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Primary Dealer Credit Facility

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Primary Dealer Credit Facility

Karen Y. Yang[1]

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Abstract

On March 16, 2008, the Federal Reserve created the Primary Dealer Credit Facility, or PDCF, to provide overnight funding to primary dealers in the triparty repurchase agreement (repo) market, where lenders had become increasingly risk averse. Loans were fully secured by (initially) investment grade securities and offered at the Primary Credit rate by the Federal Reserve Bank of New York. The eligible collateral was significantly expanded in September 2008 after rumors of Lehman Brothers potentially filing for bankruptcy, to include all of the types of instruments that could be pledged at the two major triparty repo clearing banks. The PDCF was a means for the Federal Reserve to provide lender-of-last-resort funding directly to primary dealers, including the five largest U.S. investment banks, which it could not do before. The program also served to buy time for dealers to find other methods of financing. During its tenure, the facility was actively used with the highest daily amount of outstanding loans at $130 billion, which occurred in September 2008. Overall, 18 of the 20 primary dealers participated in the program, although, unlike the other major program targeting primary dealers, the Term Securities Lending Facility, most participation was by U.S. firms. The facility was closed on February 1, 2010. All loans extended under this facility were repaid in full, with $593 million in interest and fees collected. It has been credited, with other similar programs, to relieve the severe liquidity stresses on primary dealers during the height of the crisis.

Keywords: PDCF, repo market, primary dealers, liquidity

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Primary Dealer Credit Facility

At a Glance

In March 2008, Bear Stearns nearly failed due to an inability to raise sufficient funds in the repurchase agreement (repo) markets. Lenders were worried about the creditworthiness of borrowers as well as the risk of their collateral (especially mortgage-backed securities). Concerned that another primary dealer might experience a run as Bear had, on March 11, 2008, the Federal Reserve (Fed) announced the Term Securities Lending Facility (TSLF) to provide primary dealers with an alternative source of funding for illiquid assets. However, the TSLF would not hold its first auction until March 27.

Thus, on March 16, 2008, the Fed announced the Primary Dealer Credit Facility (PDCF), which was intended to calm the financial markets by providing primary dealers overnight collateralized loans from the Fed at the primary credit rate. The PDCF was established under the Fed's emergency authority under Section 13(3) of the Federal Reserve Act as a lender in "unusual and exigent circumstances" and relied on the two major tri-party repo clearing banks to perform collateral and valuation services for PDCF loans (haircuts were applied). Loans were made with recourse to the borrower's other assets.

The program was immediately utilized, with outstanding loans quickly rising to $40 billion in late March before falling to zero in July 2008. Usage spiked again in September 2008 when Lehman Brothers' bankruptcy instigated an additional market strain. As a result, the Fed expanded PDCF-eligible collateral to encompass all collateral eligible in the tri-party repo system, including some whole loans as well as below-investment-grade and unrated securities. Outstanding PDCF loans peaked at $130 billion on September 23, 2008 before falling again as financial market conditions improved. The Fed also made loans similar to the PDCF loans to London affiliates of four primary dealers, which when aggregated with PDCF loans, resulted in a peak of $156 billion outstanding loans on September 29, 2008.

The PDCF was similar to the Discount Window, as both served as a standing backstop source of overnight liquidity. The facility successfully concluded on February 1, 2010. All credit extended by the PDCF was repaid with interest.

Summary of Key Terms

Purpose: To improve the ability of primary dealers to provide financing to participants in securitization markets and promote the orderly functioning of financial markets more generally

Announcement Date	March 16, 2008
Operational Date	March 17, 2008
Expiration Date	February 1, 2010
Legal Authority	FRA Section 13(3)
Term	Overnight
Rate	Primary credit rate
Collateral	Originally OMO acceptable collateral and investment grade securities. In September 2008 broadened to any tri-party repo collateral
Other	Recourse, frequency use fee
Peak Utilization	$130 billion
Participants	Primary dealers and handful of London affiliates of 4 primary dealers

Summary Evaluation

The PDCF is generally seen as having been successful, although it is unclear how successful the program was in restoring liquidity in the securitization market. Participation was widespread, surging after Lehman's bankruptcy when the interbank markets were particularly tight. Additionally, the broadening of eligible collateral in September 2008 helped reduce the likelihood that primary dealers would sell assets in distressed markets to meet their liquidity needs.

