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Abstract

During the Great Recession, the Federal Reserve implemented several novel programs to address adverse conditions in financial markets. Three of these temporary programs relied on an auction mechanism: the Term Auction Facility, the Term Securities Lending Facility, and the disposition of the Maiden Lane II portfolio. These auctions differed from one another in several dimensions: their objectives, rules, and the financial asset being traded. The object of this paper is to document, compare, and provide a rationale for the mechanics of the different auctions implemented by the Federal Reserve during the Great Recession.

Key words: financial crisis, auctions

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1 Introduction

The Federal Reserve Bank of New York (the NY Fed hereafter) has long relied on auctions to fulfill its mandate. To implement monetary policy for instance, the NY Fed historically conducted daily auctions to purchase and sell domestic securities at open market operations. Likewise, to promote smooth clearing of Treasury and Agency debenture markets, the NY Fed conducts daily auctions through which primary dealers can borrow securities from the System Open Market Account (SOMA).

Between 2007 and 2010, the NY Fed put in place several new programs in order to address some of the adverse conditions that emerged during the financial crisis. Three of these temporary programs relied on an auction mechanism: the Term Auction Facility (“TAF”), the Term Securities Lending Facility (“TSLF”) and the disposition of the Maiden Lane II portfolio. These auctions differed from one another (and from auctions conducted for permanent operations) in several dimensions, including their objectives, their rules, or the financial asset being traded. The object of this paper is to document, compare, and provide a rationale for the mechanics of the different auctions implemented by the Federal Reserve during the Great Recession.

The perspective taken is that of an economist interested in analyzing auctions but with a possibly limited knowledge of financial markets and central banks’ practices. To an economist, it is important to understand precisely both the institutional framework and the auction process. Indeed, both aspects can influence the bidders’ behavior, and in turn the performance of the auction. From a theoretical perspective, for instance, it is particularly important to identify two elements in order to explain how participants devise their bidding strategies: i) what are the exact rules of the auction and ii) how the relevant information is partitioned between what is common knowledge at the time of the auction and what a bidder needs to infer.

With respect to the auction rules, we concentrate more specifically on the allocation mechanism (i.e. the way through which the auctioneer decides which bids to accept and which bids to reject) and the payment mechanism (i.e. the way through which the price(s) paid by the winning bidders is related to the bids submitted). With respect to the information structure, we attempt to provide an exhaustive list of what is relevant before and after each auction so that bidders can form and update their bidding strategies. Finally, we try to provide a rationale to explain why an auction mechanism was preferred to alternative trading mechanisms, and, when possible, to explain why specific rules were adopted.

It is important to note that this paper is descriptive in nature. The objective is not to evaluate the appropriateness nor the effectiveness of any temporary program. For such analyses, we refer to the reader to Armantier, Krieger and McAndrews (2008), Thorton (2011), Benmelech (2012) for the TAF, Fleming, Hrung and Keane (2009, 2010) and Acharya et al. (2012) for the TSLF, as well as Goodfriend (2011) and Reinhart (2011) for a general discussion of the Maiden Lane program. In contrast, the object of this paper is simply to document, compare, and provide a rationale for the mechanics of the different auction processes implemented by the NY Fed during the Great Recession.

2. The Term Auction Facility

In response to adverse conditions in the interbank term funding market at the end of 2007, the Federal Reserve introduced the Term Auction Facility (TAF) on December 12, 2007. The purpose of the TAF was to provide sound depository institutions with term funding against collateral at a rate determined through competitive bidding. Under this temporary facility, 60 auctions were conducted between December 17, 2007, and March 8, 2010. During this period, a total of \$3.8 trillion in loans was allocated to 429 different financial institutions.

- **What was allocated at the auction?**

At TAF auctions, the Federal Reserve allocated collateralized term loans of various maturities. The maturity of the loans varied during the course of the program. The first 17 TAF auctions made funding available for (roughly) a 28-day period.² Beginning on August 11, 2008, the program started to alternate auctions for loans of 28 and 84 days. On September 24, 2009, the Federal Reserve announced that the 84 day auctions would be phased out gradually so that the program would return to a single cycle of 28-day auctions.³ In addition, in an effort to ease traditionally high demand for funds over year-end, the Federal Reserve conducted two forward auctions of 17 and 13 days to cover the transition from 2008 to 2009.

