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The Federal Reserve's Term Auction Facility

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As liquidity conditions in the term funding markets grew increasingly strained in late 2007, the Federal Reserve began making funds available directly to banks through a new tool, the Term Auction Facility (TAF). The TAF provides term funding on a collateralized basis, at interest rates and amounts set by auction. The facility is designed to improve liquidity by making it easier for sound institutions to borrow when the markets are not operating efficiently.

The Federal Reserve provides reserves almost exclusively through its system of domestic open market operations with a relatively small number of primary dealers. The operations mainly take the form of repurchase agreements against collateral such as Treasury, agency, and agency mortgage-backed securities, as well as outright purchases of Treasury securities. When the interbank funding markets run smoothly, the dealers distribute the reserves to banks, facilitating transactions in the broader economy. Banks in turn base their willingness to lend to one another on their evaluations of the creditworthiness of their counterparties as well as on their own ability to access the funding markets.

During crisis periods, however, a sudden reduction in the willingness or ability of banks to distribute reserves through interbank transactions can disrupt the funding markets and financial intermediation more broadly. In particular, banks of sound credit quality may decide to scale back their "term" lending—lending for periods longer than overnight—to other banks because they are not as certain of either the creditworthiness of their counterparties or their own ability to raise future funds. As a result, banks may have limited access to term funds even if they are willing to pay high interest rates.

Such a situation emerged in the interbank funding markets in the late summer of 2007, following deteriorating performance in much of the market for mortgage-backed securities. Interest rate premiums on unsecured bank funding for one month or longer rose precipitously while the volume of unsecured term funding contracted. The persistence of high term rates kept interest rates elevated on a wide variety of instruments, such as home mortgages and corporate loans. Moreover, banks' increasing dependence on overnight borrowing contributed to higher volatility in overnight interest rates, subjecting the institutions to greater uncertainty about funding costs.

To improve liquidity in the funding markets, the Federal Reserve made a number of changes to its discount window facility, a policy tool historically used to provide backup funds to financially sound depository institutions, particularly during market disruptions. However, as pressure on term funding rates persisted into the fall, the Fed

took the new step of auctioning funds directly to depository institutions, by introducing the Term Auction Facility (TAF) in December 2007.

Through the TAF, sound institutions can obtain longer term funding on a collateralized basis through periodic auctions. The new policy tool shares some features of both open market operations and discount window lending. It originates and distributes the lending through auctions of fixed amounts of funds in a fashion similar to open market operations. At the same time, it lends on a collateralized basis by using the discount window and its collateral management operations. What sets the TAF apart from the discount window, however, is the competitive auction format and use of a market-determined interest rate.

This edition of *Current Issues* offers a detailed look at the Term Auction Facility. We discuss the market conditions leading up to the facility's introduction, other funding steps taken by the Federal Reserve, the central bank's objectives in establishing the TAF, and the structure and operation of the facility. We also describe the results of the first ten TAF auctions conducted through April 2008.

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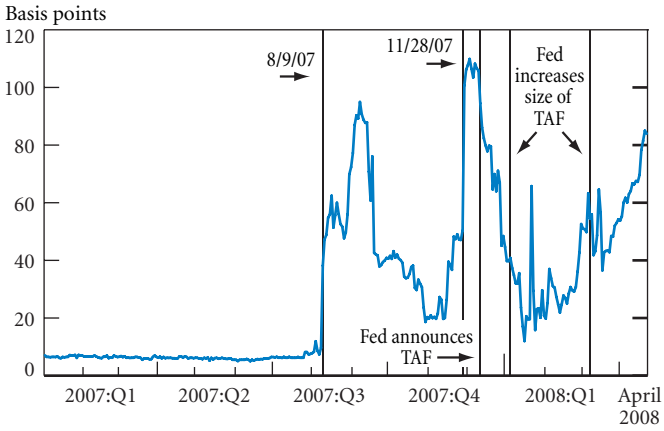
Market Conditions in 2007

