

Economic Research Note

US: Stay thirsty my friends: the mechanics of liquidity-draining

- Sole aim of Fed “reserve-draining” tools is to exert more precise control over short-term interest rates
- The Term Deposit Facility faces certain drawbacks that will make it a secondary tool
- Increasingly the overnight reverse-repo facility appears to be the go-to reserve-draining facility
- We expect the rate on that tool will be set to 10bp below IOER, and usage capped at \$500 bn-\$1 tn

Decisions the Fed makes about its exit strategy could affect the allocation of trillions of dollars of balance sheet within the financial system. As a byproduct of its asset purchase programs, the Federal Reserve has created over two-and-a-half trillion dollars of reserves—which are a liability of the Fed but an asset of commercial banks. Now, as the Fed reviews its approach for controlling short-term interest rates, technical decisions it makes will influence whether its balance sheet will continue to be funded mostly by commercial banks, or whether money funds will take on more of the Fed’s liabilities.

This note discusses how the exit strategy will affect who holds liabilities of the Federal Reserve and at what interest rate. We begin by diagramming the asset flows involved in various scenarios and then attempt to quantify the magnitudes involved as well as the potential impact on short-term interest rates. Throughout we will highlight where new financial regulations will interact with these flows, and note times when those regulations may act at cross-purposes with the exit strategy. In broad brushstrokes, we are confident in the Fed’s ability to execute its exit strategy—that is, to raise short-term interest rates as needed—and for many investors that may be all that matters. But for other actors in the financial system, the somewhat arcane details of that exit could have massive implications for financial sector balance sheets for years to come.

Leaks in the floor

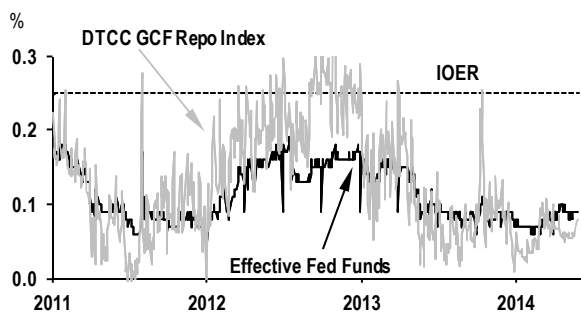
As is well known, the Fed’s various QE programs have involved the purchase of trillions of dollars of securities. Those securities now on the asset side of the Fed balance sheet have their counterpart on the liability side primarily in the form of reserves—which are deposits at the Fed held by banks. Banks have a small, but positive, demand for reserve balances, notably for fulfilling reserve requirements and for clearing interbank payments. In normal times, the Fed would

Federal Reserve balance sheet, April 30, 2014

\$ bn			
Assets	Liabilities and owners' equity		
	Liabilities		
Treasuries	2350	Currency	1229
Agency debt	45		
MBS	1632		
Repurchase agreements	0	Reverse repos	325
Discount window loans	0		
Primary dealer credit	0	Deposits and other items	
Term auction credit	0	Banks (reserves)	2514
CP programs	0	US Treasury	148
Gold and SDRs	16	SFP	0
FX swaps	0	Other liabilities	23
Other items	252	Capital accounts	56
	4296		4296

Source: Federal Reserve

Selected interest rates



Source: Federal Reserve Board, WSJ

adjust the supply of reserve balances to a level where the price to borrow those reserves—the federal funds rate—would be consistent with its monetary policy objectives.

Pre-crisis, the demand for reserve balances was usually under \$20 billion, and the Fed would only need to make moderate adjustments in reserve conditions to affect the fed funds rate. Given the vast increase in reserve balances, conditions of scarcity in the market for reserves will not exist absent truly massive amounts of reserve-draining.

Initially, the solution to this quandary was thought to be the interest on excess reserve rate (IOER): by setting this rate the Fed could set overnight rates in the interbank funds market by fiat, in turn influencing all other dollar-denominated interest rates. It was thought interbank rates would not go below the IOER; hence the name “floor system” for overnight rates, with IOER serving as the floor.

