General Discussion: Mind the Gap in Sovereign Debt Markets: The U.S. Treasury Basis and the Dollar Risk Factor

Chair: Ilan Goldfajn

Mr. A. Taylor: I thought this was a great paper and it's very provocative, and it makes you think. I just have a couple of suggestions and thoughts, but I don't have any answers. First, you set it up as a safe asset supply story, but it also works with safe asset demand shocks. One can imagine in a higher interest rate world, even with all else equal on the yield differential, non-U.S. entities may think we're now in a risky world. This could be a flight to safety of some kind. But can you identify supply and demand shocks here? It's very hard to measure those. As Hanno Lustig modestly said, it ends up being ketchup; it's tasty ketchup, so it's still good.

Second comment. You have two channels, but only one IV and I was trying to think of a way to get around that because you might worry that you've instrumented for the Treasury basis, —which is the story you want to tell—and if there's attenuation bias you're going to fix that problem on that coefficient, but you've still got an ordinary least squares estimate on the yield coefficient and you're just putting that in as a control. But we've talked and I think you've got a Kalman filter. You can actually infer a lambda, and in your equation on page 466, I think you could run a restricted model where you just put the yield in, and instrument for that with the usual instruments, and then have the alternative unrestricted model with lambda and

the yields in there, and estimate that. And just see if that improves the fits, can you reject the null against your alternative, and see how much bigger is the coefficient on the combined terms, because they enter with unit coefficients in that equation. So, I hope that might help nail it down for you.

Mr. Gourinchas: I thought this was a terrific paper and also a fantastic discussion that really covers a lot of ground. I'm a big fan of the research agenda that Arvind Krishnamurthy and Hanno Lustig have been putting together over time. But let me just point out something that I think is important in their results, and maybe hidden a little bit in the discussion. We should ask ourselves whether safety comes because you have securities that are issued by the U.S. Treasury versus whether safety comes because something is labeled in U.S. dollars. And I think those are two very different things, and they are comingled in some ways. In the paper, you have a way to recover an overall convenience yield that I think you want to attach to the dollar, but I'm not entirely sure that it is, and I think it's a difficult question empirically to sort of separate what is coming from the safety of Treasuries versus safety of U.S. dollars. Now, that's going to matter. It's more than an accounting question. It's going to matter when we think about an environment like the one we're currently experiencing where there might be an overall scarcity of safe assets. What matters is whether we want to think the scarcity is in terms of the dollar safe assets, or it's in terms of Treasury safe assets. And the solutions in terms of the overall scarcity would be very different. In one case, if we think it's dollars, as you have in your framework and other papers that you've written, you could think that private investors or issuers could try to issue dollar securities and sort of alleviate this scarcity and sort of contribute to that. If it's really about Treasuries, then it's a very different world. So, I sort of put that out there, and I would welcome your comments on that.

Ms. Kalemli-Özcan: I fully agree that this is a terrific paper and a great discussion. Two questions. The first one is about the fact that it is very peculiar. You actually said this in the presentation. During the zero lower bound, because interest rates cannot respond, everything is picked up by exchange rate fluctuations. So, this is the reverse of

what I have showed yesterday in my paper, where for the countries who manage their exchange rate the risk shocks are picked by the fluctuations in interest rates. So in this sense this is a clear exercise at zero lower bound, but how do we think about the other part of your sample? You have a long sample here and you want to control the whole path of interest rate differentials right, not only the expected rate, but also the spread. I believe, this is important as you are interpreting your results from the perspective of changes in U.S. monetary policy.

The second question is going back to this question on the specific role of the dollar that is linked to the intermediation channel. I realize that these correlations you show in Table 2 are much stronger for the emerging markets instead of the G-10 and even stronger in the post-crisis period. This tells me that we should think the financial intermediation channel not only in terms of global banks but also in terms of the domestic banking sector in emerging markets as frictions facing global banks versus emerging market banks might differ. So, what are your views on that?

Ms. Eberly: Let me join in the chorus of people who enjoyed this paper very much, and I got a lot out of the discussion as well. Pierre-Olivier Gourinchas asked the first part of my question, so let me just follow up on that and ask a more general question of what makes these assets special. In both the presentation and the paper, you talk about safety and liquidity, and I'm imagining you have in mind a hierarchy of assets, and some assets have both, a low amount of credit risk, but then in the paper you talk about the Australian and New Zealand fiscal issuance which probably have less sovereign risk than U.S. dollars, and they could issue then the U.S. Treasuries. They could issue on their own, but they're not going to access this liquid pool of dollar investors. So, maybe the point is more about the investors than the assets. If you could talk about that, that would be helpful.

