THE POST-CRISIS MARKET FOR TRI-PARTY
REPURCHASE AGREEMENTS

by

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ABSTRACT

This study examines the post-financial crisis market for tri-party repurchase agreements ("repo"), highlighting the details that make this market function properly after the run on the repo market during the financial crisis and explaining the systemic need for the market itself. In addition, it will analyze the effects of regulatory changes aimed at supporting and restructuring the current system. The data gathered for this project revolves around the recent ramp up of the Federal Reserve System’s use of reverse repurchase agreements to regulate market repo rates in addition to the effects of changes in the Federal Reserve’s balance sheet on the volumes of securities used as collateral in repo transactions. Finally, estimates will be made on the systemic effects of unloading the Federal Reserve’s balance sheet on the many aspects that make the tri-party repo market function efficiently.
SECTION I - INTRODUCTION AND LITERATURE REVIEW

Repurchase agreements ("repo") are a relatively simple tool used to borrow cash at very low interest rates through the process of selling and repurchasing collateral from a cash provider. In return for collateral, the cash provider will initially pay the collateral provider a specific cash amount and when the agreement is ultimately undone, the cash provider will receive a slightly larger amount in return. Although repurchase agreements are simple conceptually, when scaled up and intertwined with the overarching financial system, they become a very complex, dangerous and useful tool for broker-dealers, money market mutual funds ("MMMFs") and the Federal Reserve System ("Fed"). Although a fundamental flaw regarding the availability of safe assets for use as collateral in the market for tri-party repurchase agreements was responsible for the recent financial crisis, it today remains one of the largest sources of funding for broker-dealers and other financial intermediaries, while providing money market mutual funds and other asset managers a safe, short-term investment vehicle. The analyses provided below exhibit a robust tri-party repo market supported by reverse repurchase agreement operations of the Federal Reserve, regulatory changes that allow for more liquidity and increased competition within the market and future large scale open market asset sales by the Federal Reserve, all of which will increase the volume of outstanding collateral used in tri-party repo agreements. The analyses will expand upon monthly tri-party repo market data collected and compiled in addition to Federal Reserve Z.1 data and Federal Reserve Economic Data (F.R.E.D.). This data will be used to support the conclusion that due to Federal Reserve reverse repurchase agreement operations, regulatory policy changes that increase market transparency and security and Federal Reserve large scale asset sales, the tri-party repo market will continue to grow in volume upon its already systemic size.
In a tri-party repo agreement, three parties are necessary in order for the transaction to be originated (step 1 in Figure 1) and at a later time be reversed (step 2 in Figure 1):

(i) Collateral provider ("Borrower")
(ii) Cash provider ("Lender")
(iii) Clearing bank (J.P. Morgan Chase or Bank of New York Melon)

Collateral providers in the tri-party repo market are generally security broker-dealers, but other institutions including hedge funds make up a small portion of those who borrow through this market. Cash providers are primarily made up of money market funds and other securities lenders, who use tri-party repo markets to reinvest excess cash from repo contracts that they had previously engaged in (Copeland, Martin, Walker, 2014). These are financial intermediaries with large pools of cash that need to be invested in safe, short-term assets. Repo assets fit both of those categories since they are overnight agreements and collateral is provided by the borrower.

Figure 2 below is a simplified overview of the current tri-party market for repurchase agreements.
In a repo contract, a lender purchases securities from the borrower in exchange for cash. Lenders in repo markets traditionally introduce a new, secondary rate in the form of a haircut, which forces borrowers to take a lower cash amount than the value of the collateral that they have posted. In a repo agreement, the borrower agrees to buy back the security that they sold to the lender, but at a higher price. The difference between the price that the security is initially sold for and the price that it is ultimately repurchased for is used to calculate the primary interest rate on the repo contract. This interest rate is completely independent from the haircut level that is introduced, effectively forming two different rates that can be analyzed. The interest rate on a repo contract is directly related to market interest rate forces, while the haircut rate on a repo contract is directly related to the quality of collateral that is being used. At any time during the trading day, the borrower or the lender is able to end the agreement, at which time both cash and securities are re-exchanged.

