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# YPFS Lessons Learned Oral History Project: An Interview with Seth Carpenter

Seth Carpenter

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# Lessons Learned Oral History Project Interview

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**Introduction**

Seth Carpenter, an economist, worked for the Board of Governors of the Federal Reserve for 15 years. During the 2007-09 financial crisis, he was a senior member of the Division of Monetary Affairs, meaning he was part of the team that advised the Board and members of the Federal Open Market Committee (FOMC) in setting monetary policy.[2] He led the team that worked daily with the Open Markets desk at the Federal Reserve Bank of New York to implement policy.

Carpenter left the Federal Reserve System as Deputy Director of Monetary Affairs to work at the U.S. Department of the Treasury, where he became the Acting Assistant Secretary for Financial Markets. At the time of this telephone interview in July 2020, he was the Chief U.S. Economist at UBS, the international investment bank.

***This transcript of a telephone interview has been edited for accuracy and clarity.***

**Transcript:**

**YPFS:** **In this discussion, I want to focus on the formulation of U.S. monetary policy during the global financial crisis of 2007-2009; the interactions that your division at the Federal Reserve had with the open market desk in New York, then; design and implementation of special lending facilities during the crisis; the lessons all those experiences taught; and how those lessons can carry forward to today. Again, we're going to focus on lessons learned for this. I know that you have talked at great length over time about your experiences at that time. Nonetheless, if you could do a quick summary of what your role was during your time at the Fed. You were there for 15 years, so let's do that as some background.**

[1] The opinions expressed during this interview are those of Mr. Carpenter, and not those any of the institutions for which the interview subject is affiliated.
[2] A stylized summary of the key observations and insights gleamed from this interview with Mr. Carpenter is available in the Yale Program on Financial Stability's *Journal of Financial Crises*.

Carpenter: I started off as a research economist in the division of monetary affairs in a section that was called monetary and reserve analysis, and the general role there was to work on money and reserves as the name implies, but in particular pre-financial crisis, there was a daily open market operation conducted by the Federal Reserve Bank of New York, the open market desk. It was based on the then-standard operating procedures of trying to supply the right quantity of reserves in the banking system so that the funds rate hit the target. I say that by way of pointing out that it was the daily nuts and bolts implementation, very much where the rubber meets the road, aspect of monetary policy.

I oversaw a group of staff in Washington who came up with numbers and forecasts to try to infer what the right number would be there, compare notes with our colleagues, the Federal Reserve Bank of New York staff, and then the execution happened. That was one big part of my role. Over time, working in the division, I became the economist who was responsible for the weekly publication of the Federal Reserve's H.4.1 statistical release, which is the mandated weekly publication of the balance sheet, and that ended up mattering a lot because as the crisis evolved there was more and more disclosure of what was going on and it had to be reported on the balance sheet.

Then over time I went from being an economist to being a manager, what the Fed calls a section chief, and then an officer of the board. Especially in that latter capacity, I ended up being involved in the strategy of monetary policy, so ended up doing both the day-to-day tactical implementation as well as the strategy of monetary policy. That was my role up to and during the financial crisis.

**YPFS: Can we focus in a little bit there then in the '07 and '08? What did it look like where you were sitting then?**

Carpenter: I'm glad you said '07 and '08, because often when people talk about the financial crisis, they start the story in 2008, which I think is probably wrong. There were some other minor hiccups in financial markets even going back a year or two before that. There were a number of special purpose vehicles, special investment vehicles that were experiencing stress. But the real flashpoint for us was in August 2007, when there was acute tightening and liquidity conditions in money markets after a couple money funds shuttered.

We ended up—it was a Thursday and a Friday, so August 7th or 8th or in there--doing what at the time was an extraordinarily large open market operation for a single day. Now it kind of looks quaint in comparison, but I think we did something like a $9 billion operation on the Thursday and a $20-something billion operation on the Friday to try to reduce the pressure in, especially, overnight dollar funding markets. Again, coming up with that decision, it was this regular standing morning call between the Federal Reserve Bank of New

York staff and staff of the monetary affairs decision at the Board, and so I was sort of helping to run the team at the Board who was part of that conversation.