And related to the discussant's point, there seems to be a big change around the financial crisis in many dimensions, but one of them was the supply of safe assets, moving away from mortgage-backed securities almost entirely and toward this global funding supply. I wonder

if that switch is related to her observations about LIBOR, which would play a role in the latter but not in the former.

Mr. Krishnamurthy: Thank you all for the comments. Let me try to answer these questions. I have ordered them a little differently than they were asked. I'm going to start with Pierre-Olivier's question, which is quite an important one for understanding what we are doing. Pierre-Oliver asks, is the phenomenon we describe about U.S. Treasuries or about U.S. dollars? We present a measurement of the basis that is based upon Treasuries, and show that the basis moves with the dollar. The way I would answer Pierre-Olivier to say that it is both: we present evidence that there is a special demand for safe dollar assets. There are two attributes that are valued and they are valued jointly. If you can promise me one dollar for sure tomorrow, that is an asset that is very highly valued. Investors will pay a lot for this promise, and issuers of this promise can obtain cheap funding. That is the central fact that we have discovered in this asset space. Now, the par excellence of a safe dollar claim is a U.S. Treasury bond. But there is a hierarchy of safe dollar assets and there are some assets that are a little bit less dollarish and a little bit less safeish, and all of these assets are also going to carry convenience yields depending upon how close they are to the U.S. Treasury bond. It is a joint property that we present evidence for, and as Pierre-Olivier says, that's quite important because it sheds light on the substitute assets to U.S. Treasury bond. If there is a scarcity of global safe dollar assets, is it only the U.S. Treasury that can supply? If only Treasuries carry a convenience yield, then yes. But if convenience yields are attached to safe dollar assets, then a broader set of assets meet the demand.

Hanno made this point in his slides that the corporate financing, that is the capital structure of the world, features an enormous amount of dollar debt. The way we understand this capital structure is that it is due in part by issuers tapping into the demand for safe dollar debt. This motive is particularly relevant for entities issuing short maturity, high-grade bonds.

This observation also relates to the point that Jan Eberly brought up. One way of understanding the pre-crisis run-up in U.S. leverage, this is the global imbalances argument, is that it was a flow into U.S.

dollar safe assets which was met by the issuance of asset-backed commercial paper. This is a well-developed narrative of the pre-crisis run-up in dollar debt. If you look in the post-crisis period, we know that the financial sector's production of safe assets has collapsed. That is the point that Wenxin Du has made in her discussion. But other issuers have stepped in. And when we look at the data, there is evidence that entities from OECD countries including Australia and Canada are supplying dollar safe assets and earning some of the convenience yield.

Let me also talk about Wenxin's discussion. Wenxin made the point that an important part of what is happening in the post-crisis period has to do with financial intermediation. And I think she's exactly right. That's quite important to understand. She points out in her discussion, building on two of her excellent academic papers, that financial intermediation capacity has been constrained post-crisis and such constraints play an important role in the equilibrium for exchange rates as well as for interest rates. The way we think about that role of financial intermediation is that they are part of the supply side of the equilibrium in the safe dollar asset market. The supply is coming from many sources. It's coming from the U.S. Treasuries; it's coming from the supply of corporate and multinational issuers. It is also importantly coming from financial intermediaries via their sale of dollars in the forward market. Financial intermediaries are active in providing the assets that are in high demand in the world. In the pre-crisis period, they had less constraints on them. In the post-crisis world, regulatory constraints of the type that Wenxin discusses have made it harder to do this. And the footprint of these constraints is the gap between cash dollar and synthetic dollar assets. So, the supply curve for dollar safe assets has been impacted in the post-crisis period by regulatory constraints impinging on banking activity. That factor generates the relation that she documents between the dollar exchange rate and the cash dollar-synthetic dollar basis. But really, the broader point of which post-crisis financial intermediation is an example, regards the market for safe-dollar assets. Shifts in supply and demand impact this equilibrium and drive both the basis and exchange rate. Wenxin's work focuses on a well-identified regulatory event, which is quarter-ends, on which supply shifts. But the phenomena she documents fits into a broader point about the safety and

the supply of dollar safe assets. And another way of seeing this broad point is to notice that the dollar LIBOR basis is significantly nonzero only post-crisis. That is when financial intermediaries have been constrained. But the patterns that we document obtain to the start of our date sample in the 1980s. That is to say, when you zoom out, there's a broad convenience-yield phenomena, of which the post-crisis banking regulation is a part.