“The clearing bank provides back-office support to both parties in the trade, by settling the repo on its books and ensuring that the details of the repo agreement are met” (Baklanova, Copeland, McCaughrin, 2015). Clearing banks also ensure that borrowers’ collateral is not being
reinvested by the lender, holding the collateral in escrow until the settlement and repo agreement are cleared. By using a clearing bank, both lenders and borrowers are ensured that settlements are cleared in a timely fashion, giving broker-dealers an extremely cheap, flexible and accessible source of capital to finance their operations.

The economics of security repurchase agreements are appealing for both the cash providers and the collateral providers. For cash providers, or lenders, repo agreements are a very safe investment as they receive collateral in return for the cash that they hand over to borrowers. This gives lenders a sense of protection on their investment in the case that the debtor defaults, in which case they would be able to convert the marketable security that was posted as collateral to cash. The securities that lenders receive as collateral are generally safe and marketable, making them liquid in the case of a debtor default. For borrowers, repo agreements are an appealing source of financing as these agreements carry an extremely low interest rate, offering broker-dealers very cheap means of leverage.

The tri-party market for security repurchase agreements has been cited as a leading source of the 2008 financial crisis in which many financial institutions that relied heavily on repo funding became insolvent. This insolvency is primarily attributed to a withdrawal from repo contracts by cash providers which stopped the ability for security broker-dealers to use repo funding with certain types of collateral. Gorton and Metrick described this process as “a system wide bank run,” citing similarities to past bank runs on traditional banking systems, yet calling the run on repo markets “special [because] it did not occur in the traditional-banking system, but instead took place in the ‘securitized-banking’ system” (425).

The overall architecture of the shadow banking system and lack of its regulation by the Treasury and the Fed created an environment where demand for securities to be used as
collateral greatly increased, increasing leverage and decreasing the quality of collateral used in repo contracts. Minsky’s financial instability hypothesis reasons that as entities believe their ability to repay debts is increased, they continue to take on more debt, assuming that growth will continue into the future (14). This hypothesis greatly applies to collateral providers in repo markets leading up to the crisis, who continually viewed their collateral as risk free assets without properly assessing the future cash flows that support these assets. As broker-dealers continually leveraged themselves with new collateral to use in repo contracts, the quality of the assets and the cash flows that supported them decreased. This application of Minsky’s financial instability hypothesis provides insight into the growth of the repo market even though it is applied to repo market funding rather than traditional debt financing. In addition, since these security broker-dealers were outside of the traditional, highly regulated banking system, their funding source, repo, was also largely outside of the scope of major regulatory policies. Ex-Chairman of the Federal Reserve, Ben Bernanke, labeled shadow banking as “the intermediation of credit through a collection of institutions, instruments, and markets that lie at least partially outside of the traditional banking system.” Since these firms using repo funding remained outside of the traditional banking system and therefore outside of the major scope of financial regulators, the quality of collateral being used in repo contracts was not strictly monitored as the collateral and repo contracts themselves were generally considered safe assets.

In order to fund their operations, investment banks, or broker-dealers, use repo funding in order to receive cash from money market funds. The tri-party repo market plays a large role in the overarching credit intermediation chain by funding shadow banking activity and by providing money market mutual funds with assets to purchase that are safe and have short-term maturities.
According to the Federal Reserve bank of New York, the tri-party repo market serves three distinct economic purposes:

(i) The tri-party repo market creates liquidity and transparency for both government and corporate securities,

(ii) The tri-party repo market is deeply connected with payment systems that affect the United States financial system and

(iii) The tri-party repo market creates an integral source of funding for broker-dealers that create markets for United States government and corporate debt instruments (Federal Reserve Bank of New York Tri-Party Repo Infrastructure Reform).