**YPFS:** **I want to talk, sort of if we can separately, about the implementation and the policy behind it and your role there. Let's start bigger picture, with the policy and your role as staff support to the Board and the FOMC. What kind of information did they need and want to make decisions about monetary policy? Then we talk to how that information flows to your daily implementation.**

Carpenter: I think in broad terms the question of what's happening is a key part there. The immediate locus of the money funds stopping redemptions and that people who are focusing on would come up with data on how big the money fund industry is, how many are there, who are the counterparties. It was a combination of people who are tracking those data for the regular compilation of monetary statistics—but then a lot of the staff, both the Federal Reserve Bank of New York and of the Board who have a job of monitoring markets who would be on the phone and getting deep market color on the specific conditions.

Then there were data on pricing, so, what's going on, for instance, in the federal funds market, per se, and the repo market and Eurodollar market, how dispersed are the rates of the different trades. Again, for the people who are monitoring market conditions, the question is who is it that has to pay up and who is it that's able to secure funding. It was data covering all of those topics.

Then just as a matter of course, every day we get data from all the banks that have accounts and we have, from all the reserve banks, information on the level of reserves in the banking systems. That was another input to the data. There's some information that the Fed gets every single day on how those reserves are distributed, how much among the largest money center banks, how much among the smaller banks, how much among the intermediate banks. It was trying to get as granular as picture as possible on money market positioning and that sort of thing.

**YPFS:** **How does that granular data translate to the information that is needed to make decisions, for instance, at the FOMC level, where you're providing key support to major decisions?**

Carpenter: There it's varied. Different members of the FOMC have different understandings of the nuances of the markets. [Chairman Alan] Greenspan had been around markets for a long time, but we tended not to get all the way down into the deep weeds with the Chair when it was, sorry, [Chairman Ben] Bernanke, Greenspan because it was a broader scenario, situation. When Tim Geithner was president of the Federal Reserve Bank in New York, he was pretty deep in the weeds on the details. Bill Dudley was the open market operations manager, so running the open market desk. He had been in markets for the long time, so he had a really deep understanding of the some of the weeds. Part of the answer to how do they translate is it depends on who you're talking to at any point in time, but I think in the design and policy response is trying to answer the question, what is the problem and how is the proposed solution going to fix it? Part of that granularity is, is it a specific set of people who are having trouble getting financing or is it a systemic problem? It started off being acute and then spread to being systemic. When things are acute, you might think about can I just lend to a specific person or a specific entity. When things are systemic, you necessarily think as broadly as possible.

**YPFS:** **As you were talking, beginning in summer of 2007, the interbank lending markets were disrupted as the disruption from subprime mortgages flowed through. Repo rates were going up, mortgage-backed securities were shaky as collateral and part of the Fed's urging at that time was, they wanted banks to borrow from the discount window, but it was a pretty low level, as I understand it. What were the initial thoughts of your group in seeing these developments? Then, over time there were cuts in the rates for the discount window and still not much more borrowing.**

Carpenter: I think people were acutely aware of the stigma attached to the discount window. That was some consternation because in 2003 was when the structure of the discount window had changed from being a below-market-rates facility to being an above-market-rates facility where in principle there were no questions asked, but the folklore at least at the time is that there were still questions being asked in different places, and regardless, banks were shunning the window.

Whether that should be the case or shouldn't be the case, that doesn't matter right now. What matters is it is the case, and so a couple things, like I was saying in the first set of open market operations in '07 were done through regular desk operations, so they were repo operations providing cash in the first instance to the set of primary dealers, but necessarily any time extra financing happens it ends up with extra reserves in the banking system. At that time, banks were paid zero for the reserves that they had at the Fed, and so there's some market mechanism to allocate them. In general, you would see higher quantities of reserves leading to lower interest rates because there was more liquidity available. That was part of the initial reaction was, use the tool that you have and see if that's going to be enough to provide liquidity to quell some of the tightness.

