Eurodollar University: Season 2 Part 1

August 9, 2018

Erik: Welcome to Part 5 of MacroVoices Eurodollar University with Alhambra Investments CIO Jeffrey Snider. I'm your host, Erik Townsend. There is a slide deck to accompany this podcast and we recommend that you download it before listening, as we'll be referring to the charts and graphs it contains throughout this program. You'll find the download link, along with other parts of the series at https://www.macrovoices.com/edu (for Eurodollar University).

Now, you might be wondering how this could be Part 5 in what we've described in the past as a four-part series. The original four-part series, produced in 2017, focused on the history of the Eurodollar system before the great financial crisis. In Season 2 of Eurodollar University, produced in 2018, we're going to analyze how and why the system broke down, beginning on August 9 of 2007, and hasn't been the same since. Season 2 adds Parts 5, 6, and 7 to what has now become a seven-part series overall.

So, without further ado, let's bring back Alhambra Investments CIO, Jeffrey Snider.

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Erik: Jeff Snider, thanks so much for joining us again for Eurodollar University, Season 2. This is Part 5 in what was originally conceived to be a four-part series. And the reason for that is the original series really was focused on the history of the Eurodollar system up until it broke down in 2007. In Season 2, we're going to talk about what's happened since 2007. Thanks so much for being with us and doing this again with us, Jeff.

Jeff: Thank you Erik. And thank you to all your listeners at MacroVoices. It's my pleasure doing it and I look forward to all the material that we get to present in Season 2.

Erik: Fantastic. I think a good way to start is just a quick summary. Of course, we strongly urge our listeners who haven't yet listened to Season 1 to do so, because there is so much information there. And you really need that in order to make sense of what we're about to discuss as we dive into Season 2.

I'm going to summarize my own takeaway from Season 1. I learned so much, Jeff, about the history of Eurodollars. Originally, I just thought Eurodollars were money denominated in US dollars that was on loan some place in the world outside the US.

What I learned from the series is how much the history of monetary policy in the United States was affected, essentially, by the shadow banking system having its own ability to create money supply. Particularly the stories of Paul Mozer in the '90s, literally going and paying more than

anybody could possibly think Treasury securities were worth – overpaying beyond their intrinsic value. Everybody thought he was crazy.

And of course, what was going on was the commercial banks had figured out a way to do something that only central banks are supposed to be allowed to do, which is to create new money supply, essentially out of thin air. And they were doing that by getting the most pristine collateral and, essentially, double spending it, using it twice as collateral for multiple loans. And that created billions and billions of dollars of money supply. So it really informed my understanding of what drove the bull market in the '90s and everything else.

But everything we covered in Season 1 was up until the system broke down in 2007, leading into the great financial crisis. Before we dive into the slide deck, Jeff, why don't you give us the high-level overview of what our listeners can expect from Season 2?

Jeff: Season 1, what we were trying to accomplish was mostly just background information, because what we're really interested in is where we are today. And where we are today is the global monetary system – as you very well described, and repo is a very big component of it – this global monetary system that once had the ability to create its own funding in all sorts of crazy, weird ways, broke down in 2007 and then never recovered.

So what we want to do in Season 2 is get into the details about, first of all, why it broke down, so that we can understand why it hasn't fixed itself, or why it hasn't healed. Because, in a lot of ways, that's what we hear and that's what we expect. Whenever you go through any of these kinds of banking panics or monetary issues in history, we always think of it as a temporary deviation where, after it's over, it goes back to the way it was before.

I don't want to say this is the first time in history, but it's certainly the first time in modern history where we've had a permanent break in a monetary system on a global scale that then became a permanent break. Because it has never been allowed to fix itself. Because it can't.

So what we're trying to do with Season 2 is describe what happened in 2008 at a very high level of detail in order to try to better understand why it was a permanent dislocation or disassociation.

Erik: Well I think that's a really important point, Jeff. We covered in Season 1 40 or 50 years of history of the Eurodollar system and the incredibly important role that it played in the global financial system. It broke in 2007.

That's 11 years ago. And it hasn't fixed itself yet. It sounds like your opinion is that it's not likely to fix itself.

So, with that, why don't we go ahead and dive into the slide deck. For our listeners, if you don't have it already, you absolutely, positively need to stop and download the slide deck because we're going to be referring to it throughout this series. You'll find the download link at

macrovoices.com associated with the description of this particular episode of Eurodollar University.

If you don't have access to that, if you got this link some other way, just go to macrovoices.com, click on the Timeless Series button on the black menu bar, and you'll find your way to Eurodollar University. We are now in Part 5 of the series.

Jeff, let's go ahead and dive in to this slide deck. Now, we have a series of slides, starting on Slide 4, which is not going to present anything about the Eurodollar system. It's actually just going to review the conventional wisdom, what everybody has been told about monetary policy over the last ten years, the role that quantitative easing played, and so forth.

It will come as no surprise to our regular listeners – spoiler alert – that we're going to have another story all about the Eurodollar system in just a few minutes. But let's make sure that we're all on the same page and start by reviewing the conventional wisdom of what everyone's been told about monetary policy. Jeff, take it away from Slide 4.

Jeff: What they teach you in school and what you hear about on TV about the Federal Reserve and monetary policy is really something called maturity transformation. It's a very simple idea, a very simple construction of what a bank does. In other words, a bank borrows in the short-term markets and lends in longer-term securities or loans.

And what monetary policy developed, especially after the 1970s and into the 1980s, developed along the lines of something called interest rate targeting. And interest rate targeting was, again, a very simple idea. The idea being that if you controlled the cost of funding, the short end of that maturity transformation, you could therefore control what a bank did and therefore what the banking system did and how that related to the overall economy.

Everybody knows that the Fed raised and lowered the federal funds rate by 25 basis points most of the time during the past couple of decades. The idea being that if they raised the cost of funds by raising the federal funds rate, they would make it more expensive for banks to make loans. And, therefore, they would create fewer loans. And then that would have a depressive effect on economic conditions downstream.

Again, there are several problems with that, starting with the fact that the federal funds market was not the entirety of money markets all across the world. We talked in Season 1 about how the Eurodollar system is really a global currency. But one of the reasons they focused on the federal funds rate as a target, and one of the reasons they were able to focus on the federal funds rate, is (Slide 4) US dollar, Eurodollar, LIBOR rates tracked federal funds very closely. Up until 2007.

And that was for several reasons. The idea that the Fed could control the cost of short-term funding was believed to be a universal one. Therefore, they developed a very simplistic monetary policy model based on what they thought was a seamless global money market.

Erik: Jeff, as I look at this graph on Slide 4, we have a lot of information here. We're going all the way from 1986 to 2010. Let's move on to Slide 5 and zoom in on this picture and look at the period from 2000 to 2007. Tell us what happened then.

Jeff: I think it's important to remember and to review the middle 2000s. Not just because it was the period of the housing bubble and the housing mania, where things really got crazy. What happened during that period, especially in a monetary policy context, doesn't quite make sense.

From June 2004 until June 2006, the Federal Reserve raised the federal funds target rate 17 times. Each one of those was 25 basis points. They brought the federal funds target rate up from a low of 1%, which was thought to be a very low level at that time, all the way to 5.25% by the middle of 2006.

