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TLDR - If you've ever wanted to know about Repo or the Fed RRP, you have to read it all. If you've ever used the RRP as part of a DD or theory, you really should read it all. If you don't like to read and just prefer to hodl, move along, these aren't the characters you are looking for.

My background. 22.5 years trading repo for a primary dealer (total of three dealers over my career). Won't profess to being an equity guy, but I'll discuss repo all day long.

Repo 101

This essay will explain what repo is to a mild degree and shift to the more popular and present discussion regarding the Fed's Reverse repo.

What is repo?
Repo is short for repurchase agreement. The market is usually called the "Repo market" but what you should understand is that for every "repo" trade, there is a coinciding "reverse repo" trade. Just like ever sale has a buyer and a seller but we call them all "sales". The actual 'What' is an agreement that mimics a lend (repo) and a borrow (reverse repo) of fixed income collateral. It's technically a sale and a purchase but it is quoted in interest rate terms. The transaction is composed of the following parts
Collateral- Bill, bond, note of any variety. Could be a corporate bond or MBS paper or just a plain old treasury note.
Start and End date - the bulk is done overnight but term trades make up at least 25% of trades. Terms are usually limited to 1yr or under but occasionally can be longer. 90% of the trades are 30 days or less.
Interest rate - this is the rate charged for the trade and determines the cost/profits of the trade. This number rarely strays higher than the Fed Funds rate but can go much lower and even negative. (Ponder that, you'll borrow a less liquid bond and give cash and at the end of the trade, get less cash back. Doesn't make sense unless the item is expensive to short)
Par amount - obviously the amount of bonds being repoed
Start price - the mutually agreed starting price of the bond, which determines the value (par * price) of the transaction.
The formula is quite simple (((par * price) * interest rate)/360) * length of trade.
Using this formula you can determine various aspects of repo trading. If you were short a bond, you can insert the variables above and the end result will be how much it will cost you to be short. Knowing that, you'll be able to calculate where you need the price to drop to breakeven on a trade. The price might move down by X but if the cost to borrow was X+Y, you are still losing.

This is the basic math and factors of repo. It gets much more complex but this is Repo 101.

I'll introduce a few terms of repo that I'll use later.

GC - General Collateral - this is the cheapest collateral available in the repo market. It shifts over time, but there are trillions of this stuff available each day (during normal times)

Special - This usually refers to the "on the run" or current treasury notes and bonds such as the 2yr, 5yr, 10yr, etc. These bonds will trade in repo at various rates below the GC rate and can easily be negative. Back in 2008, the Fed had to institute new rules to allow for fails to have negative charges because the system wasn't clearing.

The GC rate is the focus for the Fed. They want it to remain near the Fed Funds rate. You can see a Fed

rate that mimics GC called the BGCR here https://www.newyorkfed.org/markets/reference-rates/bgcr

Why is repo?
Repo was a market that literally created itself. People traded bonds long before there was a repo market. What repo did was make the bond market loads more efficient. It assists in clearing transactions by allowing firms to borrow issues they may be short. The short may not be purposeful, a firm may buy a bond for extended settlement, say 5 days but sell it for normal (1 day) settlement. They don't have a "short position" but they are short for 4 days. To avoid FTD charges, the bond would be borrowed for 4 days. The borrowed bonds are delivered to the firm that was sold to for normal settlement. When the extended bonds are delivered in, they will be sent to the firm who repoed the bonds for those 4 days. Everyone is happy, nothing fails and we move on.

It then built out into its own ecosystem. Repos are short maturity trades that are collateralized thus less risky than many trades in Fixed income. They became a great tool for collateral management as well money market aspects.

There are plenty of risks involved with repo, it is a credit trade. If the firm you are dealing with goes bankrupt, there could be repercussions. Obviously, these transactions are monitored and margined daily to mitigate risks. In addition, the more generic and liquid collateral used, the less risk is involved. Repo volume peaked in 2008, but since then, for obvious reasons, the volume has dropped. I don't think you can find an exact volume, since an overwhelming amount of the trades are between two counterparties and not public info but the USD repo market easily exceeds 6trillion a day, and I'm probably low in that estimate.