The last comment I was going to make is in response to Alan Taylor's question about instruments. Monetary policy impacts the supply of safe dollar assets. So we show that one can use a high-frequency shock to monetary policy constructed from futures contracts as an instrument for the supply of dollar safe assets and hence the equilibrium convenience yield. This exercise allows for a clean identification of the convenience yield channel of monetary policy.

Mr. Lustig: Let me address Şebnem's point as well. So, you're absolutely right. When you're away from the zero lower bound, obviously interest rates are also going to do a lot of the adjustment. So, in other work what we've done is sort of done like a proper decomposition of how much of the variation of the dollar exchange rate you can impute to news about future interest rates along the lines of work by Clarida and Campbell and Froot and others. But that also imputes the rest to this convenience yield channel, and you notice that even there a big part of the variation is actually captured by the convenience yields adjusting. In order to do that, we use a common filter approach as suggested by Alan to measure this sort of convenience yield.

Mr. Sufi: I think this is just fantastic work, and I thought the discussion was absolutely fantastic as well. Let me just push a little bit on what Jan and Pierre-Olivier were saying, and that is I think we have to take seriously demand versus supply here. And you've been hinting at it in all of your discussion. What's really the thing that's varying over time? I tend to think the demand for safety is probably a longer-run secular issue, but we may disagree on that. What's really varying over time is the set of assets that satisfy this demand, what you are talking about the hierarchy. I think you have to be careful when you move beyond Treasuries to other dollar denominated assets is that at some point you're going to start to see a flat, perfectly elastic

supply curve in the extreme. I mean, at some point, you have to be careful about what exactly satisfies that demand or you're not going to see any changes in the basis at all over time. And that's certainly not what we see in the data. It seems to me that Wenxin is pointing out one aspect, but in general you can imagine what the global financial cycle is, is really changes over time in what is acceptable in satisfying that demand. Now, we generally call risk premia or whatever we want to call it, but maybe it's really the supply curve and the slope of the supply curve, or even shifts if you want to think about it that way; that we used to accept AAA subprime mortgage backed securities, now we don't. And that's really what's driving the variation in the basis more than shifts in demand. The demand story, of course, even the level we don't fully understand. So then, when you start to rely on high frequency movements in this demand, now I'm really pretty confused. Whereas, the supply side, I don't know, it fits better into the way I think at least about financial cycles.

Mr. Clarida: I really liked this line of research in this paper, and Wenxin's discussion as well. One thing I like about this new literature is that it looks across markets and across institutional details to try to identify some common patterns. For a long time, I think a lot of the literature ignored that. So, I think this is a real advance in the way that we think about these issues. It strikes me there's also in this dollar safe asset nexus a liquidity piece. There are dollar assets that are safe, but that are less liquid. And then also, there is a sovereign credit default swaps (CDS) market for major countries that will never default on local currency nominal debt. And those spreads move around and may be correlated with your index as well. So, either in this work or in a later work, it would be nice to look at how these are related to identical assets that differ solely in liquidity. And as you know, there are examples in Germany and the United States. And then also, the way these relate to sovereign CDS markets. But again, great, great line of work.

Mr. Rehn: Thanks for the excellent and very policy-relevant paper and discussion. My question is related to Mark Carney's call at yesterday's lunch for a better functioning international monetary and financial system, linked to safe assets. It also concerns the role of the

convenience yield and the unique position of U.S. Treasuries as the global safe asset today and its importance for the global dollar cycle, which has obvious cyclical ramifications. So, in light of your paper's findings, and even though this may be a long stretch from today's perspective, would the creation of a European safe asset be desirable from a global standpoint—not only from the European standpoint, especially from the point of view of global financial stability?

Mr. Ferguson: I agree with the praise that this paper has achieved. Those are some markets observing the natural experiment now, which is both domestic and foreign demand for high grade munis, which very much speaks to the notion of their many asset classes, and it speaks to the notion of the intersection of dollar and supply. We've been tracking very closely the spreads between AAA munis and Treasury securities and have found them not surprisingly coming in and tightening up quite a bit. And we were surprised by the number of foreigners who were investing in U.S. munis. The other thing that we're observing in this natural experiment is high-risk munis are also tightening versus the spread that they normally have over AAA munis. So, I just bring this to everyone's attention to say, there's a natural experiment going on now that validates very much this notion of an intersection of security and dollar-denominated assets and looking for close substitutes. The other thing that we're seeing is that domestic policy drives the ability to create these substitutes, and it also brings in different investors. So, in the muni case, obviously, the change in state and local tax deductibility has also driven an increase in demand from high-income individuals, obviously not as rich as what we see with sovereigns, but new supply and new demand both come into play. But it validates very much the nature of the conversation.