Regulators also underestimated the possibility of a run on the tri-party repo market by MMMF’s which ceased funding for security broker-dealers during the financial crisis due to the unknown exposure that shadow banks had to certain collateral types that were no longer deemed “safe assets.” When these assets were deemed unsafe, institutions began to hoard Treasury securities as they are extremely safe in times of crisis. As firms began to stockpile Treasuries, the reduced amount of available collateral in the system made it difficult to use repo facilities for funding, resulting in repo failures (Gorton, 36). Ex-Chairman Ben Bernanke once said that “Until recently, short-term repos had always been regarded as virtually risk-free instruments and thus largely immune to the type of rollover or withdrawal risks associated with short-term unsecured obligations.” The lack of regulation of and liquidity within the tri-party repo market ultimately resulted in the insolvency of Lehman Brother’s investment bank, a Fed-assisted takeover of Bear Stearns investment bank and more. Figure 3 depicts the tri-party repo activity of Lehman Brother’s leading up to its bankruptcy.
This paper will focus on the tri-party repo market after the crisis had taken place, as newly transparent data has become available with which repo market volumes, collateral types and rates can all be analyzed. Literature surrounding the recent crisis is abundant, yet research about post-crisis repo markets is only becoming available due to the relatively new transparency of the tri-party market itself. Despite the events that occurred during the financial crisis, today’s tri-party market for repurchase agreements is one of the largest markets for financial institution funding, with an average of $1.667 trillion in outstanding repo funding between January 2011 and January 2017 (Federal Reserve Bank of New York – Tri-Party/GCF Repo). Although repo market volumes have not yet returned to pre-crisis levels, they could possibly do so with a reversal of the Fed’s Quantitative Easing asset purchase programs, which will be analyzed more thoroughly in Section IV. In addition, repo funding provides capital primarily to private security brokers-dealers, who use repo markets as an alternative to traditional bank funding methods for many reasons that will be noted. On the other side of the same coin, money market mutual funds

Figure 3 - Lehman Brother's Repo Liabilities

and security broker-dealers themselves are the primary providers of cash that is lent through repo contracts.

In 2009, in addition to increased transparency of repo markets by the Federal Reserve Bank of New York, it also created the Tri-Party Repo Infrastructure Reform Task Force. This task force aimed to create policy recommendations to give to the Fed for stabilizing and maintaining stability in the repo markets after the events of the financial crisis. Consisting of executives of shadow banks and federal regulators, the Task Force recommended policy on repo market payments and the transfer of collateral, much of which was enacted. By February 2012, policy recommendations to reduce intraday credit extensions and increase transparency surrounding repo contracts were enabled in many forms. The removal of non-maturing term agreements from intraday repo trading reduced daily exposure of the repo market and explicit rules requiring clearing of trade between dealers, cash investors and clearing banks allows transparency and recordkeeping of repo market transactions (Tri-Party Repo Infrastructure Reform Task Force, 1). These proposals by the task force aid in creating a more transparent, less exposed and increasingly liquid tri-party repo market.

As of December 2016, 34.73% of all repo liabilities are attributed to security broker-dealers, making these broker-dealers the largest private users of repo funding on the open market (Board of Governors of the Federal Reserve System – Z.1 Table L207). The Federal Reserve System is the second most active party in repo markets with 19.18% of total repo liabilities recorded on their balance sheet (Board of Governors of the Federal Reserve System – Z.1 Table L207). This volume in repo liabilities from the Fed is due to the ramp up of what are known as Federal Reserve Reverse Repurchase Agreement Operations (“RRPs”) that began in 2013. Through these operations, the Fed “sells a security to an eligible counterparty with an agreement
to repurchase that same security at a specified price at a specific time in the future” (Federal Reserve Bank of New York, 2015). The rest of this paper will analyze the volumes and flows of securities used as collateral in the tri-party repo market from January 2011 to January 2017, the Federal Reserve System’s reverse repurchase agreement operations and the impact of Federal Reserve open market asset sales on the volume of collateral used in repo agreements in the tri-party market.