The amount of funds allocated at TAF auctions also varied throughout the life of the program. The first TAF auction was for \$20 billion, and the amount allocated gradually increased over time to reach \$150 billion at the peak of the financial crisis.⁴ Although none of the 22 subsequent \$150 billion auctions was fully subscribed, the amount made available remained unchanged between October 6, 2008, and June 29, 2009. As conditions in interbank lending improved over the second half of 2009, the Federal Reserve gradually reduced the amount of funding offered.⁵ Finally, as the improvement in market conditions and the increasingly weak bidding indicated that TAF auctions were no longer necessary, the program was discontinued on March 8, 2010 after a final \$25 billion auction.

The assets used as collateral for a TAF loan were the same as those pledged to secure Discount Window loans. In addition, standard Discount Window valuation and haircut procedures were applied. To ensure that a depository institution still had collateral available to access the Discount Window during the term of a loan, the maximum TAF funding for an institution (including outstanding loans) was limited to 75% of its available pledged collateral for auctions with terms exceeding 28 days.

- **Who was eligible to bid?**

² The second TAF auction had a term of 35 days.

³ As a result, a 70-day auction was conducted on October 5, 2009 for \$50 billion, a 70-day auction was conducted on November 2, 2009 for \$25 billion, and a 42-day auction was conducted on November 30, 2009 for \$25 billion.

⁴ The amount made available at TAF auctions increased to \$30, 50, 75 and finally 150 billion on respectively January 14, March 10, May 5, and October 6, 2008.

⁵ On July 13, August 10, and September 8, 2009 the amounts offered at 28-days TAF auctions were reduced from \$150 billion to respectively \$125, \$100, and \$75 billion. On February 8, and March 8, 2010 the amounts offered at 28-day TAF auctions were further reduced to \$50 and \$25 billion.

A depository institution was eligible to participate at a TAF auction if i) it was eligible to borrow under the Primary Credit program, ii) it was deemed in good financial condition by its regional Reserve Bank and iii) it had enough collateral posted at the Discount Window to clear the minimum bid amount.

- **What constituted a bid?**

An eligible participant could submit up to two bids per TAF auction, each consisting of a rate-quantity pair. Bids were made in increments of \$100,000 and rates were expressed in percentage points with up to three decimals.

The rules of the TAF program imposed constraints both on the amount and the rate that could be submitted. The minimum bid amount was originally set at \$10 million. On February 1, 2008, the Federal Reserve lowered the minimum bid amount to \$5 million in order to promote participation by smaller financial institutions. In addition to being limited by the amount of collateral pledged at the Discount Window at the time of the auction, the sum of the two bids tendered by a financial institution was not permitted to exceed 10% of the amount offered at the auction. This constraint was imposed in part to ensure a wide distribution of the funds across TAF participants.

TAF auctions initially had a minimum bid rate set equal to the overnight indexed swap (OIS) rate corresponding to the maturity of the credit being auctioned (either 28 or 84 days). After the Federal Reserve was granted authority to pay interest on excess reserves, the minimum bid rate was set at the interest rate paid on excess reserves on January 12, 2009. An attractive minimum bid rate was considered an important feature for the success of the TAF program, as it was expected to promote a broad participation of financial institutions with heterogeneous needs for term funding.

- **The Allocation mechanism:**

After the depository institutions submitted their bids to their respective regional Federal Reserve Banks, all the bids were consolidated at the Federal Reserve Bank of New York where they were ranked in order of rates from highest to lowest. The bid submitted at the highest rate was accepted first and allocated in full (i.e. the corresponding bidder received all the funds it demanded). The allocation mechanism then successively moved down the list of bids submitted at lower rates until the amount of funds made available by the Federal Reserve had been entirely allocated, or until all bids had been accepted (whichever occurred first). The lowest accepted interest rate is called the “stop-out-rate.” Consequently, the TAF allocation mechanism was such that bids at interest rates above the stop-out-rate were accepted and fully funded. If the aggregate amount demanded at or above the stop-out-rate exceeded the supply of TAF funds, then bids submitted at the stop-out-rate were prorated based on the amount tendered.

