize, you know, your policy action, you are

committed to your framework to preventing inflation.

So, if I can say a couple things. So, one of the problems -- So, Louise, you raised this idea of why do we need a fiscal policy? And so in these kind of models, if you think about monetary policy in itself, there is many puzzles that these models imply, which is to give a lot of power to the commitment of the monetary policy to achieve their objective. That might not be the case, so using G as a form of commitment device, especially when the economy is of the zero lower bound, it's one of the idea of sort of this sort of program.

Coming back to John's point, I mean in these models, the price level has always been down. I mean, we are assuming all the time that there is no, you know, fiscal dominance, and so all the time the monetary authority is in charge of the monetary policy, and you are guaranteed that the price level is pinned down, and inflation is achievable in the long run to 2 percent.

So, Emi, has this interesting point about

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what about do you think about distortion in taxation in this other model, why this kind of coming back to the Emmanuel. So, it's interesting to think about, you know, somehow we are thinking about this form of distortion in taxation that is introducing inflation in the economy might be probably better off. Better or not, that other form of distortionary taxation is unclear because we don't have other form of distortionary taxation, we have this lump sum in the background, that makes, you know -- we don't need to think about the sustainability on the fiscal budgetary constraints.

But in principle, as I said before, this idea of fiscal dominance is very important; I think about how complicated it is to get out of this sort of situation when you want to inflate the economy away, especially when you are on the zero lower bound.

MR. WESSEL: Thank you. Ben, have we learned anything.

MR. BERNANKE: I did. David asked me to make a few comments on both papers. So, I'll you

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know, yank you back to Neil's paper first for a few minutes, and then come back to Bill's paper; both very interesting papers, and obviously the essence of the Hutchins' mission to talk about monetary fiscal interactions.

On Neil's paper, I thought -- I guess my main objection to the paper was: there are two really good things in the paper was, there are some interesting empirical results about the time series behavior of the cost of financing debt, cross section time series. And there's a nice model, they not that closely connected.

So, on the model, I thought, you hear very often that, well, real interest rates are low therefore we should go out and borrow and spend. And of course there's the elementary point that the sustainability of debt depends not on an R , but an R minus G plus N , and in a world where growth is low, and labor force is in some cases shrinking, as in Japan, maybe low interest rates are not sufficient reason to advocate more fiscal expansion.

And Neil does a nice job of analyzing of analyzing in this model, you know, the point not only that sustainability depends on R minus G plus N , but R , it also matters what is the source of the change in R . So, for example, if R is falling because population reasons, that's a very different proposition from R falling because of productivity reasons.

Now in that model I had the same reaction everyone else did, which is that it seems that the theoretical result that productivity growth mix debt less sustainable seems kind of implausible. And Neil cites the Hamilton, Hatzius, et al. paper which finds empirically that there's not that much relationship between growth rates and real interest rates.

So that will be one question about the model implication. The other implication, some legendary Brookings participant once said, let me put this in a larger context to my own research, so let me do that.
(Laughter)

There is the issue of the domestic versus
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the global determination of real interest rates, and one very simple way, I think there's huge complementarity between my global saving story, and Larry's secular stagnation story, which of course Neil has done a lot of work on. But I think one way of thinking about the difference is that in a secular stagnation story, it's sort of domestic capital investment opportunities and growth that is the most important determinant are in savings and investment.

Whereas, in the global savings glut story it's more of a global thing, even if in one country you have low interest rates because you have low growth, then you still can get a high return because you can invest abroad? And that therefore, highlights barriers to capital flow, the savings glut story highlights things like reserve accumulation, which are affecting the global market for saving and investment. So, anyway, I agree with Emmanuel's point that some thought about the international flows would be helpful on the model.

Now, in terms of the linkage between the
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model and the very interesting points, and empirical findings about sort of the bouncing back and forth of the cost of -- the net cost of fiscal finance; I guess I just have two general points, one is that, what's very interesting of course is the time series, and that there is work, I'm sure you are familiar with it, that the Fed, which uses exactly this kind of, you know, OLG type modeling, and attributes a big part of the decline, the trend decline of real interest rates, for example, to demographic factors.