SECTION II – METHODS

Data collection for this thesis was conducted using monthly tri-party repurchase agreement volumes from the Federal Reserve Bank of New York. Fedwire Eligible collateral (defined as “collateral settled on the Fedwire Securities Service” by the Federal Reserve Bank of New York) is mostly comprised of United States Treasuries and agency mortgage backed securities (“MBS”). Due to the following reasons, Fedwire eligible collateral was observed separately from non-Fedwire eligible securities in many cases throughout this study:

(i) The composition of Fedwire eligible securities is extremely similar to that of the Federal Reserve’s current asset composition on their balance sheet and,

(ii) The volume of the Fedwire eligible collateral averages 81.02% of the total volume of the tri-party repo market during the period of data collection.

This monthly data of collateral volumes by asset type, composed of both Fedwire Eligible collateral and non-Fedwire eligible collateral, was then compiled into yearly summaries. The data was then finally compiled into a single spreadsheet containing the volumes of all posted collateral in tri-party repo agreements between January 2011 and January 2017. This method of collection from the Federal Reserve Bank of New York allowed for data comparison with Fed
Z.1 data from the Board of Governors of the Federal Reserve and also with Federal Reserve Economic Data from the Federal Reserve Bank of St. Louis. By using the above methods, the volumes of collateral being used in tri-party repo markets were able to be analyzed against the assets and liabilities on the balance sheets of entities with activity in the tri-party repo market.

In addition to repo volumes and rates, Federal Reserve reverse repurchase agreement operation data collection allowed for the analysis of interest rates in the tri-party repo markets between September 2013 and April 2017. Daily rates on reverse repurchase agreements were collected with 897 days of rates conducted by the RRP operations. This data was compared primarily to the Federal Funds rate at which traditional depository institutions are able to borrow cash overnight.

SECTION III - CURRENT MARKET SITUATION

The current market for tri-party repo has recovered from the repo run of 2007 and 2008, becoming one of the largest sources of funding for financial institutions after Federal Funds held at the Federal Reserve. As seen in Figure 4, the current size of the market for repurchase agreements is over $1.7 trillion in collateral volume as of January 2017, with $1.4 trillion of that

Figure 4 - Fedwire vs Non-Fedwire Eligible Collateral ($ in billions)

Source: 1 - Federal Reserve Bank of New York - Tri-Party/GCF Repo
collateral being made up of Fedwire eligible securities. The total volume of non-Fedwire eligible securities has remained relatively constant but there are much larger peaks and troughs within the total volume of Fedwire eligible collateral. This analysis led to further research to determine what factors influence the volume of Fedwire eligible collateral being used in repo contracts.

Figure 5 shows a breakdown of Fedwire eligible securities by collateral type. This figure illustrates the large volume that United States Treasuries and agency-backed MBSs represent out of the total market for repo. When combined, Treasuries and agency-backed MBSs make up

![Figure 5 - Fedwire Collateral by Asset Type (\$ in billions)](image)

**Sources:** 1 - Federal Reserve Bank of New York - Tri-Party/GCF Repo

67.75% of the total tri-party repo market and 83.62% of the total Fedwire eligible collateral being used for repo contracts (Federal Reserve Bank of New York – Tri-Party/GCF Repo). These securities are used as the leading source of collateral in repo markets for multiple reasons:
(i) The volumes of Treasuries and agency-backed MBSs in the open market are much greater than that of the other collateral posted.

(ii) These are considered “safe assets,” which are approvingly accepted by cash providers as collateral due to their extremely small chance of default.

(iii) The Federal Reserve has an abundance of Treasuries and MBSs on its balance sheet from the effects of quantitative easing to use in its RRP operations.

For the three reasons above, the market for Fedwire eligible securities remains extremely liquid despite the run on the market during the financial crisis. During the financial crisis, point (iii) did not yet exist (the Federal Reserve began its RRP operations and 2013) and point (ii) was in question by many cash providers in repurchase agreements as many of these lenders did not know whether or not MBSs were still considered “safe assets.”