Later, over the course of 2007, the Term Auction Facility was developed, and the theory of the case was that we can lend to the banks and try to solve the stigma problem by the structure of it. If everybody understood that this is a facility where you have to bid, so it looks like a market-determined price, where it settles on a forward basis, so it doesn't look like anyone is showing up on the day having been caught short, this is just a way of prudently planning for liquidity provision. Then if you do both of those together, the theory of the case was it should reduce stigma because it doesn't look like anybody's in bad shape through borrowing because they can and it's available, and not because they have to or they don't have any other choice.

In the event, the increase of the usage of the term auction facility sort of made it seem as if that theory of the case were true. The terms ended up being fairly generous. Again, the original thought was it seems like there's a problem. Let's use the tools that are currently at our disposal. Once those are in place, also think about trying to develop new tools within the legal framework that we have. Then what we saw over time was that those new tools that were developed got progressively further away from the status quo ante, so the first step doing what at the time seemed like very large repo operations ... The small step away, I mean, it's the same tool with the same counterparty. It was just much larger in size. The term auction facility was a further step away. The Fed had since time immemorial lent directly to banks, but never in that structure, and in a way to try to mitigate the stigma. Then obviously as we get into 2008, the steps away from the earlier status quo got bigger and bigger.

**YPFS:** **How about those later facilities? I think you were involved with them, the term securities lending facility, the primary dealer credit facility, others that would come along, I can't remember all the acronyms. Can you talk about the thinking behind how those facilities evolved? Starting with the Term Auction Facility as you were discussing, until you get further and further away. And we're still not too late in 2008 yet.**

Carpenter: Yeah, so the Term Auction Facility, again, pressure in money markets, so-called interbank markets. Finding ways of adding liquidity in a way that's a little bit more predictable and systematic because, again, the target for the federal funds rate was still well above zero at that point. Adding reserves, if they ended up staying in the system over time, tended to depress the level of the federal funds rate. We were still trying to simultaneously hit the target for the federal funds rate and allocate reserves. That was just much more challenging because there was no authority to pay interest on reserves at that point, and so excess liquidity tended to, over the course of a day, and definitely over the course of a week or two, push down the short-term interest rate. They were simultaneously increasing lending through the Term Auction Facility and then draining reserves through open market operations or through redemptions of Treasury bill holdings. I think it was actually mostly the latter. Over the fourth quarter in 2007, I think it's the case, the Fed's holding of Treasury bills dropped by several hundred billion dollars, because those were allowed to mature to drain reserves. The liquidity was being added through Term Auction Facility operations, trying to target where the liquidity was needed most.

That tension is one that ended up being a recurring theme, up to and including September of last year when the repo market went kerflooey, which is there's an aggregate quantity of reserves in the banking system, but the distribution of that across the system isn't always uniform. It doesn't always go on its own automatically to the area that has the biggest demand for liquidity. That's what we were trying to manage at the end of 2007 with the Term Auction Facility.

The primary dealer credit facility in March of '08 and term securities lending facility and then the Maiden Lane facility ... Once the use of the section 13.3 authority came up—there's section 13.3 and section 13.13—but there was, again, a variety of thoughts. What is the problem at hand? What are the tools that we normally use? Is there a way we can expand, given this newly deployed authority? For the primary dealer credit facility, it was on a regular basis, there are financing operations between the Fed and the primary dealers. Every single day there were repo operations before the crisis, but those were restricted to taking in Treasuries, agency debt, and agency MBS as collateral.