- **The Payment Mechanism:**

The TAF auctions belong to the class of uniform-price formats. In other words, every participant whose bid was accepted was asked to pay the stop-out-rate, regardless of the interest rates at which it bid.

- **Timing & Schedule:**

Since the inception of the program, TAF auctions were conducted bi-weekly. The timing of a typical TAF auction was as follows. A schedule of forthcoming auctions was typically released by the Federal Reserve on a quarterly basis. This schedule included tentative amounts and maturities. At 10:00am on the Monday of the auction, the Federal Reserve confirmed the auction's parameters (see below). An eligible financial institution could then submit its bid to its regional Federal Reserve Bank between 11:00am and 1:00pm. The results of the auction were announced the next day at 10:00 am, after which the winning bidders were contacted by their regional Federal Reserve Banks. Finally, the funds were credited to the account of the auction's winners at the Federal Reserve on Thursday of the same week.

- **Information available to bidders before each auction:**

In the pre-auction announcement the following information was provided to the bidders: the amount of funds to be auctioned, the term of the loans, the minimum and maximum size of bids, and the minimum interest rate at which propositions could be tendered.

- **Information released after each auction:**

After each TAF auction, a summary of the results was published on the public website of the Board of Governors of the Federal Reserve. The information released included in particular the stop-out-rate, the aggregate amount of bids submitted, the aggregate amount of funds awarded, the bid-to-cover ratio (i.e. the aggregate amount of bids submitted divided by the amount of funds auctioned), as well as the number of bidders. Data on individual bids and on the number or the identity of the winners were not made public after each auction.⁶

- **Why an auction?**

The Federal Reserve viewed an auction mechanism as having three potential advantages over traditional means to inject liquidity (e.g. the Discount Window).

First, auctions enabled the Federal Reserve to control precisely how much, and when, liquidity would be injected into the markets. In comparison, reducing the spread between the Discount Window rate and the target Federal funds rate could have resulted in a very volatile and unpredictable demand for funds.

Second, in contrast with the discount window, a competitive auction was believed to be less susceptible to "stigma." An auction format required banks to approach the Fed collectively

⁶ On December 1 2010, after the TAF program was terminated, the Federal Reserve released the identity and the amount allocated to each TAF winner.

rather than individually, and obtain funds at a rate set through competition rather than at a penalty. As a result, banks may have been less reluctant to borrow at the TAF, as bidding for funds did not necessarily signal an abnormally high demand for funds.

Third, the ability to allocate funds directly to a wide range of financial institutions based on their need was perceived as one of the key advantages of the TAF program. Indeed, because the interbank funding markets were impaired at the time, it was believed that other channels (e.g. open market operations), in which the Federal Reserve deals with a small set of primary dealers, could not properly disseminate liquidity through the entire banking system.⁷

3 The Term Securities Lending Facility

With the onset of the crisis that emerged at the end of 2007, the value of numerous assets, such as mortgage-backed securities, became highly uncertain. As a consequence of this heightened uncertainty, financial institutions found it more difficult and more costly to secure loans against a range of increasingly illiquid collateral. To ease the strains in the securitized market and, more generally, to promote the functioning of financial markets, the Federal Reserve introduced the Term Securities Lending Facility (TSLF). The TSLF enabled primary dealers to borrow for a one-month term general Treasury securities held in the SOMA against a relatively wide range of eligible collateral at a fee determined through competitive bidding. The primary dealers were then in a better position to borrow funds at relatively favorable rates using the more liquid Treasury securities as collateral. The TSLF program was in effect between March 27, 2008, and January 7, 2010. During this period, a total of 91 auctions were conducted, during which \$1.94 trillion of securities were allocated in aggregate.⁸

On the surface, the TSLF was very similar to the SOMA Securities Lending program, a permanent facility operated by the NY Fed since 1999 in which specific securities from the SOMA are offered for loans at daily auctions. Indeed, the two facilities share a number of characteristics as they both i) enable primary dealers to borrow Treasury securities, ii) are “reserve-neutral,” as the loans are collateralized by other securities, and iii) have a borrowing fee determined competitively at an auction. As we shall see, however, the TSLF differs in several key aspects from the SOMA Securities Lending program. In particular, TSLF auctions i) allocated general Treasury collateral instead of specific Treasury securities, ii) accepted a broader range of securities as collateral, iii) enable primary dealers to borrow Treasury securities for a term instead of overnight, iv) used a uniform (single) price format, instead of a

⁷ For further institutional details on the TAF implementation see Armandier, Krieger and McAndrews (2008), as well as the FAQ on the NY Fed website (<http://www.federalreserve.gov/monetarypolicy/taffaq.htm>).