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I. Overview

Background

By late 2007, problems in the subprime mortgage market began to spread into the interbank lending markets and panic grew, resulting in a contraction in some types of lending, particularly term lending. Primary dealers, which are the securities firms that trade with the Federal Reserve in order to implement monetary policy, were particularly dependent on triparty repurchase agreements (repos) for their funding. As term funding became more expensive, outstanding overnight triparty repurchase agreements (repos) by primary dealers grew to a peak of $3 trillion in March 2008, the equivalent to 75% of total primary dealer financing, reflecting significant rollover risk. Furthermore, Lenders were worried about the risk of the collateral they were buying, especially the mortgage-backed securities, resulting in rising haircuts, even for safer collateral such as Treasuries. The risky collateral brought risk into the market and increased the chance of a repo run (as would impact Bear Stearns), which then could lead to sales of securities at depressed prices. (Adrian, Burke, McAndrews, 2009).

The Fed's earlier programs were limited to providing liquidity only to depository institutions, and there was no guarantee that the liquidity provided to these depository institutions would be passed-on to primary dealers. Therefore, the Federal Reserve sought to provide liquidity directly to primary dealers.

On March 7, the Fed introduced a single-tranche open market operation that allowed primary dealers to borrow at a 28-day term – much longer than its typical overnight loans – using traditional OMO collateral (see separate note). However, that program accepted only high-quality collateral. On March 11, 2008, the Federal Reserve Board announced the Term Securities Lending Facility (TSLF), which allowed participants (primary dealers) to exchange less liquid collateral for Treasuries, which would be acceptable as repo collateral. However, the TSLF's first auction would not be held until March 27, 2008. In the following days Bear Stearns's near failure additional liquidity strains were observed in the repo market, the Federal Reserve Board grew concerned that other primary dealers might face runs on their liquidity, as Bear had. It was also concerned about the risk that the clearing banks were facing at the increased possibility that a major financial institution might fail. The clearing banks held borrowers' collateral overnight on behalf of repo lenders – typically short-term investors, like money market mutual funds – who lent cash overnight. But during the day, the clearing banks "unwound" the trades, returning cash to the lender and collateral to the borrower – and essentially lending their own cash to the borrower. If a clearing bank chose not to unwind a borrower's trades out of concern it might default during the day, all of its repo lenders would be left holding collateral that they then would be forced to sell quickly, flooding a depressed market. (Adrian, Burke and McAndrews 2009). Thus, the Fed sought to provide a more immediate and direct solution. (GAO 2011).

Program Description

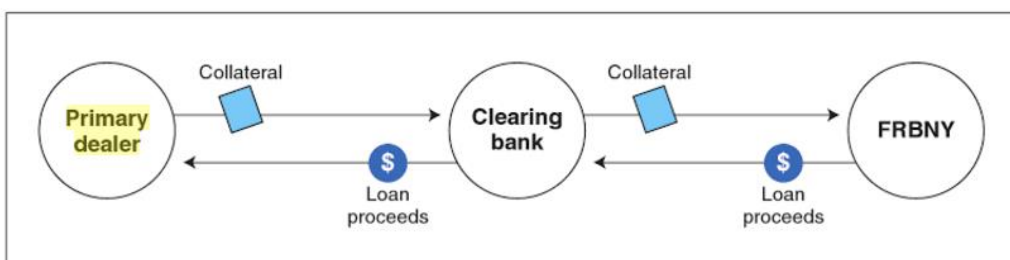
At the height of the Bear Stearns crisis, the Federal Reserve worked continuously over the weekend of March 15-16 to create a facility that could assist primary dealers with funding in the event that Bear Stearns filed for bankruptcy (OIG 2010). The Federal Reserve Board granted the FRBNY the authority to establish the Primary Dealer Credit Facility (PDCF), announced on March 16th, 2008, to "improve the ability of primary dealers to provide financing to participants in securitization markets and promote the orderly functioning of financial markets more generally." (Federal Reserve 2008).