And so, I think a natural direction here would be to try to make this model sort of more -- not just comparative statics, but try to address some of the time series in a particular -- if we are trying to think about, you know, where we go from here, and thinking about, you know, not just historical behavior, but thinking forward how should the outlook affect or thinking about fiscal sustainability, obviously we need to take into account the factors that are broadest to the point we are today.

The other aspect of this, and I think the

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question one really wants to ask is, suppose we take as given, or semi-indigenous this behavior of the net cost to finance, which tends to go back and forth to negative, to positive; what does that say about optimal financing today? The model doesn't address the question of, okay, we know that the net cost right now is negative, but it could turn positive. What's the optimization problem here? How can we address -- You know, how should we respond to that? What is the social risk aversion? How do you think about that in the case of government finance?

So, you know, again, it's very easy to ask people to do stuff which isn't in their original paper, but I think it's an interesting question, given that you are in this kind of stochastic world where the cost of finance is fluctuating and for reasons which you only partly understand, what's the optimal fiscal plan?

And in particular here again, Emmanuel mentioned maturity. In Japan the government can issue a 40-year debt at essentially zero nominal interest

rates. So, to what extent does the ability to issue a different maturity affect that optimization problem?

So, again, I think two really interesting sets of ideas. The modeling of the determination of the cost of finance the time series evidence, you know, I would like to see a little more integration of those two.

I want to take a moment just to -- a moment of digression just to respond to something Emmanuel said about the tremendous benefits to the United States of being on the -- of the global dollar standard. I think that's actually very questionable. Seigniorage is not that big, the U.S. doesn't pay lower interest rates than other advanced industrial economies. The U.S. provides insurance, there's this work by Gordon Shaw and others, you know, that during financial crises, actually, there's huge wealth transfers from the U.S. to other countries, due to the fact that we hold equities, and other countries hold debt, et cetera.

So, anyway, I just would raise that, I don't

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think that's an obvious conclusion that there is in fact a big benefit to being -- to the dollar standard.

Let me turn a little bit now to English, et al. and the helicopter money discussion. Let me just start, just one comment about the implementation. And you talked about this more in the presentation of the paper, which is what does it mean, you know, to have helicopter money. There is this issue about the fact that we now pay interest on reserves and have -- there (Inaudible), and Larry Summers, and other people have raised this, you know, implementation issue as far as helicopter money is concerned.

I wonder. So two alternatives, and I'd really be interested to think more about -- and I'll explain why I think it's important -- but to think more about sort of institutionally how you would implement this. One possibility is to tax reserves that is, for example, in a blog post I wrote I argued for maybe an inframarginal, peg only on the margin interest on reserve, for example, and affect the change in the inframarginal part.

Another way to do it would be to not allow currency to be counted as reserve, so banks would, if they accept currency or do not, that it wouldn't be part of the interest-payable reserves. So, that's one question. The related point which I think is actually, in practice very important, is that inflation obviously with long-maturity debt obviously devaluation of existing debt is to helicopter money and I think you -- I don't know maybe in your notes you may have cited the thing I just gave at the Bank of Japan a few weeks ago. Peter Olson and I did a calculation, I don't remember it exactly, but something to the effect that it will only take about 0.5 percentage extra inflation for three years, to pay for 2 percent of GDP fiscal program, because of the fact that there's so much long-term debt outstanding.

So, I think you know, and there are other things people have thought about, like the government issuing zero interest consoles, and things like that that, well, obviously the Central Bank could offset those things. At least there's, you know, some

symbolic value there, and I'll come back to that point in just a second. Okay.

Now, more generally, I think we, you know, the recent work, and a lot of it coming out of the Fed, you know, has really helped us think clearly about monetary policy to zero lower bound. And what we kind of understand now, and I discussed in this room recently in the Kiley and Roberts Paper; what we kind of understand is that the optimal response to zero lower bound is having a makeup policy, where you commit effectively after the end of the zero lower bound episodes, to have more inflation for a time.

And the Kiley and Roberts show that that has tremendously -- you know, if it's credible of course -- that it has incredibly beneficial effects in terms of reducing the impact and the frequency of ZLB episodes. And this goes back -- and what the helicopter money thing, that you are looking at in the paper, basically, is a combination of fiscal policy and the optimal monetary policy, which is this price level targeting, and very much like Kiley and Roberts

described.