The one wrinkle in this plan was the GSEs (government-sponsored enterprises, including the Federal Home Loan Banks). These institutions were some of the few non-bank institutions with the privilege of having accounts at the Federal Reserve, but at the same time the law is such that they are not allowed to receive interest on their reserve balances in

those accounts. Because of this, they have an incentive to lend into the fed funds market even if the rate they earn in that market is below the IOER, and over the past year the effective federal funds rate has averaged just 8bp. Indeed, data from the NY Fed indicate that the GSEs now account for a vast majority of lending into the fed funds market.

Why don't banks borrow from the GSEs for 8bp and lend to the Fed at IOER, currently 25bp? Two regulatory considerations hinder this apparent arbitrage. First, since 2011 banks have had to pay an FDIC assessment fee on all assets (less tangible equity), not just insured deposits. Since this fee is generally in the range of 10bp to 15bp this requires that borrowing costs need to be a fair bit below 25bp for banks to earn any arbitrage profits.

The fact that many foreign banks operating in the US do not have to pay the FDIC fee explains why they are large holders of reserves: although foreign institutions hold 17% of the asset of the banking system, they hold 49% of the Fed reserve balances. Second, stricter bank leverage ratio requirements may imply that banks will need to hold costly equity capital to conduct this trade (should leverage ratio constraints bind) even though it involves risk-free lending to the Fed. In any event, we can see that changes in the FDIC assessment and in leverage ratios have complicated the Fed's plans for a floor system for overnight rates.

Reserve draining

All of this has caused the effective fed funds rate to disconnect from the IOER rate—the rate that is under the direct control of the Fed. *The main purpose of “reserve draining” is to re-establish a tighter link between the funds rate—and other market interest rates—and the rates that are under direct control of the Fed.*

The IOER was initially thought to be a floor under the fed funds rate. Instead, because of GSE trading activity it was discovered that the floor was “leaky”: reserves were leaking into the funds market, putting downward pressure on the funds rate. Fixing the leak directly would likely require an act of Congress. In lieu of that the Fed is basically seeking to drain reserves from the banking system in order to prevent them from excessively leaking into the funds market.

In what follows we will diagram how this is designed to occur by looking at the balance sheet T-accounts of the three relevant actors: the Federal Reserve, commercial banks, and money market funds. The Fed has three main tools for reserve-draining: the Term Deposit Facility (TDF), large-scale reverse repos, and the overnight repo facility. The latter two are conceptually related and we treat them together.

T-accounts: before hypothetical reserve-draining (\$ bn)

Federal Reserve			
Assets		Liabilities and owners' equity	
Securities	100	Currency	50
		Reserves	45
		Equity	5
100		100	
Banks			
Assets		Liabilities and owners' equity	
Loans	85	Deposits	60
Reserves	45	Borrowing	30
		Equity	40
130		130	
Money Market Funds			
Assets		Liabilities and owners' equity	
Securities	70	Shares	90
Bank deposits	20		
90		90	

Source: J.P. Morgan

T-accounts: after hypothetical TDF auction (\$ bn)

Federal Reserve			
Assets		Liabilities and owners' equity	
Securities	100	Currency	50
		Reserves	25
		Term deposits	20
		Equity	5
100		100	
Banks			
Assets		Liabilities and owners' equity	
Loans	85	Deposits	60
Reserves	25	Borrowing	30
Term deposits	20	Equity	40
130		130	
Money Market Funds			
Assets		Liabilities and owners' equity	
Securities	70	Shares	90
Bank deposits	20		
90		90	

Source: J.P. Morgan

TDF

We start with the simplest reserve-draining tool: the Term Deposit Facility. This is the simplest tool because it only involves two of the three actors: the Fed and the banks. After the Fed conducts a TDF auction, banks that have submitted winning bids will receive term deposits from the Fed, which will be funded by debiting their reserve balances at the Fed. Thus the balance sheet implications are fairly simple: on the liability side of the Fed's balance sheet there will be a decrease in reserves and an increase in term deposits, and on

the asset side of bank balance sheets an increase in term deposits and a decrease in reserves. If this is done in large enough size, the amount of reserves that banks will have available to lend into, or borrow from, the fed funds market will shrink to the point where market forces—i.e., banks’ normal demand for reserves—will raise the funds rate.