The volume of treasuries used as collateral in repo contracts has surpassed that of agency MBSs as of July 2013. This is most likely unrelated to the view that agency MBSs are “safe assets” but instead, can be attributed to the sole use of Treasuries as collateral in the Fed’s RRP operations with the Federal Reserve Bank of New York citing, “The [Federal Open Market Committee] has directed the Desk to undertake RRP operations using Treasury securities held in the [System Open Market Account]. The [System Open Market Account]’s holdings of agency debentures and agency mortgage-backed securities are not currently used in the Desk’s RRP operations” (2015). The Federal Reserve System Open Market Account “contains dollar denominated assets acquired via open market operations” (Federal Reserve Bank of New York – System Open Market Account Holdings). These System Open Market Account holdings are the assets that the Fed would sell outright on the open market in order to unwind its balance sheet.
The Federal Open Market Committee is in charge of Federal Reserve open market asset purchases and sales and is in control of the System Open Market Account.

After the Federal Reserve’s third iteration of their Quantitative Easing operations, their balance sheet swelled to a level of assets that has remained just below $4.5 trillion. These $4.5 trillion in assets are composed mostly of US Treasury securities and agency-backed MBSs, mirroring the composition of Fedwire eligible collateral used in tri-party repo agreements. Because of this relationship between repo collateral and the assets held by the Fed, there was a direct and observable relationship between the levels of assets being purchased on the open market by the Fed and the amount of collateral that is available to create liquidity in repo markets. As a result, Figure 6 illustrates that effect of the Fed’s Quantitative Easing III on the volume of Fedwire eligible securities being used as collateral in repo markets. Due to the mass

![Figure 6 - Fed Assets vs Fedwire Eligible Collateral ($ in billions)](image)

*Source: 1 - Federal Reserve Bank of New York - Tri-Party/GCF Repo*
*Source: 2 – Board of Governors of the Federal Reserve System*
asset purchases of the Federal Reserve, the amount of Fedwire eligible collateral being used in repo agreements fell 23.14% year-over-year between December 2012 and December 2013. In addition, since the Federal Reserve has maintained a steady level of assets between January 2015 and January 2017, the level or tri-party repo has not recovered to its December 2012 high even though the Fed itself has begun to participate through its RRP operations. This signals that there is less liquidity in repo markets than before due to the lower amount of Fedwire eligible securities available for use as collateral on the open market.

Of the $4.5 trillion worth of assets on the Fed’s balance sheet, the Federal Reserve Bank of New York has openly stated that it “anticipates that around $2 trillion of Treasury securities will be available for overnight RRP operations to fulfill the FOMC’s domestic policy directive” (2015). Since the Fed anticipates that approximately 44% of its total assets will be available for use in its RRP operations, it is signaling to market participants that the amount of reverse repurchase agreement operations moving forward will greatly increase from the amount seen in Figure 7. As of December 2016, the Federal Reserve has $468 billion in outstanding RRP liabilities, only using up 23.4% of its available RRP operations capacity.

Figure 7 - Fed RRP operations liabilities distribution ($ in billions)

Source: 1 – Board of Governors of the Federal Reserve System – Z.1 Table L207
In addition to the volume of Fed RRP operations, Figure 7 also illustrates that almost all of the Fed’s reverse repo operations are directed at money market mutual funds. Since MMMFs are a large supplier of cash in repo markets, the Fed is able to use RRP operations to create a floor at which MMMFs will not lend at a lower rate. This is because MMMFs find reverse repo agreements with the Fed particularly attractive due to the interest rates that the Federal Reserve is offering on their contract and the safety with which these contracts are viewed as MMMFs have the certainty of repayment from the Fed. Since lending to the Fed is extremely safe, MMMFs are not likely to lend to riskier broker-dealers at a lower rate, thus the floor on repo rates is created by the Fed’s RRP operations. As a result, MMMFs have allocated an increasingly large portion of their capital to repo agreements. As seen in Figure 8, MMMFs conduct approximately half of their reverse repo agreements with the Fed, creating competition with broker-dealers for cash from MMMFs. In addition, reverse repo agreements with the Fed make up nearly 15% of assets held by MMMFs. In addition to creating an interest rate floor at which