That primary dealer credit facility then said, take that same structure but expand the sets of collateral. The term securities lending facility took what had been in place before, the sec lending window, and said— Treasuries are liquid, there are other sorts of collateral that's less liquid—. Why don't we allow for a swap of the less-liquid collateral in exchange for the liquid collateral? Before the crisis, it was Treasuries for Treasuries, then it shifted to being non-Treasuries for Treasuries, hence the need for the additional authority to be able to do that sort of lending. Then the very, very different circumstance was the creation of the Maiden Lane LLC.

**YPFS:** **That was the Bear Stearns Maiden Lane.**

Carpenter: Exactly. That was just a huge leap away from what had been done before in recent history because there was the perceived need to lend directly to a single entity to facilitate JPMorgan's acquisition of a bunch of Bear's assets.

**YPFS:** **Now Maiden Lane was for a single thing and was different from some of those other facilities. But for the other facilities, was stigma still a factor in the design of this? How did you weigh that?**

Carpenter: I think stigma was to some extent a factor. However, the set of primary dealers who were in for repo operations on a regular basis leading up to the crisis, expanding the set of collateral that they could borrow felt somehow a little bit more natural than banks using the discount window, at least that's my recollection at the time. That wasn't as difficult a shift. I remember conference calls with the set of primary dealers. I remember one where I was on, Chris Burke who was running the domestic money market desk was on, Bill Dudley as the manager came on and it was trying to explain, yes, it is an expanded set of collateral. Things that are eligible generally for tri-party repo, those are now eligible for this credit facility, so there's no reason to be shy. The key is to make sure the system continues to function, so if you got collateral that needs to be financed and it's on this list, come in and get it.

**YPFS:** **No arm twisting a la TARP [the Troubled Asset Relief Program]?**

Carpenter: My recollection was it was more of a clarification of no, no, no, we are serious. We know we've never done this before. Yes, we are saying here are the terms, here are the conditions. We want there to be liquidity available. That's my recollection of it. It wasn't, hey, come in and get it so that you're going to be in the line-up with everybody else. I don't have that recollection of it at all.

**YPFS:** **Looking back on the creation and implementation of those facilities, what lessons were there to be learned that could carry forward to the future and how do you think those will or have carried forward? You may need to split between your experience working for the Fed, and I know you're in a different position now.**

Carpenter: Yeah, I guess I would say: Speed matters a lot. When markets start to freeze up, what is initially a liquidity problem can turn into a solvency problem. I think that's a key lesson learned. It also means that I think what we've seen in the past six months or so is that the longer you wait, often the more you end up having to do in terms of restoring liquidity and restoring market functioning. I think we may have seen that coming out of 2007, 2008, because it was initially very incremental, trying to put out one fire after another. As a result, we ended up continually expanding the facilities and that sort of thing, as opposed to jumping to something bigger earlier on. I think the lesson learned is going bigger earlier is probably a safer route.

I think the other lesson learned is just the critical need for constant dialogue to understand what positions the big players have, to understand the interconnectedness of the system. We were doing a lot of learning as it was going on. There was often a mindset in the Fed that markets are deep and liquid and efficient, and they distribute liquidity and so you don't have to worry. Then to their credit, a bunch of my colleagues who worked on the domestic money market desk in New York spoke up. They were used to thinking about the repo market, which was very heavily bilateral and, on the phone, and relationship driven. That mindset that they had of trying to understand, trace out the flow of the money, I think was invaluable.

Over time, as the financial stability division of the Board was set up people began to realize how critical interconnectedness was, how critical the actual specific bilateral relationships are. You see that being embodied, for instance, in some of the G-SIB [global systemically important bank] surcharges with the penalty for interconnectedness.

**YPFS:** **Talk just a little bit more about repo markets, short-term funding markets, and liquidity, what the situation was then and what the takeaway from the liquidity lock ups then was.**

Carpenter: Yeah, I think early on there was not the perception in the late summer 2007 that this was a massive systemic global event that had the possibility of having all financial markets come to a screeching halt. The idea was there were acute problems that probably needed to be addressed, and once they were addressed liquidity would flow some more, which is why adding liquidity where it was most acutely needed was matched with draining liquidity from the system overall so there wouldn't be too much liquidity in the system and drive short-term interest rates down.