Mr. Krishnamurthy: Let me start by answering Amir Sufi's question about demand versus supply. I think the truth is that it's both. A global financial crisis is a time in which there's both a greater demand for dollar safe assets and a reduction in the supply in part because the line between what is considered safe and what is considered non-safe shifts. So, the effective supply of safe assets is shrinking and the equilibrium outcome we observe, which is a high convenience yield and an appreciation of the dollar, is a reflection of shifts in both demand

and supply. So, I agree with your characterization. More broadly, are movements in the convenience yield at quarterly frequencies due to shifts in demand or supply? I don't know and that's a great question which we should try to answer. At a lower frequency, Amir make the point that there has been a secular increase in the demand for dollar safe assets. I agree with that point. As we note in our paper, there is evidence of this shift in demand.

Pierre-Olivier and Hélène Rey have a paper with Emmanuel Farhi on the new international monetary system. One of the points they make is there is a new version of a Triffin dilemma that has arisen, which is that as this secular demand increases, if the United States is the sole provider of safe assets, then leverage has to rise in the United States. And this is a problem that is endemic to the current international monetary system. We would echo that point and add one more thing: it is not just U.S. issuers. Every actor who is in the business of supplying dollar safe assets, including the number of foreign currency issuers who in the process incur currency mismatch, will increase their leverage. The Triffin dilemma appears broader now than it did back in 1960.

Mr. Lustig: I just want to come back to your point that you mentioned that to you it seemed like demand had to be sort of a secular phenomenon. In fact, over the break I was having a conversation where it was pointed out to me that to practitioners it seems obvious that what we're partly picking up is just risk on, risk off changes in the markets that happen at high frequencies. And so, I do think there are these high frequency shifts in the demand curve for dollar safety driven by whatever's going on in the markets. So, I don't think it's implausible to think of that demand curve shifting. In fact, I think practitioners think that's kind of obvious. At least that's what was pointed out to me. So, if you'd look at correlations with the VIX, for example, I think there'd be strong correlations with things like the VIX.

Mr. Krishnamurthy: Richard Clarida asked about liquidity and safety, and this is something that I've thought about extensively in other research on the Treasury market. I think it's much more nuanced than we've generally understood. The reason I say that is because there are many assets that have value because they're good

collateral for liquidity provision. The repo market offers the perfect example for this point. If investors value liquidity, they will pay a high premium when placing cash in a repo. What that means is that assets, which may not be liquid but are good collateral, will reflect the valuation of the high liquidity services that come from their use as good collateral. So, when you look into the measurement exercise and try to disentangle whether it's coming from liquidity versus safety and use as collateral, they are connected together and there is not a clean way of disentangling these effects. So, it's a great question and it connects back to a previous question which is, what is the underlying factor that is driving the valuation of dollar assets? Is it the fact that they're safe? Is it the fact that they're liquid? What is the factor that really holds together the equilibrium in which dollar safe assets carry high values? These are questions that are important to answer, but to which at present we do not have answers.

Olli Rehn asks a related question about euro bonds. Could euro bonds affect the dollar equilibrium and is it possible that euro bonds would lead to a multipolar equilibrium? I should preface my answer by first saying we have nothing to say at this point in this paper. Our paper is an empirical paper that examines the footprint of safe asset dollar demand in asset prices and quantities. Now, if you allow me to speculate beyond our paper, I can give an answer based in part on other research I have done with Zhiguo He and Konstantin Milbradt. I think that multipolar world would lead to a welfare-improvement. However, I worry about instability. Almost any academic analysis of the reserve currency phenomenon begins with coordination motives. I play dollars because you play dollars. Coordination as it plays out in a financial crisis is that we all rush to the dollar and Treasury bonds because everybody rushes to the dollar and Treasury bonds. Its value goes up thereby making dollars and Treasury bonds safe investments in a self-fulfilling manner. So, imagine that type of dynamic in a world in which there are two reserve assets. And let's just hypothetically think about a world in which these assets are symmetric.

Now, suppose one of these assets looks a little bit better, a little bit more liquid, or a little bit safer. You can see that coordination forces may lead to instability. Some investors shift out of the one that's a

little weaker, shift into the one that's stronger, and then coordination kicks in so that other investors follow suit, and so on. During a downturn or a crisis, this force for instability may be particularly strong. This type of thinking leads me to question whether a multipolar world would be sustainable. And it strikes me that the economics says that such an equilibrium may be sustainable for short periods of time but not over long periods of time.