Figure 8 - Fed RRP operations as a Share of MMMF Assets

Source: 1 – Board of Governors of the Federal Reserve System – Z.1 Table L207
repo agreements are conducted, the Fed is also creating confidence in the repo system by becoming a major participant and conducting contracts with MMMFs. A major implication of the Fed’s interaction with MMMFs is that times of crisis, it is likely the MMMFs would prefer to lend to the Fed than to broker-dealers due to increased risk. This may force the Fed to temporarily discontinue RRP operations in order to ensure the proper funding of broker-dealers on the open market, even possibly forcing the Fed to conduct repo operations directly with those broker-dealers.

In addition to analyzing volumes of assets and collateral, the rates at which repurchase agreements are conducted were also analyzed. Repo rates were collected by using daily repo offering from the Federal Reserve, which set a rate floor at which repo rates are conducted. The rates seen in Figure 9 are the associated rates seen with the agreements between MMMFs and the Fed in Figure 7. These reverse repo rates are the lowest interest rates at which MMMFs will lend.

Figure 9 - Market Repo Rates vs Federal Funds Rate

Source: 2 - Federal Reserve Bank of New York – Temporary Open Market Operations
Source: 2 – Federal Reserve Bank of New York – Federal Funds Data
to broker-dealers since they are riskier to lend to than the Fed, signaling a rate floor for the repo market. Figure 9 clearly demonstrates that repo rates remain consistently lower than Federal Funds rates, providing broker-dealers with an even cheaper financing mechanism than the traditional banking sector. Figure 9 also shows that rate increases on the Federal Funds rate and repo rates are consistently timed together by the Fed, who through its RRP operations are now able to regulate both repo rates and bank overnight rates simultaneously, a tool that it did not have before the financial crisis occurred.

SECTION IV – FUTURE MARKET IMPLICATIONS

The implications of the above research tell a story about the short-term, medium-term and long-term expectations for the tri-party repo market. In addition, even though the Fed has only been conducting RRP operations for a short period of time, their direction and repo concentration make clear their implications by becoming an extremely large player in this market.

In the medium-term, it is likely that the Fed will continue to use its RRP operations in order to keep market repo rates at a slightly lower level than the Federal Funds rate. In order for the Fed to conduct these operations, the Fed must have a large amount of safe assets on hand, which it currently does due to the impact of a three phase quantitative easing program. Moving into the long-term, the Fed is likely to unwind its balance sheet, selling securities into the open market outright, rather than through short-term repo agreements. By unwinding its balance sheet, the Fed would return to a state of normalization in which it reduces the total money supply via outright security sales. Although the Fed’s desired effects of security sales would be a reduced money supply and increased interest rates to keep the economy from overheating, the outright
sales of US Treasuries and agency MBSs would greatly increase the volume of those securities on the open market that could in turn be used for collateral in repo contracts.

In the long-term, it is possible that the Fed will use a combination of RRP operations and the inverse of that, traditional Fed repo operations, to manipulate market repo rates. If the Fed were to reverse the current course of its operations, in order to drive rates down instead of up, it would have to conduct repo agreements with broker-dealers in order to force money market mutual funds to lend to dealers at rates lower than the Fed. This is in contrast to the Fed’s current RRP operations, which it conducts directly with MMMFs and not broker-dealers. If at a point in the future the Fed is looking to push market repo rates down, this is the strategy that it would have to use to accomplish that goal.

Using these characteristic assumptions, estimates are able to be made about the effect that large scale asset sales by the Federal Reserve (reverse quantitative easing) would have on the volume of collateral used in Repo markets. According to minutes from the Federal Open Market Committee (“FOMC”) during their March 14th-15th meeting of 2017, the FOMC stated, “Provided that the economy continued to perform about as expected, most participants anticipated that gradual increases in the federal funds rate would continue and judged that a change to the Committee's reinvestment policy would likely be appropriate later this year. Many participants emphasized that reducing the size of the balance sheet should be conducted in a passive and predictable manner.” Using this and the above information, a regression estimated the effects of a large scale asset sales program were estimated.