Problems associated with the credit quality of subprime residential mortgages and structured finance products surfaced in early 2007.[1] Bank funding markets, however, continued to function relatively normally until the August 9 announcement by BNP Paribas that it could not value assets in three of its investment funds.[2] This public statement of a condition that many firms had been grappling with—uncertainty about the true value of various financial securities created from residential mortgages—affected the interbank money markets in Europe and the United States like a match in a dry forest. A spike occurred in the interest rate on one-month, and longer term, interbank loans. This spike is visible in Chart 1, which shows the spread between term and overnight rates—the first represented by the one-month London Inter-Bank Offered Rate, or LIBOR, and the second by the overnight index swap rate, or OIS, calculated as an average of expected overnight rates over the term of a one-month swap.[3] The average spread jumped from 6.4 to 55.4 basis points during the five months following the announcement.[4] Interest rates on other maturities displayed similar behavior of increased spreads and greater volatility.

Following its steep rise on August 9, the LIBOR-OIS spread peaked in September—reaching its highest point since the 1990 credit crunch.[5] After a decline in September

Chart 1
LIBOR-OIS Spread



Sources: Bloomberg L.P.; Board of Governors of the Federal Reserve System.

Notes: All rates are for a term of one month. TAF is the Term Auction Facility; LIBOR is the London Inter-Bank Offered Rate; OIS is the overnight index swap rate.

[1] Structured finance products are instruments such as mortgage-backed securities created by pooling underlying mortgages, as well as other instruments created to redistribute the risk attributes of underlying streams of income into a structure that can be parceled out to owners in different ways.

[2] BNP's press release stated that "the complete evaporation of liquidity in certain market segments of the U.S. securitisation market has made it impossible to value certain assets fairly regardless of their quality or credit rating.… In order to protect the interests and ensure the equal treatment of our investors, during these exceptional times, BNP Paribas Investment Partners has decided to temporarily suspend the calculation of the net asset value as well as subscriptions/redemptions…." The release can be found at <http://www.bnpparibas.com/en/journalists/news.asp>.

[3] LIBOR is an average interbank borrowing rate gathered and published daily by the British Bankers Association. For the U.S. dollar, the British Bankers Association assembles the interbank borrowing rates from sixteen contributor panel banks at 11 a.m., looks at the middle eight rates (discarding the top and bottom four), and uses them to calculate an average, which then becomes that day's LIBOR. An overnight index swap is a fixed/floating interest rate swap with the floating leg tied to the daily effective federal funds rate; it measures the expected overnight rates over the term of the swap. When measuring the relative size of term rates, it is conventional to use the spread between LIBOR and OIS because it corrects for any expected changes in overnight rates.

[4] Source: Bloomberg L.P., OIS-LIBOR one-month spreads for the periods January 1, 2007-August 8, 2007, and August 9, 2007-December 31, 2007.

[5] For information on the 1990 credit crunch, see Bernanke and Lown (1991).

and October, the spread increased sharply on November 28 (the first day on which one-month deposits would extend past year-end) and reached a peak of 110 basis points on December 4. Although we focus on the one-month LIBOR, the pattern is very similar across many terms up to a year. The fact that term rates were so elevated relative to overnight funding reveals that banks faced more difficulty borrowing at all but the shortest terms in fall 2007.

Problems linked to structured finance products affected the term money markets because commercial banks had invested in these products through off-balance-sheet entities.[6] Banks had provided implicit and explicit guarantees to these entities in case their access to short-term borrowing was curtailed or became too expensive. As investors lost confidence in the streams of income flowing into the structured finance vehicles, they pulled away from investing in them further, and asset-backed commercial paper issuances declined.[7] The decline in issuances led to calls on banks' liquidity and credit guarantees; thus, banks had to fund the underlying assets. The depository institutions also faced large expected future demands for funds as they anticipated further calls on their promises to provide credit.

The fact that term rates were so elevated relative to overnight funding reveals that banks faced more difficulty borrowing at all but the shortest terms in fall 2007.