Now, under the textbook orthodox convention of monetary policy and interest rate targeting, that should have been a tremendous amount of tightening. Again, the idea of controlling the short-term cost of borrowing. In conventional terms, what happened in the middle 2000s was Alan Greenspan's Fed, which became Ben Bernanke's Fed toward the end of it, believed that it was initiating and inaugurating substantial monetary tightening during that period.

If we go to Slide 6, what we can see is that, during that time, LIBOR rates, which are these Eurodollar-related rates, followed along with federal funds very closely, as you would expect if you expect that these global money markets operate on a seamless fashion. And the reason they operated in what appeared to be a monolithic way was because of arbitrage, or what we call covered interest parity.

They were money dealer banks stationed both inside the US and offshore that, whenever one of these rates got too far out of line, there was an arbitrage opportunity. If, for example, the LIBOR rate got too high, a bank could take advantage of federal funds in New York and then borrow in federal funds and then transfer those funds into London and lend them into Eurodollars.

The reason these interest rates stayed connected, and the reason they stayed together, and the reason the money markets operated on a global basis, was because money-dealing banks were there in both places, taking advantage of any kind of break in trend, any kind of break in operation. So they would make sure that the system worked in a whole fashion.

Erik: So we have 17 rate hikes in a row, quarterly rate hikes. Then the Fed acts surprised when everything starts to break down. And, of course, after 2007 the economy gets kind of dicey.

As we move on to Slide 7, I see that you've got the downhill of where all of the rate cuts occurred. We can see that stair-casing down of, first, some 25 basis point cuts and then some

50 and bigger cuts. What happens? Presumably, if we followed the Fed funds rate up with LIBOR, we ought to follow pretty closely on the way down.

Tell us what actually happened.

Jeff: There is a bit of symmetry there, too. We started going from 1% to 5.25% in the middle 2000s, which was supposed to be tightening. And then, starting in 2007, we go from 5.25% back to 1%. And so there is a bit of symmetry there in that we – the Fed and convention – believed that on the way up, in terms of the federal funds rate, there is a lot of tightening. And then, obviously, on the way down they believed that that was a tremendous amount of stimulus and accommodation.

On Slide 8, you notice right away that something very different happened on the way down as opposed to on the way up. What that tells us is, just looking at it, knowing nothing else about the system, you can see that there is a breakdown in it that was structural in the way that it operated against monetary policy.

Because no longer were these markets acting as a singular whole. The LIBOR rate was no longer closely tied to the federal funds target, which tells us that there are problems in the system in a very basic and fundamental way that perhaps there is more to the story here.

Erik: On Slide 9, you're adding this point about August 9 of 2007 being when it all broke. What is the significance of that date? Is it just when the Fed made the first rate cut? What is it about that day that signifies when the system started to break?

Jeff: It *was* the date that it broke. It's really that simple. The stuff that happened on August 9, which we'll get into later on, was the day that the whole thing broke. And it has never been the same since. And we'll go into detail about what happened on August 9.

But, for now, what we see here is before August 9 you had global money markets, in dollars, operating in a monolithic fashion, where there was close arbitrage between LIBOR rates and the federal funds target. Which everybody interpreted as the Federal Reserve was in charge of dollar funding costs. And maturity transformation behaved as it was supposed to. And, therefore, the Fed was predictably in control of the entire economy.

After August 9, as you can plainly see here, the story gets obviously a bit more complicated. The reason why it got complicated, and the reason for what happened, is what we're really trying to go over here in terms of understanding this systemic break and why it became permanent. This is our beginning point into understanding what really goes on in the shadows.

Erik: As I look at the downhill ride here, this elevator ride down on Slide 9, it's a lot of information packed into a very small space. On Slide 10, we're doing a zoom and expanding that, looking at it in an increased view.

I see here where LIBOR just goes crazy. Of course, it's October of 2008. So I assume what's happening there is a loss of confidence in the banking system that's causing that TED spread, as it's known, the difference between LIBOR and Treasuries, to blow out dramatically.

Is that right?

Jeff: Yeah, it's actually both sides of the equation. LIBOR, as you point out, is clearly going crazy. It's obviously not right, the way it's supposed to be. But you also notice the blue line there, the Federal funds effective rate, is different from the federal funds target.

Remember how monetary policy actually works? The Fed sets a target but there are actual transactions among banks. And the federal funds effective rate is the weighted average of all of those transactions and what they're actually doing. What's supposed to happen is the effective rate is supposed to match the target rate, or reasonably close to the target rate. That tells the Fed that everything is working the way it's supposed to.

And, in theory, if the federal funds effective rate deviates substantially from the target rate, the Federal Reserve is supposed to step in with open-market operations to either buy or sell Treasury securities, or whatever else it has in its SOMA [System Open Market Account] portfolio, in order to get that federal funds effective rate back to the target rate.

And what you can see, in addition to LIBOR going crazy, the effective federal funds rate also goes crazy. And it goes crazy in the opposite direction.

Starting on August 10, for example, the federal funds effective rate dropped substantially below target. So you had a situation where, in early August of 2007, the LIBOR rate was too high and the federal funds effective rate was too low. Neither side was obeying the target.

And the difference in those two directions tells us a lot about what happened in the system. Because, remember, LIBOR relates to Eurodollar rates, whereas federal funds relates to domestic funding in the particular money market, largely based in New York City. So the way we can interpret that in very broad terms is there was not enough money, not enough dollars, in London offshore. And too many of them in New York City in federal funds.

That's an important distinction in that it tells us that the system was – again, it's these various parts of the global money market that were, before August 9, 2007, operating as an efficient, almost whole system – were starting to break down into separate pieces. The system began to fragment here, we can see along geographic lines.

Erik: So, to summarize this, if I look before August 9 of 2007, I see the effective federal funds rate, which is the blue line, just perfectly tracking the grey contour. And you've explained the reason for that is the Federal Reserve Bank of New York has a trading desk. They have people sitting there watching the market. They're actively moving huge amounts of money around as necessary, to make sure that the blue line correctly follows the top of the grey shaded area

here.

August 9, 2007, basically everything goes to hell in a handbasket and they lose control of the effective funds rate. Even as they are making interventions through open market operations, they are unable to keep the blue effective funds rate locked in where it is supposed to be, right on the top of the grey contour at the target rate.

So we've got the effective fed funds rate, the blue line, perfectly tracking the grey-shaded area as it's supposed to. Until it all breaks down August 9 of 2007. And, of course, what's going on here is the Fed is very aggressively reducing interest rates because that is supposed to be wildly stimulative. They are trying to save the day as things go to hell in a handbasket in the fall of 2008.

Moving on to Slide 11, how did that stimulation work out in terms of achieving the goal it was supposed to achieve?

Jeff: I think, just from hindsight and history, no, it didn't work out very well for anybody. Obviously, there was a panic starting in late September of 2008, a full-blown panic I should add. And it wasn't just that the Federal Reserve reduced the federal funds target rate. They also did a bunch of other things along the line. They did dollar swaps, they did dollar options, they increased collateral eligibility, and a bunch of other things.