As seen in Figure 10, a decrease in assets held by the Federal Reserve would result in an increase in the volume of Fedwire eligible collateral posted in the tri-party repo market. This result would primarily be spurred by the increase in securities on the open market that are
available for broker-dealers and other financial institutions to use as collateral in repo agreements. Since the Federal Reserve’s assets are mostly composed of Treasury securities and agency MBSs, the amount of Fedwire eligible repo liabilities in the market would drastically increase due to the market liquidity from the Fed’s open market asset sales. The two-year projection period estimates in Figure 10, were made using the simple ratio between Federal Reserve assets on balance sheet and the volume of Fedwire Eligible securities being used as collateral on the tri-party repo market during Quantitative Easing III. During Quantitative Easing III (November 2012 – November 2014), the Fed’s asset size experienced a quarterly growth rate of 1.899%, or a compound annual growth rate of 25.328%. During the same period, the amount of Fedwire eligible collateral outstanding in tri-party repo agreements experienced a quarterly decline of 1.224%, or a compound annual decline of 15.723%.

Source: 1 - Federal Reserve Bank of New York - Tri-Party/GCF Repo
Source: 2 – Board of Governors of the Federal Reserve System
Using the relationship between the two asset volumes and the most recent tri-party repo data from January 2017, it was discernable that as the Fed commits to large scale asset sales, the amount of Fedwire eligible repo collateral being used on the market will rise at 64.464% of the rate that Federal Reserve assets would fall on a monthly basis. In addition to an increase in available collateral due to asset sales by the Fed, assumptions were also made that the Fed will continue to increase its RRP operations in the medium-term. This would have the effect of increasing the amount of outstanding Fedwire eligible collateral in market. Both an increase in available securities for use as collateral on the open market and an increase in the volume of Fed RRP operations would greatly increase market liquidity for both broker-dealers and MMMFs. These two effects can be seen in the increase in outstanding Fedwire eligible collateral throughout the two-year projection period in Figure 10.

SECTION V – CONCLUSION

A robust post-crisis market for tri-party repurchase agreements has emerged from the repo market that was a source of the 2007-2008 financial crisis. Through the above analyses, it is clear that both the Fed’s RRP operations and large scale outright open market asset sales would have the effect of increased collateral volume in the tri-party repo market. This increase in securities available on the open market would greatly increase repo market liquidity and would also prevent firms from hoarding the majority of Treasuries and agency MBSs used by firms in repo as described by Gorton (36).

Based on the above analyses, it is clear that the amount of assets on the Federal Reserve’s balance sheet directly impacts the volume of collateral being used in the tri-party repo market by regulating the amount of securities available to be used as such. This primarily means that in
order for the Federal Reserve to regulate repo volume, they must actively alter the amount of available collateral in the open market rather than control the money supply as they do with the traditional banking sector. As the Fed acquires more assets through outright purchases on the open market, the amount of securities available for use by broker-dealers as collateral greatly decreases, decreasing liquidity in the tri-party repo market. This can be seen through the impact of Quantitative Easing III on the volume of Fedwire eligible collateral in outstanding repo agreements. The above data displays that in combination with the Fed’s RRP program, large scale open market asset sales (reverse Quantitative Easing) would scale up the already systemically large market for tri-party repurchase agreements, increasing funding availability for firms that use repo as a financing instrument while providing MMMFs with increased volumes of safe assets to purchase through the tri-party market. Although the Fed’s policy initiatives will likely increase repo volumes in the medium-term, the Fed will also continue to play a more active role in the controlling of repo rates as can be seen by the fast growth and implementation of its RRP operations. The implications of the above findings support future growth in the tri-party repo market that is sustainable due to the Fed’s market interaction, increased collateral availability and regulatory support systems that provide sufficient high quality collateral, simultaneously preventing future collateral hoarding and reallocating a greater proportion of Fed policy attention to the tri-party market for security repurchase agreements.
WORKS CITED


Board of Governors of the Federal Reserve System. Z.1 Financial Accounts.


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