The market for newly issued securitized credit declined sharply during this period and reduced a source of funding to banks that originated large amounts of mortgages and other loans.[8] Consequently, banks experienced a decrease in their ability to sell loans in securitized markets at the same time that they were contending with a greater demand for funds arising from their prior commitments to supply funds. Overall, the institutions faced a sizable rise in the current and expected future demand for funding.

Lenders in the money markets grew increasingly concerned, both about the credit risks associated with commercial banks and the reduced market liquidity. Their growing reluctance to lend combined with banks' heightened funding needs created a large imbalance between the supply of and demand for longer term loans. As banks typically account for much of the lending in the short-term money markets, this imbalance caused a significant contraction in market activity. Short-term funding pressures thus intensified in European and U.S. money markets (European banks fund many dollar-denominated assets, and hence must attract funding in dollars as well).

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Concerns about counterparty risk and the ability to access future funding in turn exacerbated conditions in the term money markets. Term premia on unsecured interbank funding in these markets increased and volume decreased, and funding terms were progressively shortened.[9] The higher term premia in turn affected borrowing rates, because many loans are priced according to LIBOR rates for comparable maturities. Significantly, banks with excess funds did not step in to provide lower rates for term loans, an action that could have eased liquidity conditions.

Given the high spreads and contraction of activity in the term funding markets, banks resorted to overnight markets to meet their funding needs. However, overnight rates in the federal funds market and in the Eurodollar market (represented by the overnight LIBOR interest rate) became much more volatile after August 9, 2007.[10] The higher volatility in overnight rates made banks' funding costs less predictable,

[6] Examples of such entities are structured investment vehicles, collateralized debt obligations, and conduits. These structured credit institutions are funds that hold long-term assets, such as mortgage-backed securities, and fund them through the sale of short-term debt, such as asset-backed commercial paper and other securities.

[7] Asset-backed commercial paper is a primary source of funding for structured investment vehicles. See the table "Commercial Paper Rates and Outstanding" (<http://www.federalreserve.gov/releases/cp/>).

[8] For example, non-agency mortgage-related issuances of securities fell from approximately $773 billion in 2006 to $678 billion in 2007 and to much lower levels in the first months of 2008. See the table "Mortgage-Related Issuance" prepared by the Securities Industry and Financial Markets Association (<http://www.sifma.org/research/pdf/mortgage_related_issuance.pdf>).

[9] See Michaud and Upper (2008).

[10] See Federal Reserve Bank of New York (2008, pp. 27-30) and British Bankers Association (<http://www.bba.org.uk/bba/jsp/polopoly.jsp?d=141&a=11947>). The Eurodollar market is a market for Eurodollar deposits, which are deposits denominated in dollars in a bank or bank branch outside the United States or in international banking facilities. See Stigum and Crescenzi (2007) for a description.

and the institutions faced a greater roll-over risk—the risk that they would be unable to renew, or "roll over," their borrowing when a loan matured—than they would have under normal circumstances. As a result, the short-term money markets were operating less efficiently than usual in allocating funds to banks.

The Federal Reserve's Response to Conditions in the Money Markets

On August 17, 2007, the Federal Reserve announced several changes to the discount window's primary credit program in an effort to facilitate orderly functioning of the short-term credit markets.[11] The central bank reduced from 100 to 50 basis points the premium on the primary credit or "discount" rate over the target federal funds rate. To address tensions in the term funding markets specifically, the Fed also allowed eligible institutions using the primary credit program to borrow funds for up to thirty days, with the possibility of renewal.

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This policy change, however, generated little additional borrowing from the discount window.[12] The outcome may be explained in part by the fact that the one-month term interbank market rate was almost equal, on average, to the expected discount rate.[13] Furthermore, the commonly held market belief that use of the discount window carries a stigma may have made borrowing from the window a less attractive option than turning to the markets for funding. Indeed, studies suggest that potential borrowers shy away from the discount window out of concern that such borrowing will be seen as a sign of weakened creditworthiness, which could impair a bank's ability to borrow at favorable rates in the market.[14] In times of high uncertainty about creditworthiness, such concern may have been more widespread and may explain the relatively modest discount window borrowing—despite encouragement by Fed officials.[15]