⁸ On July 20, 2008, the Federal Reserve introduced the Term Securities Lending Facility options program (TOP). It offered primary dealers the possibility to purchase options on shorter term, fixed-fee, TSLF loans against eligible collateral during periods of heightened financing pressures, such as quarter-ends. Similar to the TSLF, the program relied on an auction mechanism to allocate and price the options. The TOP program was in effect between August 27, 2008, and June 3rd, 2010. A total of 6 TOP auctions were conducted, during which \$19.4 billion of options were allocated (31.6% of which were ultimately exercised).

discriminatory (multiple) price format, v) relied on a simpler allocation mechanism, and vi) were not conducted more than once a week instead of every business day.

- **What was allocated at the auction?**

At a TSLF auction, the Federal Reserve made available shares of a specific basket of general Treasury securities (i.e. bills, notes, bonds and inflation indexed Treasury securities) held in the SOMA for loans of 28-days. The loans were collateralized and allocated against a fee determined through competitive bidding.

TSLF auctions can be partitioned in two types, “Schedule 1” and “Schedule 2,” depending on the securities accepted as collateral. At a Schedule 1 auction, the Federal Reserve accepted all collateral eligible in standard open market operations, that is, Treasury securities, Federal agency debentures and mortgage-backed securities guaranteed by Federal agencies. At Schedule 2 auction, other investment grade debt securities were accepted in addition to the collateral eligible for Schedule 1 auctions. This larger set of eligible collateral originally consisted of AAA/Aaa-rated non-agency residential MBS, commercial MBS, and agency collateralized mortgage obligations. It was expanded on May 8, 2008, to include AAA/Aaa-rated asset-backed securities, and then on September 17, 2008, to include all investment-grade debt securities. The Federal Reserve conducted a total of 33 Schedule 1 auctions, 12 of which were fully subscribed while the last 7 attracted no bids. A total of 58 Schedule 2 auctions were conducted, 14 of which were fully subscribed while the last 6 attracted no bids. The total amount of Treasury securities allocated was respectively \$0.5 and \$1.4 trillion at Schedule 1 and Schedule 2 TSLF auctions.

The basket of Treasury securities auctioned by the Federal Reserve was distributed among the successful bidders on a pro-rata basis.⁹ The Treasury securities that were lent to a primary dealer could change during the course of a loan. Indeed, the objective of the program was to lend general Treasury securities. Therefore, if one of the securities lent became special (i.e. traded at higher rates than general Treasury securities), then the NY Fed could replace that security with a general Treasury security of same value. Likewise, the collateral pledged to securitize a loan could change during the term of a loan. This could happen either at the borrower’s discretion, or as required by the NY Fed if the value of the collateral pledged deteriorated. To mitigate credit risk, the Federal Reserve also imposed a haircut, whereby the market value of the collateral pledged by a borrower exceeded the value of the Treasury securities lent.

- **Who was eligible to bid?**

As in the SOMA Securities Lending Facility program, the TSLF was open only to primary dealers because of their extensive experience in trading securities with the FRBNY. The TSLF was offered as a service by the Federal Reserve, and therefore, participation by primary dealers was not mandatory.

⁹ For example, a bidder who was awarded x% of the offered amount at auction, received x% of each of the Treasury securities in the basket.

- **What constitutes a bid?**

A bid is a pair consisting of i) a face value amount of general Treasury securities (expressed in increments of \$10 million), and ii) a fee (expressed in increments of 1/100th of a basis point). Each bidder was allowed to submit up to two bids per auction. Each bid could not exceed 20% of the amount auctioned by the Federal Reserve, and a bidder could not be awarded more than 20% of the offering amount. The minimum fee was 10 basis points for Schedule 1 auctions, and 25 basis points for Schedule 2 auctions. Since the program operated on a borrow-versus-pledge basis, the bid rate may be interpreted as reflecting the spread between the rate of the general securities eligible as collateral and the rate of the general Treasury securities allocated at the auction.