And to give Michael Woodford credit, I mean he's been talking about this for a long time, and he argued a long time ago, the helicopter money is basically equivalent, and I think this is true only in a rational-expectations world, but in a rational expectation world helicopter money is the same thing as this optimal price-level targeting strategy.

And so then the question really is, given that we understand this basic point, you know: what's the best way to implement that, both credibly and effectively? And I think your analysis; I think there are two key issues here about how you implement helicopter money.

The first one I will call a calibration problem, which is that our intuitive idea about, you know, money finance spending runs into the problem which we've already -- several people have already pointed out, and you pointed out that the money -- the currency stock is low relative to the size of normal fiscal policy, and therefore you know, it's the

calibration.

One way I think about this, is going back to the old Marty Weitzman, Quantities Versus Prices literature where he says: well, how do you best implement environment controls, do you set a fixed amount of pollution, or do you put an effluent charge? What's applicable? And it turns out it depends on your uncertainty about the benefits and costs of the rule.

I think the same thing is going on here in some sense. So, what's happening is that you can either implement a price-level targeting regime indirectly by making some commitments about the money supply, but given that in reality it's a complicated calibration linking the money supply to the price level, and since it's the price level you really care about, then I think it makes perfectly good sense in this world of uncertainty, et cetera, to basically say what the -- forget the money supply, this will go directly to the price level, which is what you are saying, and which is Michael Woodford would say.

So, again, what I'm saying, I'm basically on those criteria that, you know, you really should be talking about the price-level target, and all this other stuff is just creating more noise, and making it hard to calibrate your policy, and hard for the public to figure out what you are going to do.

So, I think that in some sense the message of your paper, and which I think I basically agree with. The only thing I would say about this though is that, and you also allude to this, is that the communication and credibility issues are in fact very important and very difficult.

Bank of Japan is a great example. I mean, they had a big regime change, you know, the government, change of government, change of governor, change of inflation target. And they've had a lot of difficulty getting inflation expectations up. And so then the question is, are there ways to be more (inaudible) or effective, or plausible, you know, in creating these expectations.

And I don't know the answer to that

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question. Let me just tell you what I recommended to the Bank of Japan last week, which is very similar to what you were suggesting. What I suggested to them, is that if they get to the point now. So, they currently have a pretty expansionary policy in place, and interest rate is zero, all under terms structure, not just from the short end.

So, what I recommended to them was that if they have monetary fiscal cooperation in the future if they need it; and the way they do it is the government will announce some fiscal plan, and the Bank of Japan will commit to a price program that is sufficient to keep the debt-to-GDP ratio from rising. So it's exactly what you are talking about. It's basically money-financed thing, although it's working, I should add, it's not working through currency, it's working through inflation effect on existing bonds, and as I mentioned at the beginning it doesn't take a lot inflation actually pay for that, given the existing bonds outstanding.

Now, then the question is this would be an

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optimal policy if it was credible. Would it be credible? I don't know, but I think one way of thinking about it is this, that suppose you've got, let's think about the behavior of the fiscal authorities, if they are very concerned about the debt-to-GDP ratio which in Japan is very high, perhaps, at least initially, the combination has two benefits.

One of course is that -- So Paul Krugman, in this room, talked about the possibility that there is a kind of a multi-equilibrium in inflation; that people, if you would expect low inflation, in which case that's self-fulfilling because you don't get -- because real interest rates remain high, or you could expect high inflation, in which case real interest rates are low, and that's also self-fulfilling.

So, suppose you are in that kind of low-inflation trap, so nothing that Bank of Japan can do, you know, to show that it's actually serious, and so they can announce something but they can't do anything. So one advantage of the fiscal plan, of

course, is that as you point out, and he points out, it is a concrete measure and a supportive measure by the government and it will have short-term effects on economic activity, and if inflation expectations are in fact adaptive, and as they always say they are in Japan, I don't know if they are not, but that's their claim, that will begin a process maybe of moving inflation expectations.

But the other advantage is that even if the public doesn't believe the inflation plan of the Central Bank if the Parliament believes it, then that might make them more willing to take this action. And so, at least initially all you need to do is convince the government. If the government believes it, then they will take the action and be more aggressive on the fiscal side than they otherwise would be, and maybe this thing will grow a little bit.