There are two issues that may dampen the usefulness of the TDF. First, this facility does nothing to directly address the GSE issue. Instead, it addresses it indirectly: by withdrawing reserves from the banking system the TDF aims to reduce reserves in the system to a level whereby banks’ demand for reserves—due to reserve requirements or need for clearing balances—force them to return to the interbank market to borrow reserves. But recall earlier we said that in normal times that demand was on the order of \$20 billion. While that figure may be somewhat higher now, it is still the case that the Fed would likely need to do a lot, perhaps \$2 trillion, of term deposits to exert meaningful upward pressure on the funds rate. There may be some apprehension at the Fed about such a large increase in the TDF program.

The second concern is that term deposits—by their very nature—are less liquid than reserves. The new liquidity coverage ratio (LCR) regulations that were established in the wake of the crisis require banks to hold a certain amount of highly liquid assets on their balance sheet. Because term deposits don’t have any early withdrawal provisions, they are not treated as an asset that is readily convertible into cash. Under the proposed US rule, these liquid assets should cover the peak daily outflow in a 30-day stress period. If those peak outflows are judged to occur on the first day of a stress scenario, then from an LCR perspective cash is much preferred to term deposits, even if the term is quite short. In order to compensate banks for the punitive regulatory treatment of less liquid term deposits, the TDF rate might need to rise well above IOER, which would add to the Fed’s interest expense. Of course the Fed could re-structure either the term deposits or the liquidity regulations to overcome this problem, but in the current regulatory environment term deposits face some challenges that may hinder their usefulness in the exit.

The repo facility

The Fed has two repo tools, large-scale reverse repos and the overnight reverse repo facility. There are important differences between the two: the former is a fixed-allotment amount with a market-clearing rate, whereas the latter is a (potentially) full-allotment amount at a fixed, Fed-determined, rate. The length of the reverse repo may differ as well: the overnight facility is, of course, overnight, whereas large-scale reverse repos can be overnight or longer term. Despite these differences, how they will affect flows in the financial system

T-accounts: after hypothetical repo facility (\$bn)

Federal Reserve			
Assets		Liabilities and owners' equity	
Securities	100	Currency	50
		Reserves	25
		Reverse repo	20
		Equity	5
100		100	
Banks			
Assets		Liabilities and owners' equity	
Loans	85	Deposits	40
Reserves	25	Borrowing	30
		Equity	40
110		110	
Money Market Funds			
Assets		Liabilities and owners' equity	
Securities	70	Shares	90
Bank deposits	0		
Reverse repo	20		
90		90	

Source: J.P. Morgan

are the same. For concreteness, we will look at the overnight reverse repo facility (or just: the repo facility).

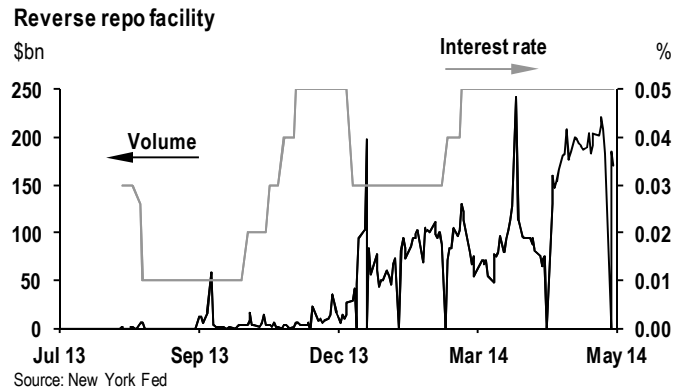
The repo flows are a little more complicated than the TDF flows. In the case of a money fund accessing the facility, the fund will lend “cash”—i.e., reserves—to the Fed, collateralized by Treasury securities from the Fed’s System Open Market Account (SOMA). However, like most non-bank financial institutions, money funds do not have accounts at the Fed. Thus, the transaction needs to be settled by drawing down the reserve balance of the money fund’s clearing bank. As the reserve assets of the clearing bank decrease, so, too, will a corresponding liability of the clearing bank. Initially, this will be deposits that the money fund has at the clearing bank.

The limited experience so far with the repo facility may be instructive. The testing of the repo facility has routinely attracted over \$100 billion in participation. Weeks with particularly high amounts have correspondingly shown up in the Fed’s weekly H.8 bank data report as periods when bank cash assets decline. In particular, foreign banking institutions, which, as mentioned earlier, hold a large share of the reserves in the banking system, experienced large declines in cash assets when participation at the repo facility was high. However, most of the decline in liabilities was in non-deposit liabilities such as commercial paper, possibly signaling that the money funds replaced foreign bank CP holdings with repo lending to the Fed.