- **The Allocation Mechanism**

The allocation mechanism for the TSLF was simpler than for the SOMA Securities Lending program. This difference stems from the fact that the goods to be divided among bidders at a TSLF auction (i.e. a share of the basket of general Treasury securities) may be considered homogeneous. In contrast, specific Treasury securities need to be allocated between different bidders at a Securities Lending auction, subject to amount limits at the security and aggregate levels. The allocation process for TSLF auctions therefore only consisted of accepting eligible tenders in decreasing orders of the fee bid until either the entire basket of securities had been awarded, or there was no more bid to consider. The fee bid by the marginal bidder, i.e. the fee of the last bid accepted, is called the “stop-out-rate.” The dealers that bid at or above the stop-out-rate were awarded securities on a pro-rata basis of their bid amounts.

- **The Payment Mechanism:**

In contrast, with the SOMA Securities Lending program, TSLF auctions relied on a uniform (or single) price format, whereby every primary dealer whose bid has been accepted paid the same fee equal to the stop-out-rate. In this time of heighten uncertainty, and in the absence of well functioning markets on which bidders could rely to estimate the value of the basket of Treasury securities to be auctioned, a uniform price format was perceived to have two potential advantages. First, as the stop-out-rate was likely to be lower than the highest fees bid, a uniform price auction may provide primary dealers some protection against pricing errors. Second, it may have helped in the price discovery process, whereby the stop-out-rate, once published, may have provided useful information to market participants.

- **Timing & Schedule:**

A tentative schedule for future TSLF auctions was published in advance on the NY Fed’s public website. The day prior to a scheduled auction the NY Fed assembled the basket to be auctioned by combining Treasury securities that were not trading special on that day.

TSLF auctions were usually held on Thursdays from 2:00pm to 2:30pm. Between March 27, 2008 and September 11, 2008, Schedule 1 and Schedule 2 auctions alternated on a weekly basis. Schedule 1 auctions then occurred monthly until their suspension on June 25, 2009.

The frequency of Schedule 2 auctions was also reduced over time, from twice a month to once a month until the program was terminated in February 2010.

Shortly after the auction closed, the NY Fed informed the dealers of their awards and published the auction's results on the NY Fed's public website. All loans awarded were settled the following business day.

- **Information available before each auction:**

Along with a tentative schedule, the Federal Reserve provided advance notice (on average once a month) about the parameters of forthcoming TSLF auctions, including the amount to be auctioned, whether the auction would be Schedule 1 or Schedule 2, as well as the settlement and maturity dates. At 3:00pm on the day prior to a TSLF auction, the Federal Reserve confirmed the auction's parameters and disclosed the particular basket offered at the auction by specifying the face value and the CUSIP number of each of the Treasury securities to be auctioned. The announcement also specified the minimum bid fee, as well as the auction start and closing times.

- **Information available after each auction:**

After each auction, the NY Fed published summary information including the stop-out-rate, the aggregate face value tendered and accepted, as well as the maximum amount allocated to a single bidder. In addition, if during the term of the loan one of the Treasury securities in the original basket traded special and had to be replaced, then the NY Fed would identify on its website the recalled security as well as the general Treasury securities used to replace the special security in the basket.

- **Why an auction?**

As a facility where Treasury securities could be borrowed from the Federal Reserve, the TSLF could be considered an extension to the SOMA Securities Lending program. It therefore appeared natural to rely also on an auction mechanism for the TSLF. Furthermore, given the fact that securitized markets were not functioning properly at the time, an auction mechanism appeared appropriate to price the general Treasury securities to be allocated at TSLF auctions. Finally, as in the case of the TAF, it was believed that an auction could overcome the possible perceptions of stigma that seemed to have affected the efficacy of other facilities relying on a posted price (e.g. the Primary Dealer Credit Facility).