But anyway, so I think ultimately the recommendation I made to them was pretty similar to what you are recommending, and I think you're probably right that too much evocative, you know, comparables

are not -- where economists, the level of evocative parallels, I think real people could get scared by them, and I understand exactly why. I understand better now than I did in the past why -- (laughter) you know, why that's potentially a problem.

I also talked -- Finally, I also talked a bit about independence in -- central bank independence in my remarks, which are on Brookings website, and what had drawn the big distinction between the government and the central bank coordinating to achieve something which is in fact the Central Bank's target. I mean, the goal here would be to hit the inflation target, as opposed to something which is not in the mandate of the Central Bank, like financing government debt, or whatever.

So, I think it's much easier to preserve independence when it's clear that the cooperation is in support of the official mandate of the Central Bank. So that eliminates that problem to some extent.

MR. WESSEL: So, I'm trying to imagine some future point in history when we are at the zero lower

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bound, and your successor at the Fed goes to Congress and says, here's the plan, you guys run up the debt enough so that we get more inflation, so we don't have debt-to-GDP thing. I mean, can imagine that? Can you imagine Congress --

MR. BERNANKE: Well, first of all, that's not what I said. I mean, what I said was that the Central Bank tells the government, listen, if you guys -- Well, obviously by assumption we are in a situation where there's high unemployment, and we are at the zero lower bound.

MR. WESSEL: Right.

MR. BERNANKE: And we are at deflation risk, and everybody is really concerned about that. And there's reluctance in the Congress, let's say, to take fiscal action, and the Central Bank says, look, we'll backstop you. But Japan is different from the U.S. in many ways, but in one particular way which is that, I think that monetary policy is really much closer to its absolute limits than it is here in the United States, because your interest rate is zero, not just

at the short end, but all the way out the whole term structure.

So, I think that's a rather different situation. I mean I think here, I'm not recommending that for the United States, I think in the context of the United States that there are still ways to affect the term structure further out, for example, precisely through, even if price-level targeting doesn't affect inflation expectation, it affects bond markets, you know, you could still get results.

MS. SHEINER: Do you want to let them respond?

MR. WESSEL: No, let's get some -- I'm going to go ahead and --

ATTENDEE: With regard to the Japan policy, the question I've had is, why announce it in advance you are going to do this fiscal policy? What if you just, you are the Bank of Japan, you just start buying dollars, or buying euro. And eventually what's the worst thing that can happen? Eventually maybe the yen will depreciate, and you make a killing on your

assets, and you are basically like a hedge fund.

So, one counter-argument I've heard is that politically that's infeasible because, you know, the U.S. or the euro, or whoever was on the other side would get so upset, but what do you think of that question? You know, there's this issue that central banks are always trying to talk down their currency, but from a fiscal standpoint you could take the view, they are not trying to talk it down.

MR. BERNANKE: Right. So, this is Lars Svensson's -- What they call it the --

ATTENDEE: The Foolproof Method.

MR. BERNANKE: -- the Foolproof Method, yeah, the Foolproof Method, well, I guess you could argue -- I think there are some issues with interest parity, and the extent, how far can you get the currency down, et cetera. But I think the first question would be, particularly in a current environment, I mean, how would that look and how would it work? And I think there will be a very strong reaction from some of Japan's key allies on that

issue.

MS. SHEINER: But do you think your policy would not have that?

MR. BERNANKE: Well, I mean there is in fact a G7 Agreement. The G7 Agreement says that monetary fiscal actions that are directed at the domestic economy but have side effects on the exchange rate are fine. But attempts to target the exchange rate, that's a currency war, and that's not legitimate. So, the G7 has very explicitly made that distinction.

MR. WESSEL: David?

MR. LOPEZ-SALIDO: Yes. So, a couple remarks; in thinking about your proposal for Japan, I think that definitely is very interesting to introduce in our model, long-term debt, a lot of long-term debt and try to see, you know, as Emmanuel was pointing out. I mean, we are thinking about seigniorage, we are thinking about, we need a lot of inflation, we might not need that much inflation when we have actually long-term nominal debt, so you can eat up a lot of that without creating mass inflation.