The PDCF was established under the Fed's powers granted to it under Section 13(3) of the Federal Reserve Act, which allowed it to act as a "lender of last resort" to nonbanks in "unusual and exigent circumstances" and if the borrower was unable to attain other means of credit. Any loans made under Section 13(3) had to be secured to the satisfaction of the lending reserve bank.

The PDCF provided overnight, secured loans to primary dealers. To carry out this mission, the PDCF utilized its existing operational relationships with the primary dealers and the tri-party repo system which it used for its OMO repo operations and in which JP Morgan Chase & Co. and Bank of New York Mellon were the two triparty repo clearing banks (GAO 2011). This enabled the Fed to make the PDCF operational just one day after announcing it.

To participate in the PDCF, primary dealers signaled a request for an overnight loan to their clearing banks, usually before 5 p.m. ET on business days. Once the clearing bank confirmed that a sufficient amount of eligible collateral had been pledged to cover the loan, it would price the pledged collateral and apply a haircut. The clearing bank would proceed to notify the Federal Reserve Bank of New York (FRBNY), who would then also acknowledge that the primary dealer had pledged a sufficient amount of margin-adjusted eligible collateral. The FRBNY then transferred the loan amount to the clearing bank for credit to the primary dealer's account. This process is illustrated in Figure 1.

Figure 1: Structure of the PDCF



Source: GAO 2011

Loans made under the PDCF were collateralized but also made with recourse, ensuring that the primary dealer was responsible for repayment even if the collateral lost value overnight.

Initially, eligible collateral for the PDCF was restricted to collateral that was eligible in the Fed open-market operations (OMOs), investment-grade securities, including corporate bonds, municipal securities, and asset-backed securities (ABS), including

mortgage-backed securities. In September 2008, eligible collateral was expanded to match all types of collateral eligible in the tri-party repo system, which included some noninvestment grade securities, equity securities and whole loans.

For collateral eligible in OMOs, haircuts assigned were equivalent to haircuts under the OMOs. For collateral not eligible in OMOs, haircuts were determined by the asset's risk and were generally higher than those under OMOs standards. The PDCF was designed to last six months, subject to extension based on market conditions.

PDCF operations were published in a weekly (Federal Reserve's H.4.1 weekly statistical release, *Factors Affecting Reserve Balances of Depository Institutions and Condition Statement of Federal Reserve Bank*) and monthly (Credit and Liquidity Programs and the Balance Sheet) release on the Federal Reserve Board's public website. (OIG 2010). Only broad numbers were reported, such as the average daily loan size for the week. The names of specific borrowers were not disclosed in order to protect borrowers from stigma associated with relying on the Fed for loans. The Fed hoped that this level of anonymity would encourage participation in the program. In December 2010, the Fed released PDCF loan details, along with details from its other emergency lending programs, in accordance with the new requirements of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.

The funding and management of the PDCF was conducted by the FRBNY. However, the Federal Reserve Bank of Chicago (FRB-Chicago) and the Federal Reserve Bank of Atlanta (FRB-Atlanta) provided operational assistance in implementing the PDCF (Ibid.).

The PDCF terms did not impose a borrowing limit for any individual primary dealer. Therefore, the amount of funding that any primary dealer could borrow under the PDCF was limited only by the amount of haircut-adjusted eligible collateral that such primary dealer could present to its clearing bank. However, the PDCF did, originally impose a frequency-based penalty fee on primary dealers who accessed the facility on more than 30 days out of any 120 days (Ibid.).