I think that mindset of—because we had not lived through it yet—not seeing the extent of where everything was going to be going, meant that we were trying to be as tactical and surgical as possible.

**YPFS:** **Now to do a little switch of subject. Can you talk about the role of non-U.S. dollar markets and the demand for U.S. dollars and how this affected the Fed's role and its response?**

Carpenter: Yeah, I mean, every day we would look at where repo was trading because it tended to ... Our mandate was to have the market federal funds rate hit the committee's target for the federal funds rate. Money markets were interconnected. We had to do the operations early in the morning because that's when the repo market was active, the federal funds market was not particularly active early in the morning, and so we would look at repo transactions in New York, and the New York desk would be the ones reporting on this, but also Eurodollar transactions, dollar funding transactions going on in London, with their earlier time than New York. That would give us some indication of where offshore dollar funding pressures were, how big they were, how far away that overnight Eurodollar rate was from the target rate from the close of the night before. Those sorts of metrics give you some idea of how acute the strains were.

Then the New York Fed's staff would have been already, by the time we were doing the money operation, they would have been on the phone with funding desks in London and other parts of the world trying to understand the color on the market, what the lay of the land was. You would have pricing information. You'd also have qualitative information about liquidity and what sorts of entities were long, short, what have you.

**YPFS:** **Talking liquidity. Frequently, back to the U.S., people have discussed the crisis as a liquidity crisis, rather than a solvency crisis, although banks failed, nonbanks failed. In hindsight, does that characterization still seem appropriate?**

Carpenter: It seems a bit oversimplified now for a couple of reasons. One, I think it's clear that just a liquidity issue can become a solvency issue given enough time. If I have to pay my mortgage, but I don't have any cash in my banking account, and I'm trying to make my mortgage payment by selling my house, chances are I'm going to miss that monthly payment and it starts to look like a default, even though it could easily be the net value of the house far exceeds the liability on the mortgage. I think there's less of a sharp dichotomy between liquidity crisis and solvency crises, especially when ... And this is the second part of why I think it's too simple, especially when you have so much leverage in the system and the maturity mismatch, because then I think the measurement of the difference between liquidity and solvency is further blurred.

To use the simple analogy, I gave before with the house. What's the value of my home here in New York? I know how much I paid for it, and I know how much I could potentially receive for it if I were to sell it, as long as I'm willing to wait a certain amount of time. Valuing assets is very, very, very state contingent. If you're in a situation where there is this massive liquidity shortage, a set of assets or a specific balance sheet that looks like it's solvent, it looks like the value of the assets exceeds the value of the liabilities, when there's a liquidity crisis you can't ignore the temporal question, which is, is that value a value on T plus zero or that is a value that's T plus one or is that a value that's T plus 30? The difference there matters a lot. If it's T plus 30, then even if you're by one definition solvent, you're ... the illiquidity of it forces that insolvency.

**YPFS: How about leverage? Can you expand there on the interplay there with leverage? I'm not sure if you can do it with the house, but you can try.**

Carpenter: Yeah, fair enough. I guess leverage, in two related, but conceptually distinct ways: One is the more leverage there is in the system, the more precarious, then, is the situation because if and when the willingness to lend dries up, that distinction between liquidity and solvency becomes that much bigger. If there's no leverage whatsoever, if all assets are financed out of equity, if I bought my home literally for cash, if I brought a suitcase of cash to the closing, then banks saying we're not going to lend doesn't change whether or not I've got net worth in my house. If everything is done 100 percent levered or multiply times levered, then the ability to maintain those asset prices is heavily dependent on the continued extension of that lending.

It's that same, I guess, point about there's a temporal dimension to valuation when you have things that are levered, and just the sheer amount of leverage can often support higher asset prices, which makes you look solvent, but if the higher asset prices are dependent on the existence of that credit, then what looked solvent at one period of time with lending going on, is perhaps not solvent when the flow of credit goes away.