In thinking about Japan, so basically this is a huge transfer, I think in all population, I think about the population distribution, so you are pretty much taxing the savers in Japan which presumably all the older people, they are holding all these bonds, so pretty much this is one of the problems in Japan going through, you know, external, the current account. You are actually, you know, affecting domestic consumption and savings by just, you know, the holders of these bonds are going to be less well, so I see some political economic complications of that nature, when you think about the population, how the population would think about that.

I mean I believe that probably, that the government announced a plan he's going to help to some extent. And also when you start thinking about the sort of joint programs, between the two authorities, so the idea that is hard for -- I mean simplicity in our model that, you know, it's always a possibility, he's in charge of the Central Bank, there's no sense of a fiscal dominance simply in the whole argument.

You can think about situation in dealing with the transition which your people might start believing that, well, pretty much inflation is part of the fiscal authority, so the independence of Central Bank is in the opening there.

So, in this kind of political economy aspect, how do you think about, Ben? So, what is the nature of the agreement? What is the nature of the agreement, what is the nature of the communication, that minimize at the end, the problem which is a credibility problem? So, how do you sustain that to make it credible that sort of announcement?

So, I'm thinking about maybe you'll want to do, coming back to Emmanuel, so imagine a fiscal plan that's working through capital, which is future output, as opposed to G, which is not in our model, and you finance that with, you know, long-term nominal denominator debt, so that may be a way of -- on the one hand you say, well, but I'm giving you capital, you know, tomorrow which is -- I invest in today, so there's some benefit that you can actually see, as

opposed to just through -- it's just kind of on the fiscal side, not just G, but do you have some idea of how you implement that plan on the fiscal policy side?

You know, do you think more on the investment side to supplement that, as opposed to the -- I don't know what kind of chart is -- I mean, you are thinking about transfer program in the -- I'm thinking about fiscal element to it.

MR. BERNANKE: Well, in my specific remarks I suggested that -- you know, that they use fiscal policy to ease the transition so that the third arrow of Abenomics as structural reform --

MR. LOPEZ-SALIDO: Right, right.

MR. BERNANKE: I was just in Japan and I had six people help me get on the elevator, and I got to wondering a little bit about that issue (laughter), and I was wondering whether --

MR. LOPEZ-SALIDO: So it just got -- Yeah.

MR. BERNANKE: Where the fiscal program that, you know, retrain people and support the people and provide, you know, childcare so that more women

could enter the labor force, or things like that, whether that would be a good use of the money. They don't need to build anymore highways, really.

MR. LOPEZ-SALIDO: Exactly.

MR. BERNANKE: But, yeah, some of these transfer things, they could actually address some of the other issues. On the political economy, inflation tax is also a tax, right?

MR. LOPEZ-SALIDO: Right.

MR. BERNANKE: Hausman and Wieland gave a paper here on Abenomics, and they argued that one of the reasons that inflation wasn't more credible in Japan was precisely because half the voters are 55 and older, or something like that, and they don't like inflation.

MR. LOPEZ-SALIDO: Yes.

MR. BERNANKE: I'm a little skeptical about that, because after all the Bank of Japan is independent, and it's not been under that much pressure, it is raising inflation target to 2 percent, I don't think that it's that credible that the

government would come in and prevent the Bank of Japan from reaching its target if on other dimensions it was able to reach the target. So, I don't know. I mean, a political economy is important, and all these things, and I think your paper has a lot of implicit, political economy in it.

MR. LOPEZ-SALIDO: Yes. Yes.

MR. BERNANKE: About what people would consider plausible at times, and consistent, and so on.

ATTENDEE: So, I guess it's just probably helpful to underscore the -- Oh, sorry -- I think it's helpful to underscore that in -- it was under our interpretation, money financing, you know, has certain elements of nominal consumption or income targeting, but the really key difference is that it implies essentially a shift in the price level target path, that depends on money demand, which is inherently very uncertain.

And so to the extent that the -- you know, essentially the program commenced to, in the case of

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seigniorage, never allowing -- you know, basically telling the legislator, you are never going to have to issue any interest-bearing debt to finance this program. That's one form of commitment. Then the implications for the price level are extremely uncertain. And that's why, you know, we recommend something in the spirit of Woodford in nominal income targeting, perhaps with a twist, you know, to allow the price level to go up, is below (inaudible) by a few percent over a long period.