In October 2007, several factors—including reductions in the target federal funds rate, the decrease in the spread between the primary credit rate and the target funds rate, and the availability of term funding through the FHLBank System—combined to stabilize funding conditions in the interbank markets.[16] However, conditions worsened again in late November and early December.[17] In part, the deterioration may have reflected the typically reduced supply of funding at year-end, attributable to seasonally higher economic activity and banks' regulatory and tax-related desires to show safe and liquid assets on their year-end statements. Many market participants reported extremely tight term funding conditions, as reflected in the jump in the LIBOR-OIS spread (Chart 1).

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Direct Auctions of Funds

In response to the credit crunch, the Federal Reserve explored other measures to facilitate lending to solvent depository institutions. In particular, the central bank re-examined the idea of auctioning funds directly to the institutions, a strategy it had studied in 2000.[18] In considering the

[11] See <http://www.federal reserve.gov/newsevents/press/monetary/20070817a.htm>. Primary credit is the Federal Reserve's principal discount window program.

[12] See Board of Governors of the Federal Reserve System (2008, p. 26).

[13] We define the expected discount rate as the expected target federal funds rate, measured by the one-month OIS rate, plus 50 basis points over the August 17-December 31 period. During this period, the one-month LIBOR averaged 5.055 percent and the expected discount rate averaged 5.056 percent.

[14] For example, see Furfine (2003).

[15] As reported in the financial press, on August 18 the vice chairman of the Board of Governors of the Federal Reserve System and the president of the Federal Reserve Bank of New York held a conference call with major banks advising them that discount window borrowing would be seen as a sign of strength (see, for example, <http://www.bloomberg.com/apps/news?pid=20601087&refer=home&sid=aE1A7RkmKsag>). Nonetheless, discount window borrowing remained relatively modest.

[16] The FHL Bank (Federal Home Loan Bank) System provided significant amounts of term funding to the U.S. banking system by increasing its lending by approximately $200 billion over the second half of 2007. See <http://www.fhlb-of.com/specialinterest/financialframe.html>.

[17] See Bank of England (2007).

[18] See Board of Governors of the Federal Reserve System (2002).

use of fund auctions in 2007, the Fed shifted its focus from implementing monetary policy to addressing adverse liquidity conditions in the interbank markets. (Box 1 discusses the Fed's advantages over traditional banks when lending during liquidity shortages.)

The Federal Reserve viewed an auction approach as having three particularly attractive benefits over the discount window and open market operations. First, auctions would enable the Fed to control precisely how much, and when, liquidity would be injected into the markets. An alternative approach—providing reserves by reducing the spread between the discount window rate and the target federal

Box 1
Lending during a Credit Crisis

The Federal Reserve has three potential advantages over traditional banks when making loans during adverse liquidity conditions: access to a large amount of collateral, confidential information on banks' creditworthiness, and exposure to less liquidity risk.

First, the Fed holds a large pool of collateral in the form of banks' pledged assets at the discount window. Most of these assets—consisting mainly of bank loans—are difficult for banks to borrow against in private markets because of the absence of supporting market conventions and pricing services, making the collateral difficult to use as security for private loans.[a]

Second, the Federal Reserve systematically monitors banks' financial health as part of its normal supervisory duties.[b] The Fed is informed of the "CAMELS" rating of all depository institutions, even the ones for which it is not the primary supervisor.[c] By limiting term lending to banks with CAMELS ratings of 1 to 3—the highest credit quality and the fewest supervisory concerns—the Fed can be reasonably confident of a borrower's ability to repay.[d] In fact, recently issued CAMELS ratings have been shown to be a useful predictor of defaults.[e] Under normal conditions, the supervisory information obtained by the Federal Reserve may be a less reliable signal of a firm's financial health than the information possessed by the firm's private counterparties, since banks monitor one another when engaged in a lending relationship.[f] However, in crisis conditions, knowledge of a bank's supervisory rating may be more informative about basic creditworthiness than market insight because activity is typically reduced to very low levels and prices are often extremely volatile.