Where is repo?
Pretty much anywhere there is fixed income (bond market) you'll find repo. The counterparties involve range from dealers and banks, to REITs and insurance companies , to treasury and money market firms to central banks and other GSEs to Hedge funds and private individuals.

It's not a well known market because it's the plumbing of the fixed income world. The Bond market is the gleaming fixtures you see in the kitchen, some would say the MBS market is the porcelain item you find in the bathroom. The repo market is the piping that connects it all together.

However, repo is limited to larger players due to its credit risk. You can't have a repo desk without a beefy risk/margin department. The biggest risk on repo trades is not the profit/loss of the trade, rather its the risk of your counterparty going under. You won't see smaller hedge funds performing much repo, for there is too much risk to their counterparts. This is the same principle why the Fed's RRP has a very restrictive list of participants, and its was a fraction of the current amount pre-2011. As stated before, the volumes in repo are huge but the profits/losses of the trades are not. It's traded in basis points. If 1% is .01, a basis point is .0001. That's why you see such huge volumes because it takes large trades to make a trade even worthwhile to do. You can experiment with the above calculation and see. Would be quite simple to drop into a spreadsheet and play around with the costs of 10mm trade versus 100mm trade or 1 day trade vs 1 month trade.

To summarize, the repo market is massive and integral to the bond market performing efficiently. It has many applications for various areas of Fixed Income. It's an absolute necessity for larger firms. To use the plumbing analogy, you don't need plumbing in a tent or a shed. A motor home has some, an apartment has more, a house needs a ton and you get it from here.

Now I'll move on to the Fed RRP. I'm going to attempt to dispel as many myths or bad assumptions I often see, so there is more detail than your typical TLDR. I just feel it's necessary because there are so many (bad) assumptions being made that have become mantra in chats when it's based on false data.

The Fed RRP

"Back in the day" this operation wasn't called RRP, it was called matched sales. Everything was the same, it just had a different name. The process was different in the 90s, it wasn't Triparty and it was usually only used when the Fed wanted to announce a tightening of the Fed Funds rate. The Fed Terminal at each primary dealer would sound off and you'd see they were doing matched sales which meant a policy shift.

With the advent of technology, this changed and became the RRP that we currently see.

2009 - When rates hit zero (technically 0-25bps) back in December of 2008, the world was still figuring out how to deal with the GFC and the repercussions crossing all markets. After awhile, money markets started to show some pressure points. With funding so close to zero, all of the collateral that Money Market Funds would usually purchase wasn't available. It's not that there wasn't collateral, it's that it was too expensive for the MMFs. Purchasing a bill yielding .01 doesn't gain their portfolio that much after trade and clearing costs, not to mention operating costs. Usually the Repo market supplies collateral to MMFs but when GC funding approaches zero, the dealers have other opportunities to trade issues slightly lower than zero. It is pointless for a MMF to purchase anything at zero so they were left with very few options to obtain collateral. This near zero funding didn't persist for that long but the problem was noticed and this spawned the inclusion of MMFs into the Fed RRP program.

2011 - Some MMFs as well as a few GSEs and Banks were added to the Fed RRP program. (You can view all the current counterparties approved here. https://www.newyorkfed.org/markets/rrp_counterparties)This was a little anticlimactic since market conditions didn't make the RRP necessary for a few years. It wasn't until September of 2013 that the RRP was used.

Who uses the RRP?
It makes sense to explain who is the predominant user of the RRP before I explain why. Conveniently, the Fed provides all the data from RRP usage broken down by counterparty type. The data starts in 9/2013 and (as of the typing of this DD) goes through 4/1/2021. In October, the data will be released for the most recent explosion in RRP usage. You can find the data at this website
https://apps.newyorkfed.org/markets/autorates/temp

Just click on the data by counterparty link on bottom left.

I'm just going to summarize the total usage to date, anyone with a spreadsheet can do the same from the data provided.

https://imgur.com/a/m2IKxeE

It's quite clear who uses this program, it's 87.7% MMFs.