4 Maiden Lane II auctions

In November 2008, as part of the U.S. government financial support to American International Group Inc (AIG), the NY Fed created a limited liability corporation, Maiden Lane II LLC. With a loan from the NY Fed, Maiden Lane II purchased a portfolio of non-agency residential

mortgage-backed securities (RMBS) from subsidiaries of AIG. The portfolio consisted of 855 different securities with a face value of around \$39.3 billion, and a fair market value estimated at \$20.8 billion as of October 31, 2008. Once the decision to divest of the portfolio had been made, the objective was to maximize sales proceeds without disrupting financial markets. To do so, the NY Fed relied on two different auction mechanisms.

In April 2011, as the secondary market for non-agency RMBS started to recover, the New York Fed conducted a set of auctions known as Bids Wanted in Competition (BWIC). A BWIC is a standard market practice used to sell a portfolio of MBS. Technically, a BWIC generally consists of a set of simultaneous but separate single-unit auctions. Specifically, a seller distributes a list of securities to a (generally small) number of potential bidders. The list specifies the amount of total face value for each security for sale. A separate auction is then conducted for each security in which the amount of face value is sold as a whole (not in part) to a single bidder. BWICs typically have reserve prices which are not made public before the auction. On occasion, the reserve prices can be revised downward after the bids have been opened to account for the information contained in the bids. The bidder with the highest price bid for a security is allocated the entire amount of face value (provided that the reserve price is met).

Between and April 4 and June 9, 2011, the New York Fed conducted nine BWICs. Between 8 and 79 securities were offered for sale at each BWIC, corresponding to a total face value ranging from \$458 million to \$3.8 billion per BWIC. On average, 79% of the securities listed at a BWIC attracted bids above their reserve price and were actually sold. Only two of the BWICs were fully subscribed in the sense that every security listed was sold. The last BWIC, conducted on June 9, 2011, was the largest (by a factor of almost 2), but also the least successful as only 36 of the 73 securities offered were actually sold. This relative failure may have been related to the concurrent deterioration in the market for non-agency RMBS in June 2011. Because of this market deterioration, it was feared that subsequent BWICs would no longer attract bids above the reserve prices, and the NY Fed decided to halt its BWIC program. In total, 22 different institutions purchased securities at the nine BWICs for a total face value of \$13.4 billion and a total proceed of close to \$4.7 billion.

To sell the remainder of the Maiden Lane II portfolio, the NY Fed relied on a different mechanism: auctions prompted by a reverse inquiry (hereafter referred to as APRIs). An APRI is initiated when an institution approaches the owner of a portfolio with an unsolicited offer to purchase a specific block of securities. If this initial offer is deemed competitive, then the institution that made the unsolicited offer and the owner of the portfolio first agree whether all or part of the securities in the unsolicited offer should be considered for sale. This revised block of securities is then sold as a whole at an auction in which a small number of selected bidders compete. Because some time may pass between the initial offer and the auction, the institution that made the unsolicited offer is also invited to submit a revised bid. The NY Fed conducted three APRIs on January 19, February 8, and February 28, 2012, in which blocks of \$7.0, \$6.2 and \$6.0 billion in face value were offered for sale to 4, 5 and 5 bidders, respectively.¹⁰

¹⁰ It is worth noting that although the three APRIs had a total of six different bidders and two different winners, none of the auctions was won by the bidder who initially approached the NY Fed with an unsolicited offer.

As further explained below, there are essentially four differences between the BWICs and the APRI's conducted by the NY Fed. First, the list of securities sold at a BWIC was selected by the NY Fed, while the block of securities sold at an APRI was determined in large part by the bidder who made the initial inquiry. Second, while a BWIC consisted of separate auctions for each security, the block of securities was sold as a whole at an APRI. Third, while APRI's included a small number (4.7 on average) of large institutions, BWICs included a much larger (57.3 on average) and more heterogeneous set of potential bidders (e.g. smaller, regional broker-dealers). Fourth, APRI's were at least twice as large as any BWIC in terms of amount of face value put up for sale.

The sale of the Maiden Lane II portfolio was completed on February 28, 2012. The proceeds of the sale enabled the full repayment of the NY Fed's loan (including interests) and generated a net profit of around \$2.8 billion to the taxpayer. Maiden II LLC was subsequently dissolved on March 19, 2012.

- **What was allocated at the auction?**

At auctions conducted on behalf of Maiden Lane II, RMBS securities in the Maiden Lane II portfolio were allocated. The way the securities were allocated differs between BWICs and APRI's.