So it might be consistent with 2.5 or 3 percent inflation, but you are not making any commitment to how the debt would necessarily evolve, because then all the buyers might turn out to be smaller than what you think. And that's really the key difference, because, you know, that seems like it preserves monetary independence, and you could tell the legislature we think that the multiplier is going to be bigger than usual.

And we think the debt, you know, probably isn't going to increase with respect to this, but we

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are not going to -- we can't commit to that, and that's one aspect that we, you know, try to emphasize in the paper.

MR. BERNANKE: Yes. It could be ex ante commitment saying our models --

ATTENDEE: Exactly, to a certain respect.

MR. BERNANKE: -- our models predict that a certain price level will make this neutral debt-to-GDP effect. We don't necessarily come back exposed to that.

ATTENDEE: That's right, yeah. That's the key difference.

MR. LOPEZ-SALIDO: One thing that is important in the current context, is that we have a mandate which is a 2 percent inflation, so people need to realize that we are transitory, you know, movements and inflation above the target, but the target should be, you know, 2 percent of being credible, which is the assumption in the paper.

If I may, coming back to your point about somehow deflate in a way the (inaudible) debt

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outstanding, so the idea of anticipating and not anticipating inflation is also pretty important here. So, how do you create the anticipation mandate, whether you introduce a surprise, or really people need to believe that your policy is going to be credible enough?

So, how is that going to change the portfolio allocation of certain (inaudible) that can't out of, you know, (inaudible) debt, it's also pretty important. And I'm not sure how to take that into account, in the analysis that we are thinking right now. So, coming back to the first paper, I mean, you see that there is a willingness by investor top hold long-term debt, and U.S. debt, so that tells you something about the sustainability of the fiscal program that people are expecting during the horizon when they are holding the debt.

So, in these kinds of elements, are pretty important to take into account. We are missing all these elements in this sort of simple model that we are considering here, that's why I think the idea of

Woodford, of thinking of nominal GDP targeting, and then for some flexible price-level targeting is really appealing.

The problem is that, how do you, you know, explain the transition to the policy that is currently in place? So, how do you make consistent the policy that is in place with this sort of new regime, assuming that this is a new regime, just to avoid these by-gones are by-gones in the context of being at zero lower bound? Is what I think is very complicated for only the Central Bank to implement this sort of policy.

That's why somehow the idea of having some other, you know, instrument or, you know, fiscal policy, or something like that to move expectation, is that crucial. So, that's kind of what is always in my mind, when I think about this -- it's the idea of why, you know, we have this slide that Bill put out; it's, do we need fiscal policy at all? And I think we, I think we do.

I mean, just the mere announcement, it's

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just -- I think we do, I think we have to do something otherwise it requires an incredible amount of credibility to put that in place and to move inflation expectation. I mean, how do you move expectation, essentially at the end of the day; that whole idea, right?

MR. WESSEL: You know, Ben crystallized something I had been thinking about, which is, okay, we are where we are, if I read your paper in the current context, and I ask you what should our optimal debt-to-GDP ratio be, and you give me the standard economist answer which: it depends. So, what's your gut here? When you look at -- when you think about why Rachel Lowe, you think about productivity. If you had to give advice to the government, which way would you lean?

MR. MEHROTRA: So, one thing that I didn't get to show that I think sort of influences my thinking on this a bit, is if you look at the correlation between growth rates and the cost of servicing the debt, they appear to be negatively

correlated. So, that is periods of low growth, there are also periods in which there is a relatively high cost of servicing the debt.

So, you know, and from my own research I think that obviously we are in a period where low interest rates are likely to be the case going forward. It seems to me that we want to be building up fiscal space for the next recession. That will need additional fiscal -- fiscal policy will be an important part of the response in the next recession, because we are likely to remain near the zero lower bound, and there doesn't seem to be any tolerance for raising the inflation target, and even if we wanted to, it's not entirely clear how we get there given that we are just having so much trouble getting back to 2 percent.