**YPFS:** **As we move forward, coming out of the crisis, recapitalization through the banks, increased reserve requirements, stress test requirements. Do you think that all these new requirements help strengthen the banking system when you increase resilience against something like 2008 happening again?**

Carpenter: I think the evidence is pretty clear that the post-financial crisis regulations made those specific financial institutions subject to those regulations sounder. In terms of having a direct repeat of the previous situation, yeah, I think that the likelihood has gone down. I think narrowly defined; the answer is pretty clear there. I think over time though we've seen a morphing of where credit or liquidity provision happens, less from the large money center banks, the primary dealers, the big broker dealers, into—then here's a whole set of different phrases that people like—but shadow banking or non-traditional lenders or direct lenders, market-based lending.

Because the structure of the financial system has changed, just saying that the institutions that were at the center of the financial system in the previous version of the world are safer and sounder, that can be a true statement, and yet if the overall structure of the financial system has changed, that might not be a sufficient condition to make the whole system safer, more resilient. I don't think the same issue that caused the 2007-2008 financial crisis is likely to cause another financial crisis, but that's not the same thing as saying there can't be another financial crisis caused in a different way.

**YPFS:** **Again, is this a point when you can crystallize some of the lessons learned from that?**

Carpenter: One of the remarkable things about March 2008 was just how difficult it was for some people to roll Treasury repo, which ought to be crazy, because that should have right-side risk. If the world is more risky, then Treasuries should be worth more, so you should be able to borrow more easily against Treasuries, not the opposite. In that sense, the line limits, the bilateral nature of some of this financing going on, is I think a very, very stark clear lesson to be learned and it sort of has fed into some of the G-SIB surcharge calculation.

I think, and this is not a place where I pretend to be an expert and so I'm not going to say whether they got the regulation right or not, but just the sheer volume of leverage. I think the argument that pro-regulation people make is that let's have a leverage ratio in there as a backstop because just the sheer, the virtue of leverage makes things more vulnerable. I'm kind of sympathetic to that. In my heart of hearts, the economist in me says the risk-weighted asset model for capital requirements makes more sense, but I can't quite get out of my head the difficulty some institutions found in rolling Treasury repo in 2008. That to me argues that maybe there is a little bit of baby with the bathwater that needn't be thrown out just thinking about leverage in and of itself.

**YPFS:** **Moving forward, with unconventional monetary policy, liquidity, quantitative easing, the Fed's balance sheet continues to grow. Can you talk about the trade-offs there? I can't stop thinking of you as the guy who had to look at the H.4.1 every week, but nonetheless, you may be able to step back a little from that and take a slightly bigger picture than that spreadsheet, nonetheless.**

Carpenter: No, fair enough, although I think, and again, it's a bit of my intellectual upbringing. I think that release is a really great place to start, even with the question about the broader imprint. The reason I say that is the Federal Reserve has a balance sheet, balance sheets balance, liabilities of the Fed are assets to someone else and one of the key questions that's been coming up recently is, as the Fed's balance sheet has been growing as much as it has, we had this debate during the 2009, '10, '11, '12, '13 expansion of the balance sheet, which in retrospect, again, looks quaint because the numbers are just so vastly different now.

In particular, whenever the Fed buys a Treasury security, they do so by creating reserves in the account of whatever bank was settling the transaction for the ultimate seller of the Treasury security. If the Fed's buying a Treasury security from somebody who's not a bank, that's a transaction in principle between those two entities, the Fed and the hedge fund or the broker-dealer, whoever that was on the selling side. Yet, nevertheless, some bank's balance sheet is going to be directly affected by that. You see that showing up in terms of reserves, which is an asset for the banking system as a whole. That increase in the size of the Fed's balance sheet is directly affecting various banks' balance sheets and under very, very plausible circumstances can make leverage ratios for banks tighter through no active choice on the banks' part at all, if that makes sense. I think that question is still very ripe and is deeply related to the question of central banks' balance sheets globally.