The Federal Reserve has a third potential advantage when lending during a crisis. In distressed funding markets, banks are reluctant to lend because they may not be aware of either their future liquidity needs or their future borrowing ability, given the unsettled conditions. These conditions have much less of an effect on the Fed, in part because it holds a portfolio of (very liquid) Treasury securities that can be sold or redeemed to fund loans and in part because it can expand its holdings of the securities. The central bank is therefore exposed to less liquidity risk.

[a] Using these assets to make collateralized loans shifts risk away from the loans and toward the bank's remaining uncollateralized creditors (or its residual claimants—including the Federal Deposit Insurance Corporation, a public sector entity); there is no overall reduction in risk. If it is moderately expensive to collateralize lending (owing to the need for legal services, supporting infrastructure to manage the collateral, and pricing services), then as a practical matter it might be more economical for private parties to lend on an unsecured basis.

[b] For information on the examination of federally supervised financial institutions, see Federal Financial Institutions Examinations Council (<http://www.ffiec.gov/>).

[c] CAMELS refers to the six assessed components of a bank's financial condition: capital adequacy, asset quality, management, earnings, liquidity, and sensitivity to market risk; the sixth component was added in 1997. A bank's CAMELS rating is highly confidential and known only by its senior management and the appropriate supervisory staff. For foreign banking organizations, the Reserve Banks rely on SOSA (strength of support) ratings.

[d] Examiners assign a rating of 1 to 5 for each component of CAMELS, with 1 representing the highest rating, as well as a composite rating for the bank's overall condition and performance. Banks with composite CAMELS ratings of 1 or 2 are considered to present few supervisory concerns, while those with ratings of 3 or higher present moderate to extreme degrees of supervisory concern. The Federal Reserve lends to borrowers with a 1, 2, or 3 rating through the primary credit program of the discount window and to banks with a rating of 4 or 5 through the secondary credit program. The Fed also has a third window for seasonal borrowing—for example, by agricultural banks. When a bank borrows from the discount window, the Federal Reserve does not reveal whether it has borrowed as a primary or secondary credit.

[e] The largest financial institutions are monitored continuously by the Federal Reserve. For the smallest banks, a CAMELS score might be updated as infrequently as every eighteen months. The older a score the less reliable a predictor it is of a bank's likelihood of repayment. See Cole and Gunther (1998).

[f] Holmstrom and Tirole (1998) argue that the private provision of liquidity is preferable unless private market information becomes unreliable.

funds rate to a level low enough to overcome any perceived stigma—could have resulted in a very volatile and unpredictable demand for funds. Funds loaned through the discount window's primary credit program are delivered on the day they are requested; volatility in demand would therefore make it harder for the Fed to manage the total supply of reserves while keeping the effective federal funds rate close to the target rate. Thus, by auctioning a set amount of funds, dispersed with a lag, the central bank could integrate the new process more easily into its regular monetary policy operations.

By auctioning a set amount of funds, dispersed with a lag, the central bank could integrate the new [auction] process more easily into its regular monetary policy operations.

Second, competitive and well-functioning auctions for term credit could circumvent the stigma associated with the discount window. Auctions require banks to bid simultaneously; the interest rate at which the funds are allocated is determined by the demand for the funds. An auction format would enable banks to approach the Federal Reserve collectively rather than individually and obtain funds at a rate set by auction rather than at a premium set by the Fed. Thus, institutions might attach less of a stigma to auctions than to traditional discount window borrowing.

Third, an auction format could enable the Federal Reserve to allocate funds directly to a larger number of sound banking institutions—in particular, those with the greatest need for the loans. (Recall that when conducting open market operations, the Fed lends only to a relatively small number of primary dealers.) A wider dispersion of funds would be especially useful in the distressed interbank markets.