In very broad terms, what we're seeing here is that none of those things actually worked the way that they were supposed to. Because, if they had worked, what we would see in LIBOR and effective federal funds rate is that they would go back to the way they were in August 9, 2007. Obeying the federal funds target.

Which would tell us that the monetary system is operating in accordance with monetary policy. And for right now, that's the most important point. What we're seeing here is that the monetary system, globally, fragmented, which impeded the ability of the Fed to feed stimulus into it in the manner that it was supposed to have done.

The reason why that fragmented the way it did – and there were more fault lines and more fragments to be seen, as we'll cover going forward – is very important in understanding why the system has never gone back to the way it was before.

Erik: Okay, to keep this in context for our listeners, so far we're just talking through the conventional wisdom history of monetary policy through the financial crisis. Basically, everything worked fine until August 9 of 2007. The effective funds rate perfectly tracked its target rate.

Suddenly, the Federal Reserve Bank of New York is unable to control the effective funds rate and keep it locked on to its target rate. Things really go haywire and we have this massive easing program that was supposed to be stimulative that didn't really work. That is the

perspective that everyone knows, without being informed by knowledge of the Eurodollar system.

As we now move into the Eurodollar system and the role that it played in it, why don't we set the Wayback Machine to a couple of days before August 9? Tell us what happened there, on Slide 12.

Jeff: Well, on August 7, 2007, the FOMC committee of the Federal Reserve, the policy-making body of the Federal Reserve, held its regular meeting. If you recall, in the first half of 2007 there were various signs that things were not right.

Remember, Ben Bernanke, in March of 2007, said the subprime was contained. So they were aware that there were problems out there. But, before that point, it was believed that these things were minor issues dealing with a certain part of the mortgage market, where banks had gotten out of control, lending to people who probably shouldn't have gotten mortgages, and the housing bubble, and all that kind of stuff.

But, up until August 7, or up until August 9, everybody thought that these were just minor issues related to just that one problem area. And at the FOMC meeting on August 7, because they were slightly alarmed and slightly shaken awake by some of the stuff that went on earlier in 2007, they, of course, discussed where they thought everything was at that point in August.

And Bill Dudley, who was at that time the head of the System Open Market Account at the Federal Reserve Bank of New York, told the rest of the committee that, basically, they had investigated all the names that they had been seeing in the paper: Bear Stearns, Countrywide, and the list of all of the problem banks that had come up during that time.

And, as far as he was concerned, there was really absolutely nothing imminent in any of those places. So, as far as the Federal Reserve was concerned, officially this was a minor problem that was causing a little bit of a headache in certain places, but it was nothing to be really concerned about.

Again, this was August 7, 2007.

If you go to Slide 13, on August 9, this is a quote from the CEO of Northern Rock, which was a bank that eventually failed, only just a couple of months later, in the United Kingdom. The entire funding mechanism really broke down on August 9, as we previewed before. The whole thing just stopped. It was a clean break. It was a substantial break.

And so you have to consider the fact that two days before, this all broke down in a very obvious way. The Federal Reserve had no idea this was even coming. They were completely blindsided by all of this. Which tells us a lot about how monetary policy operated at the time and how it was so unprepared for what was about to happen.

And that's an important point.

Erik: Okay, Jeff, before you go on, going back to Slide 12, I see you've got commercial paper programs in red here. I'm jogging my memory. During the 2007-08 crisis, that was one of the first headlines to really hit: commercial paper in trouble. And people were asking, when that headline hit, is this a sign of a really big problem? Or is it not that big of a deal? People didn't know what to make of it. So how does that fit into this story?

Jeff: It's one of the areas that Bill Dudley, in his role as open market account manager at FRBNY [Federal Reserve Bank of New York], had apparently investigated. So, on August 7 he said the commercial paper programs were fine. And that very week – the data is weekly, so we don't know exactly what date, but we can assume it was probably August 9 – the week of August 9 and the week of August 7 – with Bill Dudley making that statement, the commercial paper market essentially ceased. It froze up entirely, which cause an enormous amount of problems.

But examining the history of the commercial paper market, especially ABS commercial paper, which is a funding mechanism tied to asset-backed security – that's what ABS is – it defied this conventional narrative.

If we look at what was going on in commercial paper, from 2004 to 2007 it was exploding in volume. This is a monetary conduit that was increasing, not decreasing. Remember, the Fed was raising rates, which is supposed to be a tightening move. So the Fed is tightening. At the same time, instead, in this commercial paper conduit, things are going in the other direction.

This is backwards. This is not how it's supposed to be.

So, already, we're into a situation where convention is missing a great deal here. And that's got to be the case. Because on August 7, Bill Dudley says there is nothing wrong with commercial paper.

But if you flip over to Slide 15, the commercial paper market was just devastated from the week of August 9 forward. And, again, it's backwards on the way down. Because, during that period, the Fed is reducing the federal funds rate, which is supposed to be stimulus. And instead, no matter what the Fed did, the commercial paper market only got worse and worse and worse and worse.

So both on the way up and the way down, both sides, everything is backwards. No matter what monetary policy is doing, the market – and especially this particular part of the global funding markets – is moving in the opposite direction.

Erik: As I look at Slide 15, obviously, we have the benefit of hindsight. And this is a striking graph. Needless to say, August 9 was a pivotal moment. What's going on in this timeframe in terms of what the powers that be have to say? Bernanke had told us earlier in the year that

everything is fine. As we move on to Slide 17, what does he say at this point?

Jeff: Again, I think the contrasting quotes there is an important part of this. As you pointed out, he said in March of 2007 that subprime was contained. It's one of those statements that's going to be stapled to his tombstone. He's going to be remembered for that for a long time. And for good reason.

And then you go forward to early December 2008, after we already had part of the panic take place. He says, oh, well, maybe we were wrong about all that and the broad financial system was a bit more complex than we thought. So that's kind of where we are so far is we're starting to get the idea that, yeah, there's something else missing here.

And what's missing here is probably very important. And probably not just complex, but vital to understanding everything that's happened before and since. Bernanke making that admission in December of 2008 is a key clue that, yeah, we need to go into these shadows and actually understand what it is that happened, because that is vitally important.

Erik: As I look at Slide 17 and this striking contrast between these two quotes from Ben Bernanke, it seems like he's figuring out at this point that things didn't actually work the way he thought they did.

What's going on in Slide 18? It looks like you're elaborating on that point.

Jeff: It's more than just a breakdown of subprime versus mortgages versus federal funds. We're really talking about, in overriding principles, the governing dynamic (if you will) about how monetary policy, central banks, and even the entire economy and the monetary system actually work.

Back in 1999, Bernanke was much more confident about things, obviously. And what he said at the time was that, under the old way that everybody understood things with controlling the federal funds rate – tying that to an inflation target and not really understanding why or how it worked – was, to him, the apex of the ability of central banks to act as a technocratic ideal where they could control the economy from a very narrow range of understanding and in very small levers.

What we're understanding here is that what he says in 2007 and the contrast between that and 2008 is: If you don't really understand how it works, maybe it doesn't really work at all. Maybe it never really did.