So, my gut would say that we should be using this time to lower the debt-to-GDP ratio so that we have space coming for the next recession.

MR. LOPEZ-SALIDO: I think that Ben has a great point. And so what I think about the net cost,

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the net fiscal cost, I mean, you treat the risk-free rate, and the growth rate of the economy and population as independent variable. They are not independent variables. I mean, it's very important to think about why is the risk-free rate is so low, it's going to continue to be low. And it's not just saying that's because you expect productivity to be low in the future, or is this coming from the baby boomers getting out of the labor force, and it' -- you know, are all aging moving the risk-free rate.

Or if you think about the risk-free rate going down, or the price of debt coming down, as in the paper, not because of the risk-free world, the neutral rate is low, but because you have actually a relatively risk premium in the economy, those are very important different elements to think about -- how to think debt sustainability down the road. That's very important.

And if you think about even the distribution of all the debt between, you know, domestic and foreigners, it's also an important element to think

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about that. So there are many variables implied, and Ben was alluding. And so you need -- in the economy we need some sort of criteria, I mean, what you are trying to optimize here? Is it a what or a who? I mean the young, the older people? I mean, that's what the whole problem is to some extent, is that economists are somehow so incompetent because we don't have a good way of answering these sorts of questions, unless you have a model.

And the model is always, you know, not a very good way of describing reality, which is pretty complicated. And so I think coming back to that, so my main point, or my main concern about the first paper, is that it's really the risk-free rate what the whole issue is. I think this is not independent of what's happening with the population growth. I mean this is really the whole point.

I mean, of all the paper that I have with that, and probably, you know, also with Gauti. I mean, is this population? And if that's population then you might want to take advantage of being, you

know, a really low the reason you call risk-free rate, but this is coming from some really high risk premium that might not be --

MR. BERNANKE: Could you solve your model like with a two-state mark-off process where productivity jumps between two levels --

MR. LOPEZ-SALIDO: Yes.

MR. BERNANKE: -- and you are just optimizing, so the cost of financing changes when you tried optimizing that?

MR. MEHROTRA: Yes. So this is something definitely based on the comments that I wanted to do, and in retrospect when I was looking at some of the empirical evidence it seemed to me that it would be great to work with a sort of stochastic version of the lifecycle model. It's a little bit more complicated, so given the time; I just stopped with thinking about stationary equilibrium, and just sort of begging through these scenarios.

But I think it would be feasible to try to take a model like this, and see if you can sort of

match the basic moments that I've documented in the data and then ask, sort of, what are the outcomes under different debt-to-GDP ratios? It's not obvious to me that -- So I sort of framed this incentive to increase the level of debt to take advantage of low interest rates, and use that as a way of raising revenue, it's not obvious to me that a government should want to do that, right?

I mean, you are introducing a different type of distortion relative to -- or like distortionary taxation. From a political economy perspective it seems like debt is the path of least resistance, and especially in the current political environment. So there might be sort of political reasons why policymakers favor debt, but it's not clear, economically that that's -- that it has some great advantage over distortionary taxation, or other forms of financing; inflation, for example.

ATTENDEE: Just to come back to one point about fiscal space, you know, I think and it echoes earlier questions that Louise raised, you know, and

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that's -- when Kings was recommending fiscal expansion in the last 1920s, it's helpful to remember that the debt-to-GDP ratio was in the range of 200 percent. And you thought that the U.K. still had latitude to pursue expansionary fiscal policy give the extreme circumstances they were facing.

But I think it's also important to underscore that, you know, at that point England's commitment to the Gold Standard was regarded as really irrevocable. That they would do whatever it took to repay that debt without resorting to inflation. And you know, they had gone to the original parity after World War I they, you know, really didn't deviate after Napoleonic War, so they went back to the original parity in the 1820s.

And, you know, yet the response could be far different in an environment where the high debt levels make markets think that they might shift their framework, so --

MR. WESSEL: Okay. Please join me in thanking both the participants, and the discussants,

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and Ben for his generous time. And just to explain, Emi is doing double duty today. She's is on the CBO Board of Advisor, so she managed to squeeze us in between. She didn't leave because she was insulted by anything I said. (Laughter)

But please, join me in thanking everybody.
Thank you. (Applause)

* * * * *

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