Now, since people are most interested in the latest points of data that won't be released until October, there is another way to see who is using it, but it's tremendously tedious. You can view the approved MMF list from the link above and view their monthly holding lists. Here is an example from the SPAXX fund's 6/30th holding report. https://imgur.com/a/3ieVLMX

As you can see, they were responsible for 61bln of the RRP that day. Now, doing this is a monumental task, however, u/humanslime already did the bulk of the work for you, you can view it here https://www.reddit.com/r/Superstonk/comments/ogj5tm/who_participated_in_the_june_30th_991_billion_fed/?utm_source=share&utm;_medium=ios_app&utm;_name=iossmf

So, as you can see, from a few different sources, this is a MMF operation. Banks, Dealers, and GSE's have negligible usage amounts. This is VERY important because MMFs are incredibly regulated and have very strict guidelines for investments, I'll discuss this more later.

How is the RRP done?
Participants submit their value (cash) and the Fed supplies the collateral. The collateral used is from the Soma portfolio. https://www.newyorkfed.org/markets/soma-holdings In the past, prior to MMF inclusion, they always used a treasury bill. They are the easiest to price, absent of any coupon payment (this adds a wrinkle into Repo trades when a coupon payment is made during the course of the trade), and have the lowest risk. However, with the volume amounts moving higher, the Fed will use the best/easiest collateral available. The Soma portfolio is also used for the daily borrowing operation, so some collateral in the portfolio is set aside because it's not GC its Special. There is well over 4 trillion in available securities to be lent, so there is no concern on the size of the operation. Estimates of the entire MMF world range between 2-4trln. Only 92 funds are approved and no MMF has ONLY repo trades in their holdings. It varies per fund and per market conditions but it's rarely even 50%. So there isn't a worry on the cap being reached.

This trade is done in Triparty format. This is important and not understood by many. A triparty trade has a third party (hence Tri) involved, a custodial bank. The custodial bank will set up the trade (commonly referred to as a “shell”) and each side of the trade will populate their portion. One side (the one reversing) delivers the cash, the other side delivers the collateral. The custodial bank is in charge of pricing the collateral to ensure that the proper amount is provided as well as intraday margin of the trade, if needed.

The reverse or borrower of the collateral never has physical ownership of the collateral. They “own” it for all financial purposes but they can’t use this collateral in anything but a triparty trade. Meaning, this collateral can NOT be used to cover a short, post for margin, or deliver anywhere outside of the custodial triparty. Even if a participant happened to be short the particular issue that the Fed gives them, they can’t use that collateral to cover the short. It can’t be delivered for it’s in triparty. This is a common mistake I see when theories are created regarding the Fed RRP and how it contributes to other market happenings. There are many theories of how it’s used for margin or short covering but it’s operationally impossible.

The daily operation is overnight only, but keep in mind that an “overnight” trade on a Friday is a 3 day trade with 3 days of interest accrual. The Fed can and has done term versions of the RRP but those are announced ahead of time and do not occur each day like the daily operation.

Upon conclusion of the trade, usually by 9am on the end date, the collateral is returned to the lender and the initial cash + interest is returned to the borrower.

Why use the RRP?
In the past, it was seldom ever needed. Since only primary dealers were eligible and they are usually collateral providers, they rarely needed to borrow collateral. It certainly happened and you can see the sporadic use here https://imgur.com/a/PVBAWAW
With the inclusion of MMFs, there were now counterparties who needed this type of operation and both they and the market in general would benefit.

MMFs have very restrictive guidelines, they must have 99.5% of their investments in either cash, US Treasuries, or Repo that is collateralized with US Treasuries. They must also have a WAM, weighted average maturity of 60 days or less. They also have maturity restrictions of about 1 yr.

If a MMF bought 10units of the 6mo Bill, they would need to buy 41 units of the 1mo Bill to have a WAM of under 60days. This means that MMFs really focus on collateral in the 1-3month range. They can buy longer paper but it has to offset with a larger amount of shorter paper. Repos are a huge benefit to MMFs for they are often overnight trades which have a maturity of 1 day. In normal environments with a positive slopes yield curve (meaning, the longer the maturity the higher the yield) a MMF could try to optimize by purchasing the longest, highest yielding paper they could and offset with repos which are the shortest. It’s “optimal” but not practical and a simple view of any MMF holding lists will show they tend to have a focus in the 1-2 month area with smaller amounts beyond 2 months. The current WAM of the aforementioned SPAXX is 33 days.