So the big point here in this quote is, if he's wrong in what he says about a flexible inflation target provides an effective unified framework, what if it doesn't? I think that's what we saw in the early part of 2008. And throughout that period were these questions that there was a lot more going on there than everybody appreciated. Therefore, everything is opened up to reinterpretation and redefinition. And I mean everything.

We're talking about the monetary system, the way the central bank fits within the economic system – and even what that means in terms of the economic system – because there is more complexity here than anyone was ever willing to admit or acknowledge.

And even then, in 2008 Bernanke wasn't really admitting all that much. He was just saying, oh, maybe it was a little more complex than we thought. What does that actually mean? And it turns out it means a great deal.

Erik: Jeff, back on Slide 15 we discussed the commercial paper system dramatically breaking down on August 9, and we said that was related to asset-backed securities. I didn't ask you to elaborate at that point because I know you've got several slides coming up to elaborate on that.

So, let's be clear. Asset-backed securities and the commercial paper associated with them – exactly what are we talking about with respect to those terms (starting on Slide 9)?

Jeff: Well, it turns out asset-backed security commercial paper, a lot of it – especially in the middle 2000s – related to actual mortgage stuff. So what we need to understand and investigate is, why were financial institutions of various kinds using that particular funding model for what were supposed to be real mortgage loans? Not just subprime loans, but prime mortgage loans.

And, in order to understand what the importance of ABS commercial paper was at that time and why the breakdown was so damaging to the system, we need to go back and understand the entire process of securitization.

Securitization was an important part of the housing bubble. But it was also closely tied in to the Eurodollar system and the global money system in that it allowed not just ABS stuff to happen, but to proliferate in such a way. That's what we talked about in Eurodollar University Season 1.

What characterized the pre-2007 history of that system was that it grew exponentially. As you pointed out several times, banks were able to conjure out of thin air the funding mechanisms and the liabilities that were meant to just entertain any kind of volume that any kind of bank wanted to put together.

But there was a downside to all that. And it wasn't revealed until August of 2007 that there were structural problems in doing it that way. As we go forward here, first trying to break down the securitization process, it starts to become clear what those fault lines were.

Erik: Okay, Jeff. Looking at Slide 19, let's assume that there is a pool of mortgages. Now, in the old days we had portfolio lenders where banks lent money and got paid back. But this got way more complicated in the '80s.

So tell us what's going and walk us through this process. We've got a pool of mortgages. What

happens with them?

Jeff: We take a bunch of mortgages – and these are large pools of mortgages. We're not talking about a couple of million dollars here. We're talking, often, into the billions. The sponsor or originator would put together a pool of mortgages where each loan had reasonably similar characteristics. And the idea behind it was that we would begin to slice and dice this pool of mortgages to create various pieces that had defining characteristics that were then salable to downstream clients.

If you go to Slide 20, what often happened was you take the pool of mortgages and you sell it or transfer it to a special investment vehicle (SIV). You may remember hearing about some of these in 2007 and 2008 because they played a central role in defining the crisis as it developed.

So, once you have this referenced mortgage pool, you transfer the rights or you actually transfer the title to the special investment vehicle. You then start TRANCHING. *Tranche* is a French word for "slice."

And so we're going to take this mortgage pool (Slide 22) and we're going to carve it up into different pieces. We're going to define those pieces by how each one handles credit losses and cash losses.

In other words, the stuff at the bottom, the equity piece, and the mezzanine pieces, they are the ones that are going to take the losses first. So if anybody defaults in that mortgage pool, if any of the mortgagers stop paying, they are going to go to the lower pieces first. So the equity piece is the one that's going to get wiped out first if there are a lot of defaults. The junior mezzanine. And then if there is a tremendous amount of defaults, eventually you might actually get into the senior piece.

I haven't drawn these to scale. Typically, the way these worked was that the senior piece, the stuff at the top, the one that is most protected, would be about 85–90% of the pool. So the vast majority went into the senior piece. The mezzanines and the equity piece were smaller pieces of it.

Erik: And, Jeff, when you talk about tranching, or slicing, what we're really talking about is slicing these mortgages and repackaging them as bonds that can be sold to investors as fixed-income securities. Is that correct?

Jeff: Yes, and not just fixed-income securities, but fixed-income with defined risk characteristics. That was the selling point for Wall Street in putting these things together: That you'd have an equity piece that had defined characteristics, and, because it was first-line for losses, it would pay an above-market interest rate. It had defined characteristics that pension funds and insurance companies love. Even though it was a higher-risk piece, they were rewarded for it by getting a higher interest rate.

These are mortgage bonds that were created off a pool. And the pool works in what's called the waterfall fashion, where defaults and cash flows are assigned according to each one of these mortgage bond pieces.

On Slide 23 we see what's called the "thickness" of each of these various junior pieces, whether it's the equity or the mezzanine, defines how much protection there is in the piece above it. In other words, if the equity piece is 2 or 3%, there is a little bit of overcollateralization at the start. Then as losses accumulate they have to take out each of the tranches above before you start experiencing losses further up the structure.

So when you get into the senior mezzanine piece, you have quite a bit of thickness in it, which acts as credit protection from any losses. And when you get into the top level of the piece, the senior piece, there should be – we're talking about 10% in the mezzanines and the equity. That's a lot of protection, so that what happens is the senior piece becomes almost like a riskless mortgage bond.

Erik: Correct me if I'm wrong, but, as we move to Slide 24 where you show outside investors coming in, this is what I'll describe cynically as I remember it – basically, you tranche these mortgages into very complex structures that most people don't understand. And then you sell off this risk based on the ability of different investors to understand what they're buying, many of them not being sure, and they don't really understand what risk they're taking.

Is that basically what's going on here?

Jeff: Yes, and that's, I think, a lot of what happened. Again, I think people, especially in the financial services industry – insurance companies, and pension funds, who were the primary buyers of all of this stuff – fell in love with the mathematics of it.

Again, these were put together primarily because the Wall Street sponsoring firm would say these things have defined risk characteristics. Yes, the equity pieces were the most risky, but we have all of this mathematics behind it that shows you just exactly how risky it is. So it was kind of easy to sell these things because it looks like these things are very predictable – even though the lower level of the structure meant they were more risky – because they were mathematically defined.

I should say a lot of these were custom Bespoke pieces too. Say you were an insurance company and you had a defined risk characteristic that you wanted to meet under your particular mandate, you could go to a Wall Street broker and say these are the exact characteristics I want.

And they would create a mezzanine or an equity piece exactly the way you wanted it to be. You know, however much thickness you required, however many other characteristics you wanted to define, whether it be volatility or anything else, especially correlation (as we'll see).

What happened was that everybody thought this was a great idea. There was no risk here, because everything was defined in exactly the way that would act in a predictable fashion.

Erik: Okay so up through Slide 24 we've now sold off the junk stuff at the bottom to outside investors. What happens to the senior piece at the top, which is the lion's share of that mortgage pool?

Jeff: That was a problem for Wall Street. Because it's easier to sell off the smaller stuff, because of the way we talked about, but it left – again, I haven't drawn these things to scale – the senior piece, which is a riskless thing. But it's also immense. And if you're talking about a multi-billion dollar mortgage pool, it's not easy to sell a mortgage bond that is perceived to be riskless that is several billion dollars in size.