At a BWIC, the securities were allocated on an individual basis. Specifically, the NY Fed first decided on a list of securities to sell. For each security in the list, the entire amount of face value in the Maiden lane II portfolio was put up for sale. The amount of face value of each security listed was allocated as whole to a single bidder in a separate auction.

At an APRI a block of securities is allocated as a whole to a single bidder. In contrast, with BWICs, the block of securities is not initially selected by the NY Fed. Instead, an institution first approached the NY Fed with an unsolicited offer for a block of securities it wished to purchase. After some negotiations, the NY Fed and the institution agreed on which subset of the securities in the initial offer would actually be put for sale.

- **Who was eligible to bid?**

The institutions eligible to bid at BWICs included primary dealers and other broker-dealers in the non-Agency RMBS market. To be eligible, a broker-dealer had to have gone through the standard counterparty approval process and the credit risk monitoring program of BlackRock Inc. (the investment manager in charge of conducting the auction). As is typical for trading non-agency RMBS, other market participants (banks, insurance companies, pension funds, hedge funds, money managers) who wanted to acquire a security for sale at a BWIC were encouraged to place a bid through an eligible broker-dealer. In total, 67 institutions were eligible to bid at BWICs. On average, 57.3 institutions were invited to bid at a BWIC, 26.7 elected to do so, and 9 institutions submitted winning bids.

In addition to the institution which first approached the NY Fed with an unsolicited offer, an APRI was open to a limited number (up to 4) of primary dealers. For each APRI, the NY Fed chose the bidders on the basis of the strength of their participation at previous BWICs and

APRIs. As with BWICs, other interested parties were invited to place a bid through one of the selected bidder.

- **What constituted a bid?**

At a BWIC, a bid is a pair consisting of i) a security in the list and ii) a price expressed in cents for the entire amount of face value of the security. Bidders could only submit one bid per security, but they could submit bids on as many of the securities listed as they desired.

There was no lower bound constraint on the price that could be bid at a BWIC. Each security, however, was assigned an initial reserve price reflecting what the NY Fed considered to be the fair value of the security at the time the auction was conducted. On occasion, this reserve price was revised downward based on the information contained in the bids submitted. A security would only be allocated if it attracted at least one bid above the reserve price. In part because the fair value of a security could change between the time a BWIC was announced and the time bids were opened, the reserve prices were not announced to the bidders.

At an APRI, a bid is simply a price expressed in cents for the entire block of securities offered for sale. Again, the auction had no lower bounds in terms of price bid. As with BWICs, an APRI had a reserve price. Indeed, although the original bid from the broker-dealer which first approached the NY Fed had been deemed sufficiently competitive, it was possible that the revised bid from this institution, as well as the bids from the other bidders would all be below the NY Fed's reserve price. In other words, the block of securities sold at an APRI was not guaranteed to be allocated at a price at or above the original offer.

- **The Allocation mechanism:**

Because they are single-unit auctions, the allocation mechanism for BWICs and APRIs is straightforward. At a BWIC, the entire amount of face value of a security in the list is allocated to the bidder with the highest price bid for that security provided that the secret reserve price is met. At an APRI the block of securities is simply allocated to the bidder with the highest price bid.

It is worth noting that no institution specific allocation limit was imposed. Indeed, the NY Fed's first order objective was to obtain the best prices from the institutions willing to submit the most competitive bids. As a result, two institutions, Credit Suisse and Goldman Sachs & Co, ended up purchasing respectively 47.8% and 25.8% of the entire Maiden Lane II portfolio. This does not imply, however, that the Maiden Lane II portfolio was not dispersed broadly. Indeed, it is believed that broker-dealers were more likely to purchase securities on behalf of their clients, rather than for their own account.

- **The Payment Mechanism:**

Both BWICs and APRIs are pay-your-bid auctions. In other words, the winner of the APRI's pays the bid it submitted for the block of securities. At a BWIC, the winner of a given security pays the bid it submitted for the entire amount of face value of the security.

- **Timing & Schedule:**

The NY Fed conducted BWICs when the time was perceived to be opportune. As a result, BWICs did not follow a regular schedule. In some cases, two BWICs occurred in the same week. In another case, three weeks separated two consecutive BWICs.