What’s different now? (Aka what caused the explosion)
We’ve discussed what MMFs purchase, repo and short maturity treasuries. When cash purchases become limited, which occurs when the yields approach zero, MMFs turn towards repo. Logically, if you were forced to invest in a 1bp yielding instrument, you’d prefer the shortest maturity possible. Why lock up your money for a longer period at the same, crappy level? As you can see here https://imgur.com/a/cDkCggP I’ve circled where the RRP started launching and the same time periods with the 1mo Bill yield as well as the BGCR. Those two rates got so low that the Fed’s RRP became the best source for collateral. You can view the data for these two rates here (bgcr) https://www.newyorkfed.org/markets/reference-rates/bgcr and here (1mo yield) https://fred.stlouisfed.org/series/DGS1MO

The RRP simply became the most reliable source of collateral for the MMFs. There were not better options. You can graph the 3mo Bill yields and they’ll also be below 5bps. An interesting anecdote is that you can see when the Fed changed the award rate to .05, that Bill yields and the BGCR immediately repriced to that level. The RRP sets a floor for funding. Quite obviously, the RRP activity jumped higher when that occurred.

What does it mean?
Well, not much at all from a financial perspective. As long as rates remain low, the RRP will be the best option for MMFs. As soon as short yields or BGCR rates move higher than the award rate for the RPP, MMFs will move towards the higher rate. Could be a few months, it'll likely be many months, it could be measured in years, that really depends on much more macro functions like the economy and inflation.

Some FAQs that come to mind.

Will it stop being used when rates move up?
No. You'll often see the RRP used during reporting dates, month ends and in particular quarter ends. This is a function of dealers reducing balance sheet as much as possible and not needing funding from MMFs. Thus, during those periods, you'll see increased use of the program.

Isn't this really because of SLR rules?
Nope, those don't apply to MMFs, which we've demonstrated are the ones using the program.

Isn't the increased use due to the collateral shortage?
Nope. There is a difference between "shortage" and "expensive". Why would anyone buy a bill yielding 1bp or less? I promise you, if you made yourself a -.01 bid (negative) for paper 3mo and in, you'd have as much paper as you can buy. It's there, there isn't a shortage, it's just too expensive for most to logically buy.

Since some banks also have MMFs, can't they simple funnel their excess cash into the MMFs they own?
Nope. There are a myriad of both regulatory and operational issues that would not allow this to happen.

Can the Fed RRP be used to fulfill margin calls or reuse/rehypothecate the collateral?
Nope, triparty format prohibits these actions from occurring.

Does the Fed RRP effect money supply?
Nope. It has no permanence, it's an overnight trade that reintroduces the cash into the system the next day. In theory, if the RRP were to be used forever, it would have an effect on money supply. But it's a temporary measure and subject to change on a daily basis.

When it reaches XXX amount, is there a problem?
Theoretically, yes. The limits set in place, per fund 80bln, could create more demand than the Fed has eligible collateral.
Realistically, no. The majority of the approved funds have fractions of the 80bln limit in NAV, thus they couldn't take down 80bln without becoming factors larger than they presently are. In addition, the Fed could simply post cash into the triparty instead of collateral so there isn't an issue with the size.

Could the reliance upon the RRP have negative connotations in the future?
Really tough to prognosticate future outcomes, anyone who does is simply theorizing. In my opinion, I don't think it will become an issue. I know that Zoltan has been speaking differently, stating that the reliance could cause issues with how Money Markets function. He could be right, he could be wrong, only time will tell. It certainly won't result in a cataclysmic event, if the Fed were to simply issue more bills, it would neuter his worries. Will the Fed? I don't have a crystal ball.

Hope that answers questions for people. Feel free to comment or post if you have questions.