So how do we dispose of this thing? Because we don't want to retain it. We've created the thing. We wanted to sell it to somebody else. So the idea was, how do we get rid of this massive senior piece that's left over after all the lower levels have been sold to outside investors?

If you go to Slide 26, what you see is the idea was relatively quite simple: Why don't we just tranche the senior piece? If we're going to slice and dice the whole thing, why not slice and dice parts of it too?

On Slide 27, what they came up with was the idea of what's called a leveraged super senior. The way you get to a leveraged super senior is you take that senior piece that's left over, you cut that up, you cut a couple of slices off of that which are smaller and, again, easier to sell because they are now senior pieces too, but they are smaller in size. And what's left over after those go away is you have this super senior piece.

Erik: So, moving on to Slide 28, Jeff, I see that, not only is the super senior big tranche AAA-rated, but the senior tranche below it, the small one, is also AAA-rated. It seems to me like, again, it's going to be hard to sell the bigger one if it's lower yielding when the smaller green one is also AAA-rated. If I can get a triple a rating in a better yield, why would I get the lower yield on the larger piece?

Jeff: And that's exactly what the idea behind the leveraged super senior was: How do we make this attractive to somebody who would otherwise look at that and say, first of all, it's too big, and second of all, it's not really attractive?

So the way they increased the attractiveness and the ability to sell it off of the special investment vehicle was (Slide 29) – now I have this leveraged super senior. Going into Slide 30, is we'll tranche that too.

The way you did that was you approached an outside investor and said, okay, we have this multi-billion-dollar leveraged super senior. It's AAA-rated, it's riskless, there's never going to be a default here. It's going to pay a low coupon. But how you can boost your coupon is you put up

just a small part of the overall part of value. Let's say it's a billion-dollar leveraged super senior. You give me $100 million of your own equity capital, which I'll take as the equity piece for your equity putdown for this leveraged super senior.

On Slide 31, the other 90% you are going to borrow in money markets. So you are leveraging your returns. Because this is, first of all, it's eminently – you could put this in any repo market you want because, if you put it up as collateral, it's pristine collateral. It's a leveraged super senior AAA-rated thing. And, number two, because you are borrowing in these money markets, you can get a lower funding cost, which allows you to have cheap leverage in order to boost your return.

So we're kind of doing a maturity transformation within a maturity transformation here. We're almost recreating the simple bank model, inside of the securitization, where the capital put up by this outside investor is pretty thin and small. And where most of the funding for taking over what's left to the mortgage pool at this point comes in from borrowing in these money markets, including asset-backed commercial paper.

That's the reason why the asset-backed commercial paper market was vital at this time, because it was funding an immense portion of these various mortgage bond structures.

Erik: Okay, Jeff. So now we're finally getting to where asset-backed securities commercial paper comes into this story. Where does the money come from to get rid of this super senior tranche? The leveraged super senior tranche, which is the safest, therefore the lowest yielding. Nobody wants it because, even though it's safest, it's also lowest yielding.

The answer is they are getting the money from the asset-backed commercial paper market. And then the investor is getting a sweetheart of a deal on the equity tranche below it. And, even though it's an equity tranche, it is an equity tranche leveraged on a super senior, which is inherently super-safe.

But, the thing is, there is still leverage here. So there has to be some degree of risk. What risk exists and what protections are in place in order to protect against those risks?

Jeff: Even if you're trying to sell this to somebody who is no longer reluctant in terms of returns, as you point out, correctly, there is still some risk here. And the risk we're talking about is liquidity risk. What happens if, for example, the commercial paper market doesn't want your paper anymore? Or it doesn't want anything to do with it?

At the time when these things were being sold, the thought was oh, that will never happen. But, anyway, just to put your mind at ease (Slide 32), what happened was the sponsors behind these special investment vehicles – these are the big banks like Citigroup and JP Morgan and all the rest, big Wall Street firms. Not just American banks. You're talking about banks all over the world that were doing these things, especially in Europe.

They would say, okay, if you are concerned about the commercial paper market, or repo, or whatever other funding leverages you want to employ, we'll stand behind it. In other words, if you have problems with commercial paper at any point, we'll offer you this liquidity backstop, which essentially says, we'll fund this thing ourselves if you ever run into problems in these money markets.

These banks thought at the time that would never happen, so we'll just give these guarantees out to everybody – because, why not? We don't expect that would ever happen, that these asset-back commercial paper markets would ever break down in any substantial way that would trigger a liquidity backstop.

So these liquidity backstops became very widespread, number one. And, number two, obviously it tied the banks into this portion of these MBS structures, which was an important element in the developing contagion throughout 2007 and 2008.

Erik: Jeff, I think this is a really important point to stress because a lot of people don't understand that, if the banks had sold these mortgage-backed securities and other associated mortgage-backed products, then why was the bank at risk if somebody else had already bought that risk from the bank? But what you're saying, Jeff, is the banks looked at the risk of the commercial paper market freezing up. In other words, exactly what did in fact happen, starting on August 9 of 2007.

They said, nah, that could never happen. So they basically wrote disaster insurance with no reserves. They told all of their customers, look, forget about that. We want to overcome that sales objection because we know it's not a realistic risk. So we're just going to backstop you, even though we have not associated any reserves or made any plan for what we would do if there was a systematic failure like that. We're going to go ahead and offer you that backstop in the contract.

Then August 9 comes along and all of a sudden, that marker is being called in. Not just by one buyer, but by all the buyers in the system. They're saying, backstop us, we can't get the commercial paper funding in order to continue financing this thing. Hey, bank that sold it to me, you've got to back me up because you promised you would. And the banks suddenly can't do that.

Is that basically what's going on here?

Jeff: That's a lot of what happened in terms of contagion. Because these banks, as you pointed out Erik, were very uncareful in how they issued this backstop, and how widespread they were – because they never thought they would ever be triggered, they never had any reserves for them.

And when they were triggered, there were an inordinate number of complications – not just because they weren't prepared for it, but who actually owned the backstop? Who actually was

guaranteeing the backstop? Was it the SIV? Was it the sponsoring bank?

And this gets into the idea between on-balance sheet stuff and off-balance sheet stuff. These special investment vehicles were all off-balance sheet. And so, when you get into the period of the crisis at 2007 and forward, it wasn't very straightforward how all of this stuff was supposed to work, because it was never supposed to be that way.

And nobody really stopped and thought, what would happen if the thing we think is impossible actually happens? So it was an inherent weakness that was supposed to be one of the primary strengths of the system.

Erik: Okay, Jeff, now we're saying that we're going to fund these things by borrowing in the commercial paper market. It seems to me, from what I understand of the commercial paper market, if you're going to pledge an asset you've got to have a way of valuing that asset. And these big structures are illiquid. So how do we put a value on it in order to market its value for the sake of using commercial paper to fund it?

Jeff: If we go to Slide 33, you're exactly right. Especially if the counterparty on the other side of the commercial paper, the one buying the paper, is a money market fund. Remember, money market funds have a requirement where they have to value their assets on a daily basis, and to make sure that the values of their assets are completely safe.