**YPFS:** **You talked a bit about the trade-offs. Now just looking back—and we're going to start looking forward soon—but looking back are there things that you wish you today had been able to tell you back in 2006 about crisis and response?**

Carpenter: Boy, yeah. Like, hey, guess what? It's going to get worse. If it looks bad in August 2007, that's peanuts compared to what it's going to be like in August 2008. I wish I had known that for sure. I think, ultimately, it is just sort of never stop peeling back layers of the onion and thinking about who's connected to whom, how much. For instance, in the repo market, how much rehypothecation can go on? Somebody has a Treasury that they lend to get cash and then that Treasury is lent again and then that Treasury is lent again, and so that whole chain, if it has to unwind, there can be lots and lots and lots of people caught short in that unwind process. That's one thing that if I had known before, I would have always been trying to peel back the layers of the onion just one more time.

**YPFS:** **How did the zero lower bound for interest come into policy discussions back in '08?**

Carpenter: Oh absolutely, and in fact, one difference now versus then, you'll recall that in December 2008, the interest on excess reserves rate went down to 25 basis points positive. Now it's at 10 basis points. The target range of zero to 25 basis points is the same, but the setting of the interest on reserves rate is lower now than it was then. That was a very, very, very active topic of debate. I wrote any number of memos about where you can put the interest on excess reserves rate. We had a lively debate with the staff, and spilled it over into the FOMC meetings, about whether or not you could go negative and where the limits are.

So yes, it was widely talked about. The limit on the interest on excess reserves rate, taking it down to only 25 basis points was seen as ... There was an FDIC assessment that was put in place to help recapitalize and reconstitute some of those funds that the FDIC had. There was a concern that if you pushed interest on excess reserves lower, it might hurt bank profits more. I think my recollection is most of the members of the FOMC thought pushing interest on excess reserves down lower to 10 basis points, maybe to zero, at the margin could help a little, but there could be a cost, and that cost is unknown. It might be outsized if it really disrupted the functioning of money markets.

My recollection is the bulk of the committee was kind of on the bubble. They could have easily been convinced to lower it a little bit. There was one member of the committee that was adamantly opposed to it, primarily of the argument of it hurting bank profits. A bunch of people who are inclined but mostly ambivalent against one who had extraordinarily strong feelings, the one who had the strongest feelings ended up carrying the day. Nobody wanted to break the glass if they didn't have high conviction on it.

We also thought about, if we did go negative, how negative could it be? One of the constraints was seen as hoarding of cash on the part of banks in vaults. Then we did some back of some back-of … --very crude-- back-of-the-envelope calculations. How big of a warehouse would you need for a hundred billion dollars' worth of cash? How much maybe would you be able to pay for either security guards or insurance for that amount of thing? It was not the deepest scientific endeavor you've ever seen before, but it was trying to highlight at least what the mechanisms involved are. Now we know from the Swiss National Bank, 75 basis points negative is clearly possible.

Yeah, it was very often considered. I think the biggest argument at the time about not going negative is still the biggest argument against going negative, which is the money fund industry is pretty critical to the flow of capital in the U.S. financial system. If you went negative in the short run, the amount of time it would take for them to adapt, you might actually tighten financial conditions rather than ease them and we've some disruption starting with money funds causing broad tightening across financing markets. I think that mindset is probably the strongest argument at the time for not going negative, and probably still is the strongest argument for not going negative now.

**YPFS:** **Let's move to 2020. This time around the Fed moved very quickly, very big, cut rates hard, used unconventional policy tools, reached into file folders from a decade ago. It seems to be generally accepted that the markets believe that the Fed is standing squarely in favor of stability, even though that's expensive. They now have $7 trillion on that balance sheet. Now you're on the outside looking in. What does it look like to you and how have the lessons the last crisis affected the response to this one?**

Carpenter: I guess I would say actually if you go back to September [2019], when repo markets had their moment of turmoil.