Auction Design

Once the Federal Reserve concluded that an auction format was an effective funding alternative, it added features aimed at ensuring the most efficient distribution of funds to banks with a high demand. In particular, the Fed established a minimum rate at which bids could be submitted that was set in a comparable, competitive market (rather than a penalty rate, which is set at a premium to existing market rates).[19] This market-based minimum bid rate was likely to encourage participation and reduce any stigma associated with receiving auctioned funds, since banks would not necessarily signal an abnormally high demand by bidding. The Federal Reserve also chose a uniform-price (or single-price) auction rather than a discriminatory (pay-your-bid) auction in part to spur participation further.[20] By using the uniform-price structure common in Treasury auctions, the Fed reasoned that banks would be more comfortable with bidding. Finally, to allow for the widest allocation of funds, the central bank imposed a cap on the bid amount corresponding to 10 percent of the auction size.

The Fed also imposed two important rules. First, based on its experience with option auctions in 1999, it would allow each bidder to make two rate-amount offers.[21] This rule represents the Fed's resolution of the trade-off associated with multiple rate-amount offers: as the number of offers increases, the auction becomes more complex, but participants are able to make bids that are more representative of their demand. Second, the central bank would require TAF participants to pledge collateral beyond the amount necessary to secure credit in the new facility. This rule was imposed to ensure that bidders in the new facility could still borrow through the discount window's primary credit facility to meet unexpected overnight funding needs.

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Creation of the Term Auction Facility

On December 12, 2007, the Federal Reserve announced the introduction of the Term Auction Facility, together with a series of coordinated actions by other central banks.[22] In particular, the Fed established foreign exchange swap lines with the European Central Bank and the Swiss National

[19] In practice, the minimum rate was set at the thirty-day OIS rate. Banks would not be able to borrow at a rate lower than what they were likely to pay to roll over one-day loans. However, there would be no minimum premium over that rate for obtaining longer term funds.

[20] For a discussion, see Armantier and Sbai (2006).

[21] See Drossos and Hilton (2000).

[22] See <http://www.federalreserve.gov/newsevents/press/monetary/20071212a.htm>.

Box 2

Operation of TAF Auctions

The Federal Reserve has typically conducted Term Auction Facility (TAF) auctions of twenty-eight-day term funding. The interval between auctions has been biweekly, except for periods around holidays.

The TAF operates in a fashion similar to the discount window.[a] Depository institutions eligible for primary credit through the discount window—those determined to be in generally sound financial condition by their District Reserve Bank—can participate. Borrowing is fully collateralized; assets used as collateral are those eligible to be pledged at the discount window. The Federal Reserve uses standard discount window haircuts to value the collateral pledged.[b] In addition, the maximum TAF funding for which an institution can bid, including loans that would be outstanding concurrent with that auction's awards, cannot exceed 50 percent of available pledged collateral. Individual propositions per bidder at any auction are limited to a maximum of two. To promote a relatively large number of winning bids, the Fed limits the maximum auction award to any individual institution to 10 percent of the announced auction quantity. The minimum bid size was initially set at $10 million, but it was later reduced to $5 million to allow smaller institutions to participate. The TAF auction itself follows the single-price format used in Treasury auctions; the format is designed to encourage participation.

A typical TAF auction occurred on March 10, 2008. At 10 a.m. ET, the Federal Reserve announced bidding.[c] The announcement included information on when eligible banks could submit bids (11 a.m. to 1 p.m.), the amount of funds being auctioned ($50 billion), the minimum and maximum size of bids ($5 million and $5 billion—the latter representing 10 percent of the total amount), the minimum interest rate at which bids could be submitted (2.39 percent), the term of the loan (twenty-eight days), and other details. At 11 a.m., banks began submitting bids by telephone to their Reserve Bank.

On March 11 at 10 a.m., the Federal Reserve announced the results of the auction.[d] The interest rate on the loans allocated was determined to be 2.8 percent (41 basis points above the minimum bid rate), eighty-two banks had submitted bids, and the total amount of propositions was $92.6 billion, or 1.85 times the amount available at auction. Finally, the winning banks had funds credited to their accounts on March 13 and they repaid the loans on April 10.