And they also have to – whatever they are buying in terms of commercial paper has to meet certain thresholds of standards to be eligible to be purchased by the money market fund. So we have to have some way of – you know, we're talking about a huge part of the structure, but these are illiquid mortgages that don't trade. So how do we value these things? How do we create prices for them? How do we create prices for them on a daily basis?

And it's not just money market funds and commercial paper either. These leveraged super senior MBS pieces were also pledged in repo markets. As a repo counterparty, you want to know what's the volatility in the price of the collateral you're obtaining? What is the pricing history for a leveraged super senior?

So we have to have a way to price these things. And we have to have a way to value these things so that they are acceptable in these various parts of the money markets.

If you go to Slide 34, you need to start having estimates not just for how do we put together a price of something that is illiquid. You need to estimate default probabilities and delinquencies. You have to estimate recovery rates. You have to estimate (Slide 35) the big one of all, which is correlation.

And the way they came up with of doing this was they would track some of the things that did trade, like ABX indices, which were credit default swaps of various mortgage bonds and various mortgage indices that did trade on a daily basis and that were the most liquid parts of these

mortgage markets.

Correlation is a very important point here (Slide 36). Because correlation defines – especially at the ends – how prices change and how fast they change. Or what's called "gamma." And you get into a situation called negative convexity.

What happened was, in actual trading markets, you had what was called a correlation skew or correlation "smile," where the senior parts and the equity pieces would often exhibit a higher correlation in terms of their pricing than in the middle parts.

Erik: Jeff, before you go on, I want to understand here, why are we focusing so much on correlation as opposed to valuation. It seems to me it's very obvious and clear, if we know what the value of the asset is, that tells us what we can get for collateral and so forth.

Why is correlation so important? And, particularly, what do you mean by implied correlation versus actual correlation? What is that telling us?

Jeff: Well, correlation, as it turns out, is probably the most important dimension of all of these things. And it's intuitive, too, if you think about it in the sense of, okay, we have an equity piece that's at the bottom of the structure. It takes all of the losses first. If the correlation is, say, 100%, that's either good or very bad. Because 100% correlation means everybody defaults or nobody does.

Conversely, you have the same problem on the other side, which is the senior piece. The higher the correlation gets, and you are a senior investor, or a super senior, or leveraged super senior investor, higher correlation means that all of that protection you supposedly had beneath you, in all of those structures, the higher the correlation goes, the greater the probability that those things get wiped out. So higher correlation means more people default, which means the greater probability you're going to end up taking a risk.

What we mean by implied correlation talks about what we just said in terms of how do you value these things that don't trade?

And when we look at these credit default swaps on these various ABX indices, that do trade. What happened was in 2000 a guy by the name of David X. Li came up with a Gaussian copula way of taking correlation out of the market. It's very much like the Black-Scholes way of implied volatility. We don't know what correlation is because we can't observe it, but we have to assume that people who are trading in these markets do know what correlation is. And therefore, we just need to know how to extract it from these various credit default swaps.

So the default swap pieces that did trade, we used this Gaussian copula in order to tell us what the implied correlation is of various mortgage structure and various mortgage products. And then we'd use those to price, in correlation terms, each of these various parts of the mortgage bond structure.

In a lot of cases, quoted prices of these mortgage structures were done in correlation. And the problem was, when you have a correlation smile that says that the pricing changes in the ends – whether it be the equity piece or the super senior piece – occurs more quickly than it does in the middle. So if correlation is rising, it's going to affect the prices in the ends in much greater gamma, in a much faster fashion with much more acceleration, than it will in the middle.

And something that happened in all of these – I don't want to say all, but most of these mortgage products – it exhibited this correlation smile which meant that there was a very big risk in terms of changing correlation probabilities that affected these prices more and more substantially and dynamically than they did in the middle.

Erik: Okay, Jeff, so what we've discussed for the last several minutes has all been about mortgages and the structure of these asset-backed securities that contain groups of mortgages. We're going to eventually relate this into the Eurodollar system.

But I think the connection between the Eurodollar system and those asset-backed securities really comes through the credit default swap mechanism. Is that right? And, if so, where do the credit default swaps fit in to this story?

Jeff: If you go to Slide 37, we're starting to get into the default swap market and what that meant. For extracting valuable pieces of information from the market, as implied correlation turned out to be for these massive super senior pieces, the status and the functioning of the credit default swap market is vital toward that, right?

If we have a healthy market, then we can be reasonably assured that the pricing dimensions that we're getting, this implied correlation, is a good signal. And, therefore, we have solid prices.

And, again, if you look at the credit default swap market (Slide 37), it's growing exponentially. Just like the asset-backed commercial paper market was. In one part, because of what we're talking about here in securitization and leveraged super seniors. And in another part, what we talked about in Eurodollar University Season 1 – a lot of credit default swaps that were being used for regulatory capital relief, as we talked about then.

So these things combined where we have this rapidly growing, robust market that everybody thought was a permanently robust market and, therefore, it was a robust way of pricing these things that are very hard to price. If we're using credit default swaps to establish these principal parameters, and the market is assumed to be a very valid signal for doing so, then we don't really have much of a problem.

Erik: Well, Jeff, as I look here at Slide 37, it is eerily reminiscent of – I think it was Slide 15 – if the line goes up, the blue line goes up on that angle, right into August 9 of 2007. I've got a feeling it's going to take a turn at that point. And, sure enough, on Slide 38 that's exactly what

happened. What's going on here?

Jeff: Again, it belies the notion that the cut in the federal funds target from 5.25% to 1% was stimulus. Because it obviously had no effect in the credit default swap market. And if the credit default swap market is very important in terms of pricing these massive pieces of these various mortgage bond structures, what does that do in terms of collateral effects across the entire system? Imagine that it's not just some isolated case where you can say subprime is contained. These are going to have massive ramifications for everybody. Because, as we talked about before, not just liquidity-backed stock, but the whole issue of off-balance sheet/on-balance sheet is – who is exposed to all of this stuff if it does start to go awry?

When we start talking about the credit default swap market itself, it's almost like a self-reinforcing process. Because we are using these things to price these big, massive structure, and, therefore, potential exposures.

But it's also used as protection against the same thing. So if the pricing starts to go haywire, then the hedging ability and then the desire for hedging start to go haywire. Which causes the pricing to go further haywire. Which causes the hedging thing to go further haywire. And it becomes a self-reinforcing spiral where there is no way out of it.

So the idea that the credit default swap market in particular was going to be functioning and robust for a very long period of time – and then when it did start to go awry, it was a bigger problem than just credit default swaps themselves.

Erik: Okay, as I look at this blue line here, what's going on in terms of credit default swaps is we're basically tracking up into August of 2007. That's the point where everybody started getting concerned. Second or third quarter of 2007 is when the adjustable rate mortgage resets, based on high interest rates.

The backdrop is there are higher interest rates. That's going to cause mortgages to reset at a higher payment. That's going to cause defaults. The Fed responds and says, wait a minute, if that's the problem, no problem. Don't worry about it. We're just going to dramatically and aggressively lower interest rates so that these mortgage resets won't be a problem.