**YPFS:** **Right, yes.**

Carpenter: I wouldn't have said there that the Fed actually acted super-fast or faster than we had in 2007 and 2008. In 2007, in August, we acted on the day with what we thought was the big repo operation, the next day was an even bigger one. It was literally same day as the tightness showed up in September, there was no delay. Again, I'm on the outside. I don't know if that was communication from the staff who had lived through 2008 up the chain to the ultimate policy makers deciders and having to explain again and again why it's actually so important.

Again, Tim Geithner was always willing to be down in the weeds of what's going on and trying to understand the functioning of it. I don't know if they had the same authority. Then in monetary affairs in 2007, 2008, we had a bunch of people who were running the division who had spent their careers thinking about banking and the plumbing of banking systems. I don't think that's the case now. I don't know if that contributes to it. We get to March of this year and there's illiquidity in the Treasury market. Yeah, again, I think the lesson that could have been learned a little bit better, is go early and go big.

What they did first in March was to go into the markets with a specific dollar amount that they're going to go up to, and the market said, "Huh, that's not nearly enough," and the illiquidity persisted. Eventually, the Fed dropped the dollar amount that they were willing to do and just started buying massive amounts and eventually liquidity was restored. Again, that might be another opportunity where lessons learned weren't fully internalized.

**YPFS:** **What else should we have learned before that could be applied now and going forward?**

Carpenter: I mean, I think going forward ... Here's the part that's hard, and I'm not sure I ... And it's easy for me to throw stones and I don't mean to, A, really be throwing stones but just making observations, and it's a little bit sheepish because I don't have the clear answer of here's the right thing to do. However: Bouts of illiquidity that seem like they can transmit out to the rest of the market, the Fed steps in because in the moment, what else are you going to do? You can't let the system come to a close or come to a stop. They rush in, throw massive amounts of resources at it, things are fixed. That's great.

The question I think then becomes, what do you do so it doesn't happen again, right? The sheer volume of Treasury debt being issued means there's going to be potential hiccups of flowing through the pipes of all the paper changing hands. I guess I still wonder. There have been debates going on for a long time, and again, I'm not saying I have the right answer right now, but about should there be, for instance, a central counterparty for Treasury securities, so it doesn't have to go through dealers' desks? Is the system of having primary dealers a good one or a bad one? Does it elevate people and give them an imprimatur of safety, or does it make things inefficient because you're forcing profit-seeking institutions to take on a role that's for the, in principle, greater good—if you think liquid functioning financial markets are for the public good?

It seems like we've been hitting some version of the same wall a couple times. The Fed coming in, doing massive amounts of things, moving asset prices around a lot, in some sense, taking risk out of the private sector in the name of restoring market functioning. That idea of socializing the cost, privatizing the gain, is I think one of the issues that lots of people have decried for a long period of time, and yet we find ourselves in that situation again. I think that for me is the hardest part of all of this is that I'm not sure we've actually learned our lesson there.

**YPFS:** **Is there anything I should be asking you along these lines before I let you go onto your job?**

Carpenter: This is where I wonder, because I'm on the outside, I don't know what's going on. There's a saying in Washington, right? Personnel is policy. I know a bunch of senior staff at the Federal Reserve Bank of New York, and I think extraordinarily highly of them. I think they're amazingly competent. But what I don't know is how the internal debates go on. Gross oversimplification and caricature, but one that's helpful anyway, is when I was there, monetary affairs at the Board, a bunch of Ph.D. economists who thought like Ph.D. economists; folks at the desk in New York were sort of tick by tick, looking at the market, types. I thought there was a lot of virtue that came out of that intellectual tension, but it doesn't work well if it's somehow imbalanced, where one side is somehow valorized entirely over the other, and I don't know if that balance remains.

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