At any rate, the end result is that the Fed's balance sheet will see no change in assets, a decrease in reserve liabilities, and an increase in reverse repo liabilities. The balance sheet of the banking system levers down—fewer reserve assets and fewer liabilities. In the aggregate, this should ease any constraint that leverage ratio requirements may exert on the size of bank balance sheets. However, the interaction with new minimum standards for funding and liquidity are more ambiguous. Initially, the decline in bank liabilities may occur in “low quality” financial institution wholesale deposits, which would essentially be a wash when thinking about banks' liquidity position (a reduction in liquid assets, but also a reduction in flighty deposits). Over time it is possible that stickier, high-quality retail deposits leave the banking system in favor of more attractive rates in money funds, which could complicate bank balance sheet management in light of new liquidity standards. The end result for money fund balance sheets is that they hold more assets in the form of lending to the Fed.

As is the case with the TDF, usage of the repo facility drains reserves from the banking system. However, unlike the TDF it may have a more targeted way of influencing the fed funds rate. Whereas to be operative the TDF may need to drain up to two trillion in reserves, the repo facility may influence the funds rate more directly through usage by the GSEs. Economically the repo facility is equivalent to IOER for non-banks, including the GSEs that are otherwise lending into the funds market. If those GSEs, which don't have access to IOER but do have access to the repo facility, choose instead to lend directly to the Fed then they will not put downward pressure on the funds rate. One potential complication is that the GSEs may prefer to unwind their repo transaction early in the day. Due to recent reforms to the tri-party repo system, they may not get their cash back until later in the day, which may be a disincentive to using the repo facility. This is yet another way in which financial stability reforms have interacted in unforeseen ways with the monetary policy framework. Some technical adjustment may be needed to encourage more GSE involvement in the repo facility.

The early evidence from its testing phase indicates the repo facility may be a good tool for controlling overnight interest rates and addressing some of the leaky floor issues that have bedeviled the Fed. What are the drawbacks? In a recent speech NY Fed President Dudley highlighted two such drawbacks. The first is that the repo facility has the potential to foster a rapid expansion of the money fund industry, a sector that Fed officials consider a key part of the shadow banking sector and one that is, in their view, vastly under-regulated (just last year all 12 presidents of the regional Reserve Banks addressed a letter to the FSOC urging more money fund regulation). Allowing unbounded growth in the repo facility would make the Fed an accomplice in the growth



of the money fund sector. A related concern is that growth in money fund balance sheets could lead to a sudden decline in bank balance sheets, which might have unintended consequences for credit intermediation. For example, depending on their funding profile, a sudden shortfall in reserve assets held by the banking system could lead to a scramble for other high-quality liquid assets—potentially to the detriment of better uses for bank balance sheets.

The second main drawback is that there is a possibility the repo facility intensifies the risk of a financial run. By creating a safe lending outlet, the repo facility might enable investors to run for the Fed at the first sign of panic, and dump non-Fed assets at fire sale prices. Treasury securities currently function as this flight-to-safety destination, but note that in a panic the price of Treasury securities will rise, penalizing investors who run to Treasuries, and thus slowing the flight to safety. The repo facility has no built-in mechanism to cause panicky investors to face an upward-sloping supply curve. Finally, note that this run risk only exists if, in normal times, the repo facility is not being used up to its capacity.

The choices ahead

Given the preceding discussion, what do we think the Fed will choose to do? First, it seems pretty likely that the TDF will not be a central part of the exit. A “belt-and-suspenders” philosophy may warrant ramping up the TDF as the Fed gets on the exit ramp, but given the previously mentioned limitations we would be surprised if it were scaled up to more than a few hundred billion dollars. Similarly, the large-scale term reverse repo program will also play second fiddle; as with the TDF we would expect some usage in the exit, but not a central role.

That central role will likely be reserved for the repo facility. In utilizing the repo facility the Fed faces decisions about two variables: the size of the facility and the repo rate. One might think that, like an ordinary market, it would suffice to set the price or the quantity, but not both. Hopefully the preceding discussion has made clear that the Fed is dealing with

anything but an ordinary market. The myriad goals and constraints facing the Fed impel it to operate with as many levers as possible. We discuss the two policy parameters in turn.