They do lower interest rates. Credit default swaps ain't buying it. They've already figured out there is a problem and they know that simply reducing interest rates – even though on the surface that should solve the problem – doesn't do anything to alleviate the tension in the credit default swap market.

Jeff: And it's important to point out here that the default swap market – again, as we talked about before – was using implied correlation. And the way that Gaussian copula worked in the way of extracted correlation from these things was that it looked at various credit default swap curves of these ABX indices and other things, the stuff that does trade.

And what it inferred from correlation was, if these curves started to look similar, it therefore thought, well, that's correlation then. These things are correlated and therefore we're seeing a rising correlation across all of these mortgage loans and across all of these mortgage markets.

But, as the default swap market became more and more illiquid, by just the very nature of this liquidity issue, these default swap curves started to look like each other. So the way we priced these things, through Gaussian copula and implied correlation, was that, as it became more and more illiquid, the more it looked like correlation was rising.

Again, when you think about the correlation smile in this super senior piece as well as the equity, that meant that the prices were going haywire more at the ends than in the middle. And at the end – which was the leveraged super senior, these large pieces of the mortgage structure, that's where this riskless thing, this thing that we thought was completely risk-free, AAA-rated, guaranteed whatever – is where the pricing issue in credit default swap markets hit the most. Where it hit the hardest was in these enormous pieces that everybody thought were risk-free.

So it's a liquidity issue as much as anything else. More so then even a credit issue. Because this irregularity in the default swap market defined further irregularity in pricing. And as these prices started to go haywire, what do you do as a bank? Or, as whomever it is that owns this leveraged super senior where the price is starting to go farther and farther against you, what do you have to do?

You wanna buy hedging against it, which is either an interest rate swap or a further credit default swap. And as you demand more hedges in the default swap market, and money dealers who are supplying credit default swaps are more and more reluctant to issue them – because they now see that there's a nontrivial risk that if I do give you a credit default swap, I may actually have to pay out on it.

That's an important part of this too. Just like the liquidity backstops, none of these banks ever thought they would ever be triggered when they were writing credit default swaps for all of the various reasons up until 2007. They never once thought that they would ever have to pay out a nickel on it. Especially anything that's written on one of these leveraged super seniors that are perceived to be the safest thing that's ever been constructed.

You have a thing where you were very willing to write credit default swaps and then, all of a sudden, well, maybe, there is a small probability you might have to pay out. Now you are reluctant. So there is no way to price these things that isn't going haywire with the credit default swap market.

At the same time, there is no way to hedge against that adverse price movement. And it became, from there, a self-reinforcing spiral. Because, as all of this stuff was going on in the pricing system, nobody wants to issue default swaps. Which means you can't hedge against it, which means you started to get into fire-sale situations and other things that further depressed

the prices of even the stuff that does trade.

Erik: Now, Jeff, as I look to Slide 42, for the first time I actually remember August 9. I remember at that time a lot of investors I knew, who were more experienced than I, were very concerned about news coming out of BNP Paribas overnight.

And I didn't really understand what they were talking about or what was going on. But clearly, that was on August 9, 2007, as you say here, at 2:44 AM (ET). What happened there? And how does it fit into this story?

Jeff: On August 9, there are a couple of things that went on. But what happened with BNP was probably the trigger. because it happened very early in European trading that day. A couple of BNP's funds that had invested in commercial paper of these US ABSs decided they were going to freeze them, which meant that they weren't going to value them. So, as the money market investor, if the sponsor of the money market fund says I'm no longer going to value my money market fund, you're going to start to panic. Because that tells you something is not right there.

So that was the trigger. It was, oh my God, all of a sudden this money market fund, which is supposed to be safe itself, is exposed to subprime. That's all anybody ever knew – that's all anybody ever cared to know. They didn't care how or why or what. But, all of a sudden, there is a problem in the money market funds that has something to do with US mortgages. And that was it. It was a trigger where everything started to freeze up.

They even said in their statement that it was a complete evaporation of liquidity in certain market segments. And certain market segments that they referred to in their statement are what we just talked about with pricing, correlation, and all this stuff in the credit default swap market.

They couldn't get what they thought was an accurate price of the collateral backing the asset-backed commercial paper that they'd bought. Because all of the problems with these correlation smiles, all of the problems with illiquidity in the credit default swap market, were hitting these leveraged super senior pieces such that it was causing their prices to drop well below fair value, or what everybody thought was fair value, or fundamental value.

So BNP said, okay, the market price that we're inferring here is X but we believe it's much higher than X, or even close to par, so we don't know what to do. So we're just not going to calculate the net asset value of our money market fund. And, rather than reassure anybody, that caused an enormous amount of collateral damage across multiple market segments.

Erik: So, Jeff, prior to that event, most investors – and that includes most institutional investors – really never would have made a connection between money market funds that everybody knows are safe and completely risk-free, and subprime mortgages, which everybody knows are a point of serious concern at that point in 2007. Everybody knew something was

going on there with these mortgage-backed securities.

Basically what happened here is BNP Paribas says, in the middle of the night New York time, hey folks, we have realized that our super-duper safe money market fund that's guaranteed to be stable no matter what actually has a risk associated with exposure to subprime mortgages – when most people had no idea that any money market fund was exposed to subprime mortgages. Suddenly the world found out that, yes, subprime means there is a risk of money market funds breaking the buck, no longer having a value of $1 per share, which they strive very hard to have no matter what.

Is that essentially what's going on here?

Jeff: Yes. Remember, what we were talking about here is the asset-backed commercial paper. Because that's what this money market fund had invested in. It didn't invest in the actual mortgage structure. It had invested in the leverage provided to the leveraged super senior part of these various mortgage structures.

If you want to understand why the asset-backed commercial paper market just completely collapsed the week of August 9, this is it. Because, not only was BNP going to be hit with a bunch of redemptions, and that money market fund was going to undergo tremendous scrutiny by everybody, who were going to look at the same thing. Whatever you were investing in that you said was completely safe and backed by tremendously pristine collateral is now subject to reinterpretation based on the fact that we have this problem with BNP and their relationship to some kind of ABS commercial paper that nobody had ever heard of before.

So that's why these money market funds started to reject commercial paper of asset-backed securities. Because there was exposure there that their investors did not want. Nor did they want it. Because of a lot of the ways they misunderstood exactly what was going on in these leveraged super senior pieces.

And, to be fair, they didn't really care nor should they have cared. Because all they wanted to know was, what is that stuff that's backing this commercial paper I'm investing in? And if it's going to go haywire in terms of pricing, I don't really care why. All I need to know is that it's going haywire in pricing and therefore exposes my fund to all of this stuff that people are hearing about in whispers and rumors.

Erik: And, of course, that creates a massive feedback loop. Because, now, all of the sources of funding for these super seniors – which are not really the risky part of the whole subprime story – but there are still mortgage-backed entities which suddenly have become classified categorically across the board as toxic waste that no money market fund is going to touch with a ten-foot pole. That means their funding has, basically, been cut off.

All of a sudden, the banks are being called upon to stand up behind that backstop that they so graciously offered to provide because they knew that it was impossible ever for anything to

happen – until it happened at 2:44 AM on August 9.