[a] When the Federal Reserve lends to a bank through the discount window or through the TAF, it intends to *sterilize* the borrowing. In other words, it conducts open market operations to offset the injection of reserves that occurs when the loan is made. Banks in total will have the same amount of reserves in aggregate both before and after a TAF auction. However, after the auction, the financial sector typically will hold more government securities than before, and the Federal Reserve will hold more loans to banks on its balance sheet. Like the discount window, the TAF operates not by increasing the quantity of reserves held by banks, but by changing the composition of the Fed's asset holdings.

[b] A haircut is the percentage difference between the market value of the collateral and the amount that a lender can borrow. The margin is calculated as the haircut times the price of the collateral.

[c] See <http://www.federalreserve.gov/newsevents/press/monetary/20080310a.htm>.

[d] See <http://www.federalreserve.gov/newsevents/press/monetary/20080311b.htm>.

Bank that would facilitate the two central banks' extension of term loans in U.S. dollars to banks in their jurisdictions.[23]

The first TAF auction was held on December 17, with subsequent auctions generally occurring every two weeks (Box 2 describes how the auctions operate). The Federal Reserve indicated on December 21 that it would continue to hold auctions "for as long as necessary to address elevated pressures in short-term funding markets."[24] On March 7, 2008, the Fed announced that it would "continue to conduct TAF auctions for at least the next six months unless evolving market conditions clearly indicate that such auctions are no longer necessary."[25] The auctions appear to be a success in terms of participation, and they are mitigating difficulties in the funding markets.[26]

[23] For detailed information on the implementation of the TAF, see <http://www.federalreserve.gov/monetarypolicy/taffaq.htm>.

[24] See <http://www.federalreserve.gov/newsevents/press/monetary/20071221b.htm>.

[25] See <http://www.federalreserve.gov/newsevents/press/monetary/20080307a.htm>.

[26] See McAndrews, Sarkar, and Wang (2008).

The Term Auction Facility: Auction Results
December 17, 2007 - April 21, 2008

	2007		2008							
Auction	1	2	3	4	5	6	7	8	9	10
Date	Dec. 17	Dec. 20	Jan. 14	Jan. 28	Feb. 11	Feb. 25	Mar. 10	Mar. 24	Apr. 7	Apr. 21
Amount allocated (billions of dollars)	20	20	30	30	30	30	50	50	50	50
Minimum bid (OIS) rate (percent)[a]	4.17	4.15	3.88	3.10	2.86	2.81	2.39	2.19	2.11	2.05
Stop-out rate (percent)	4.65	4.67	3.95	3.123	3.01	3.08	2.8	2.615	2.82	2.87
Spread between stop-out rate and expected discount rate (basis points)	2	1	-40	-42	-36	-25	-8	19	45	57
Total amount bid (millions of dollars)	61,553	57,664	55,526	37,452	58,400	67,958	92,595	88,869	91,569	88,288
Bid-to-cover ratio	3.08	2.88	1.85	1.25	1.95	2.27	1.85	1.78	1.83	1.77
Number of bidders	93	73	56	52	66	72	82	88	79	83

Source: Federal Reserve Bank of New York.

[a]The OIS rate is the overnight index swap rate.

Results of the First Ten Auctions

The Fed conducted ten TAF auctions between December 17, 2007, and April 21, 2008 (see table).[27]

The amount allocated in each of the first two auctions was $20 billion. To address a perceived increase in the demand for funds, the Federal Reserve raised the amount to $30 billion in each of the next four auctions, and then to $50 billion. The first eight auctions attracted significant competition for funds, as measured by the bid-to-cover ratio. After initially declining slightly, the ratio—the total amount bid in an auction divided by the total amount allocated—remained essentially stable, at around 2. Practitioners typically interpret a bid-to-cover ratio of 2 as a sign of a competitive multi-unit auction.[28]

> Participation in the TAF auctions has generally been strong, never falling below fifty bidders per auction through April 2008.

Participation in the TAF auctions has generally been strong, never falling below fifty bidders per auction through April 2008. Such participation suggests that many depository institutions are finding the auctions valuable. Indeed, after an initial decline over the first four auctions, from ninety-three to fifty-two bidders, TAF participation has grown noticeably, reaching eighty-eight bidders by the eighth auction.