Facility size. In his talk on this topic, Dudley mentioned caps on counterparties or on the overall size of the program to address some of the concerns about the repo facility. We would be surprised if the overall cap were below \$500 billion; after all, in just the testing phase the repo facility has routinely seen usage above \$200 billion. How about on the upside? Any cap over \$1.5 trillion would seem to be redundant—at that point, in for a dime in for a dollar (or \$2.5 trillion). Instead, \$1 trillion seems to us a more reasonable upper end of the range for a facility cap. A few other considerations support this. The Fed may be less concerned about the type of bank disintermediation that Dudley mentioned if the decline in bank reserves were concentrated in foreign banking offices, as this may be merely earning a spread in the absence of an FDIC fee. As these institutions likely hold around \$1.4 trillion in reserves, a cap of \$1 trillion may ease concerns about disintermediation of the domestic banking sector.

Related, money fund assets—across all categories—amount to \$2.6 trillion, about the same amount of reserves in the banking system. The amount held by government money funds is about a third as much, around \$900 billion. Of course, these numbers would not necessarily be static: given the earlier-discussed cost advantages that the money funds have over the banks in holding Fed assets, they could likely attract more institutional money to the fund sector away from bank deposits. A cap that is much greater than \$1 trillion could get Fed policymakers increasingly uncomfortable with the prospect of growing the money fund complex even further. We believe the Fed will cap the facility in the range between \$500 billion and \$1 trillion.

Facility rate. We assume the repo rate would be set at a fixed spread relative to the other main policy rate under its direct control: IOER. Other, more complicated regimes are possible, but that is the main case against them: they are more complicated. Given this assumption, it would appear that the range of feasible choices for the repo rate range from IOER-20bp to IOER-0bp. The lower end of the range, IOER-20bp, is the current repo facility rate, and we don't think it would go lower in the exit. The upper end of the range, IOER-0bp, would simply set the two main Fed policy rates equal to each other; at least in the early stages of the exit we do not see the Fed setting the repo rate above IOER. The narrower the spread the greater the facility usage, and presumably the closer that market rates will set relative to IOER. A spread in the 10-15bp range might appeal to some policymakers, as it would (partially) level the playing field that may have been

tilted by FDIC fees. Our best guess is that the Fed will set the repo facility rate no higher than IOER-10bp.

The way forward

If our expectations are correct, what can we expect in the months ahead? Some progress in reformulating the exit plan may occur at the June meeting. However, there may be too many loose ends for the details of the plan to be finalized by June. Instead, we expect the Committee will agree to revised exit principles this fall, which will be communicated through the minutes.

If next year's FOMC calendar (which hasn't been released yet) looks like this year's, then we would expect the funds target to be set to 25bp (instead of 0-25bp) at the October 2015 meeting, with a further increase to 50bp in December. Before then, we anticipate that reserve-draining operations would commence after the July meeting, with intermediate reserve-draining steps taken after the September meeting.

One hypothetical scenario is as follows: at the July 2015 meeting, authorize for the intermeeting period, \$125 billion in TDF, \$125 billion in large-scale reverse repos, and raise the repo rate to 10bp, leaving in place the per-counterparty cap of \$10 billion. At the September meeting increase TDF and large-scale reverse repo to \$250 billion each, raise the repo rate further to 15bp, and depending on the repo facility take-up at 10bp, adjust the per-counterparty caps to guide toward overall facility usage at \$750 billion. Finally, at the October meeting, announce a new funds target of either 25bp or a range of 20-30bp, and raise the repo rate to 20bp and IOER to 30bp. (Note, this may look like a corridor system, but it is not, as there is no reason to expect the borrowing facility—IOER—to act as a ceiling on rates). From that point, the target rate—or target range—can be raised in 25 or 50bp increments, as in normal rate cycles.

When looking ahead to the exit plan, the Fed will need to remember the wisdom of Mike Tyson: "Everybody has a plan until they get punched in the mouth." No matter how much careful planning the Fed does it must recognize that the unexpected will occur, for this reason the exit ramp cannot be one meeting's time; it may require two or three meetings before the reserve-draining tools are deployed in a way that both markets and the Fed are comfortable with their operation.

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