The list of securities offered for bids at a BWIC was sent to potential bidders at 1 pm. Depending on the BWIC, the bidders contacted had between 2 and 3 business days to evaluate the securities for sale and submit their bids. The official announcement specified the exact time until which bids could be submitted. Bidders were informed whether or not their bids were accepted ninety minutes after the bidding period closed.

By definition, APRI did not follow any specific schedule. Instead, an APRI was prompted by a broker-dealer who approached the NY Fed about purchasing a specific block of securities in the Maiden Lane II portfolio. If this initial offer was deemed sufficiently competitive, then the NY Fed invited a set of select broker-dealers and sent them a detailed description of the block of securities to be sold. The time at which bids were due (typically a week later) was also specified. Bidders were informed whether or not their bids were accepted within 3 hours after the bidding period closed.

- **Information available to bidders before each auction:**

The information provided to bidders before a BWIC and before an APRI was similar. In addition to a set of instructions on when and how to submit bids, the official announcement included the list of securities for sale. The list specified the CUSIP and the original face value amount of the security put up for sale. The announcement also mentioned that the NY Fed had reserve prices which were kept confidential.

- **Information released after each auction:**

After each BWIC, different information was released to bidders depending on their bids. The bidder who submitted the highest bid on a security for sale was informed it won that auction and it was given the “cover bid,” i.e. the second highest bid submitted for the security. The bidder(s) with the second highest bid was informed it submitted the cover bid. In addition, every bidder who submitted a bid on a security was given some “color,” i.e. an approximate value at which the security was sold.

In addition to providing specific information to the bidder after each BWIC, the NY Fed regularly released information to the general public. Every month, the NY Fed provided an updated list specifying the face value amount of each security that remained in the Maiden Lane II portfolio, as well as value of each security sold in the past month. In addition, the NY Fed published quarterly updates on the total proceeds from the sales, as well as the identity and total amount purchased by each auction winner. Finally, 3 months after the divestiture of the portfolio, a detailed listing for each individual sale was published. The listing indicates the security, the amount of face value, the price received for each security sold.

- **Why an auction?**

To dispose of the Maiden Lane II portfolio, the NY Fed had a number of objectives it was striving to achieve. First, and possibly foremost, the NY Fed was trying to maximize sales proceeds. The disposition mechanism also needed to be transparent to the bidders and to the public, and it had to provide a level playing field to potential buyers. Because they promote competition in a transparent way giving equal chance to all bidders, auctions appeared especially suited for the task. Finally, the method used to sell the portfolio had to be consistent with current practices in the MBS market, and had to minimize market disruptions. BWIC auctions were initially perceived to be the best way to achieve these objectives. However, the BWIC program was halted in June 2011 when concerns surfaced about the ability to meet the NY Fed reserve prices. Subsequently, the NY Fed decided that selling the remainder of the Maiden lane II portfolio at three large APRI auctions was the best way to maximize sales proceeds with minimal market disruption.

References:

Acharya V., Fleming M., Hrung W. and A. Sarkar, 2012, “Dealer Financial Conditions and Lender of Last Resort Facilities,” NYU Working Paper.

Armantier O., Krieger S. and J. McAndrews, 2008, “The Federal Reserve’s Term Auction Facility,” *Current Issues in Economics and Finance*, Vol 14, No. 5, July.

Benmelech E., 2012, “An Empirical Analysis of the Fed’s Term Auction Facility,” *CATO Papers on Public Policy*, 2, 57-91.

Fleming M., Hrung W., and F. Keane, 2009, “The Term Securities Lending Facility: Origin, Design, and Effects,” *Current Issues in Economics and Finance*, Vol. 15, No. 2, February.

Fleming M., Hrung W. and F. Keane, 2010, “Repo Market Effects of the Term Securities Lending Facility,” *American Economic Review: Papers & Proceedings*, Vol. 100, May.

Goodfriend M., 2011, “Central Banking in the Credit Turmoil: An Assessment of Federal Reserve Practice,” *Journal of Monetary Economics*, Vol. 58, Issue 1, Pages 1-12.

Reinhart V., 2011, “A Year of Living Dangerously: The Management of the Financial Crisis in 2008,” *The Journal of Economic Perspectives*, Vol. 25 No. 1.