Jeff: Exactly. And it wasn't just the banks that provided the liquidity backstops either. It caused an enormous scramble for alternate means of funding. Because, if you are the guy who owns these leveraged super senior pieces and you've only put up 10% of that whole point, and all of a sudden it's no longer negotiable in the commercial paper market, you can't sell commercial paper against it. What are you going to do? You've got to do something. If you're on the phone with Citibank who provided you with the liquidity backstop, and they are starting to balk because they don't really want to provide the liquidity backstop, what do you do?

As you pointed out, Erik, this triggered an enormous set of circumstances that were all adverse in every kind of way, as it happened basically in the same format as a margin call. When you have margin calls, it triggers other margin calls which triggers other margin calls. And it unleashes this snowball effect whereby these things start to go haywire, as we said at the outset.

The LIBOR, effective federal funds, all of that stuff starts to go crazy because these things that everybody thought were a solid part of a money market, a global, seamless money market, started to pull apart and fragment. What do you do in those kinds of situations? And what does the Federal Reserve do? Well, it lowers the federal funds rate. That doesn't help.

Erik: So, in other words, this really explains how that credit contagion happened so quickly during the crisis, is a really big, big source of funding gets cut off. That means everybody who has exposure to those equity tranches has to do everything they can possibly think of to chase down every possible source of borrowing available to them, anywhere in any market, trying to figure out how they are going to cover what was cut off from the asset-backed commercial paper market. And they're scrambling and they're reaching into every credit market looking for somebody who's willing to give them money.

Is that basically what happened next?

Jeff: Yeah. And it's not just them. You're also competing against the banks who are trying to fund their liquidity backstop. So it becomes this incestuous circle where everybody is just scrambling for funding. And, as you pointed out before, everything becomes classified as toxic. In these kinds of situations, nobody cares. There is no discretion anymore. It's a matter of – it's almost like everybody for themselves. And, again, that's an important part of what we're talking about here. These things start to break down and fragment.

On Slide 44, for example, when you think about it in terms of the Eurodollar system, here we had BNP Paribas's money market funds – these were European money market funds domiciled in France and Lichtenstein, sponsored by a French bank, that were invested in US dollars, ABS commercial paper, and other things, all intended to be Euro-denominated money market things.

This is a global problem. This is not just a problem with Wall Street. This is not just a problem with Citibank or JP Morgan or any of those. This is an entire global problem, and it all runs through this Eurodollar system of these interconnected channels where what's supposed to look like a monolithic whole is breaking down into pieces and nobody knows what to do with these various –

How do you operate in an environment where the thing doesn't work like it used to? It's an immense problem.

Erik: Okay, Jeff, I want to clarify something here. Up until this moment on August 9, almost nobody in the financial system, including heavyweight institutional investors, had any mental connection in their head whatsoever between money market funds – which are the safest, securest, guaranteed, nothing-can-go-wrong safe place to put your money – and subprime, which everybody knew was a hot potato. There was a problem with subprimes.

So my question is, did that mean that there really was a problem with these super senior secureds that was creating credit risk to the money market funds? Is that what was going on here? Or was it just a matter of perception of, uh-oh, we've got a connection to subprime, freaking people out and creating a liquidity crisis that probably really didn't have anything to do with creditworthiness? It was just nobody wants to touch anything that there is even a rumor might be connected to subprime?

Which was it?

Jeff: I think you're exactly right, Erik. The whole subprime issue was way overdone. And what we're really talking about here in all of this stuff, going forward as well as going backward, is liquidity risk. These leveraged super senior pieces were in fact safe. To my knowledge, not a single one ever experienced a single cash loss in the entire history of the panic.

But what happened was, as you point out, people didn't care. And the reason they didn't care was because all of this stuff started to go haywire all at once. Once that genie was let out of the bottle, which was liquidity risk, driving pricing and all sorts of irregularities down the line, it created the perception that this was a subprime thing and therefore a credit problem.

What was really liquidity risk was being inferred as credit risk, when, in fact, there was very little credit risk. These things performed as they were designed to, except for the way they were funded. Everybody thought that there was a tremendous amount of redundancies in all of these structures and systems, and therefore liquidity risk was low and credit risk was low. Well, it turned out that credit risk was low, but the liquidity risk was poorly understood because of the way that the Eurodollar system operated globally in terms of the way it was easily fragmented in these kinds of situations.

Erik: Okay, Jeff, so the big picture here is that, although these super senior secured mortgage tranches really don't have a lot of credit risk, and none of them ever defaulted on anything,

there is suddenly massive, massive liquidity risk because everybody is scared. They have been labeled as toxic, whether they are toxic or not.

I've got to believe there is a transmission mechanism. If people think they are toxic and nobody has got funding, that's got to lead to stress in the repo market. What's going on here on Slide 45?

Jeff: When you talk about the repo market, think of yourself as a repo counterparty. In other words, you're lending cash against collateral. You really don't care as much about the credit risk of the collateral you will receive. You only care because it's usually a short-term overnight transaction. You only care about how much price it tends to move on a daily basis, the volatility of the collateral you will receive as security for your cash.

So if these mortgage bonds and these leveraged super senior pieces start to exhibit higher than normal pricing irregularities – it doesn't matter what direction either – which raises the volatility, all of a sudden you're going to be more reluctant, regardless of credit risk, regardless of perception of subprime versus prime or whatever else. Because it exhibits more price volatility, you're going to demand a higher haircut.

And if it gets going too far, as it did in 2008, you're not going to take any mortgage bond collateral at all. It has nothing to do with credit risk. Again, it's all about liquidity and the fact that illiquid pricing is causing increase in perceived volatility. Which then presents a collateral issue across the entire repo market, in the mortgage bond part of it.

Because mortgage bonds, which used to be treated as good as Treasuries because they were all AAA-rated – they were low-risk or perceived that way – all of a sudden they are being perceived as something else entirely. And it puts tremendous strain on all of the rest of the collateral pools available, including the US Treasury market.

So that's why, in the beginning of 2007, and especially during these periods of more intense strain, you see these fails in the Treasury part of the repo markets because the MBS piece of the repo market was becoming more and more problematic. And, in certain parts of the MBS collateral system, these were becoming non-negotiable on any terms.

So now we're transitioning not just commercial paper, not just credit default swaps. Now we've got the repo market involved, on a basis that has nothing to do with credit risk at all.

Erik: Okay, to summarized at this point, the guys on the repo desk are hearing rumors that there may be a connection to subprime. They are not sure whether they understand what that connection is. But all they need to hear is there might be a connection and that's got people freaked out.

So everybody is freaking out everywhere. Nobody trusts the liquidity of anything and things are starting to break down.

MUSIC

Needless to say, Jeff is really on a roll here. So it was a real challenge in the editing room to decide where to insert an episode break. We're going to leave it there for this episode. But be sure to tune back in for the next episode where Jeff will explain how gold, serving as collateral of last resort, starts to play into this story as the repo system for paper assets begins breaking down.

Be sure to tune in again for Part 6 in what has now become a seven-part series overall. We'll pick right up where we just left off. You can find Part 6 as well as the download link for the chart book that accompanies Parts 5, 6, 7 at https://www.macrovoices.com/edu.