Furthermore, in most of the auctions, the spread between the stop-out rate of the TAF and the expected discount rate was well below or close to zero.[29] That is to say, banks were able to borrow TAF funds for twenty-eight days at a slightly lower rate than what they could have expected on discount window funds. Notable exceptions were the late-March and the April auctions, which had stop-out rates that exceeded the expected discount rate—defined as the OIS rate plus 50 basis points prior to March 16 and the OIS rate plus 25 basis points thereafter—by considerable amounts. This result may support the presence of a discount window stigma,

> The TAF stop-out rate has tended to settle close to the one-month LIBOR, suggesting that the new facility has allocated funds at rates generally consistent with market rates.

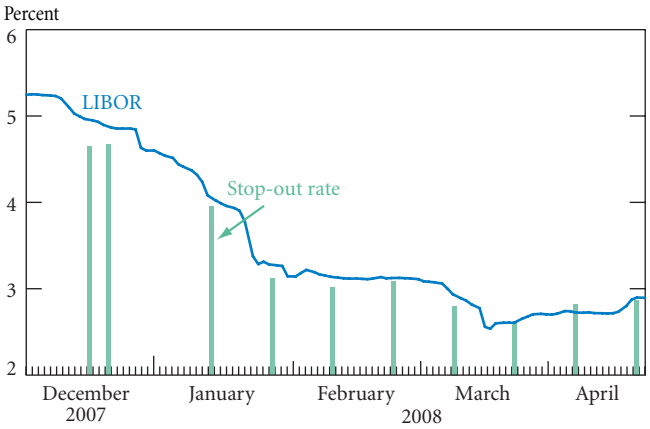
because banks appeared willing to borrow through the TAF at rates that exceeded the expected borrowing cost using the discount window over the period. Moreover, the TAF stop-out

[27] More details on the first ten auction results and on subsequent auction results are available at <http://www.federalreserve.gov/monetarypolicy/taf.htm>.

[28] For example, see Downes and Goodman (2003).

[29] The stop-out rate is the auction clearing price at which aggregate demand matches the amount supplied by the Federal Reserve. Over the period, the primary credit rate was initially at a 50 basis point spread over the target federal funds rate; later (on March 16, 2008), the spread moved to 25 basis points. The expected discount rate is measured as the OIS rate plus the spread of the primary credit rate over the target federal funds rate.

Chart 2
LIBOR and the Term Auction Facility Stop-Out Rate



Sources: Bloomberg L.P.; Board of Governors of the Federal Reserve System.

Notes: All rates are for a term of one month. LIBOR is the London Inter-Bank Offered Rate.

rate has tended to settle close to the one-month LIBOR (Chart 2), suggesting that the new facility has allocated funds at rates generally consistent with market rates.[30]

Conclusion

The Term Auction Facility is a supplementary tool that assists the Federal Reserve in meeting its monetary policy and financial stability objectives when a breakdown of liquidity conditions occurs in the uncollateralized interbank term funding markets. The TAF combines features of open market operations and the discount window's primary credit loans to provide term funding directly to banks on a collateralized basis, at interest rates and allocation quantities determined by auction.

The facility is designed to be useful when short-term money markets are not operating efficiently, and when borrower appetite for even a term discount window program is limited because of some combination of stigma and price. In these situations, by satisfying at least some of the demand for term funds that is not being met by the markets, the TAF may offer banks greater assurance of their ability to borrow term funds, thereby reducing constraints on the institutions' allocation of credit.

[30] This result does not suggest whether or how the TAF itself may influence market rates. After the eighth auction, in which the TAF stop-out rate exceeded the LIBOR, there were many news accounts of banks possibly underreporting interest rates to the British Bankers Association. For example, see Carrick Mollenkamp, "LIBOR Surges after Scrutiny Does, Too," *Wall Street Journal*, April 18, 2008. See also British Bankers Association (<http://www.bba.org.uk/bba/jsp/polopoly.jsp?d=141>).

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