On February 3, 2009, the facility frequency usage fee changed, so that fees were calculated based on use of the facility for more than 45 business days out of the preceding 180 business days. The fee would increase up to 40 basis points (annualized rate) as the primary dealer continued to access the facility past the 45-business day mark. (Ibid).

The PDCF also did not specify an overall funding limit as some Fed programs did. In this way it was similar to the Federal Reserve's discount window in that it served as a backstop source of liquidity for primary dealers during market disruptions. Before the creation of the PDCF, primary dealers that were not depository institutions had no access to a "lender of last resort" credit facility.

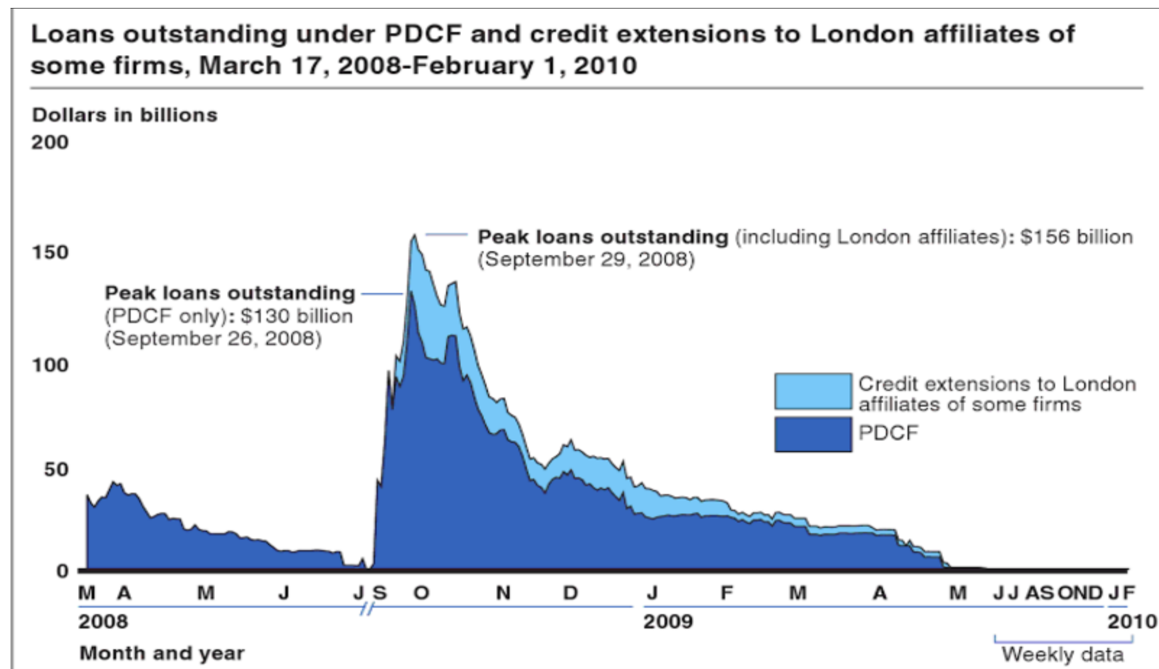
Affiliates of foreign banks, such as Barclays, BNP Paribas Securities, Daiwa Securities America, Deutsche Bank Securities, and UBS Securities LLC, that operated in the U.S. as primary dealers were eligible to utilize the PDCF, and did (Reuters, 2010). The disclosure of just how much these foreign-related entities borrowed from the facility

became a point of contention in public perception (Ibid.) However, on an aggregate basis, dealers with European parents were often heavy borrowers from the TSLF, but very light borrowers from the PDCF. RBS, for example, borrowed from the TSLF on 57 occasions, but never borrowed from the PDCF. (Achayra et. al 2014)

Outcomes

The PDCF was immediately popular, as seen below in Figure 2. In its first week the PDCF extended loans to 10 primary dealers. During its first three weeks, borrowing averaged over $30 billion per day and then peaked at $40 billion per day in March 2008 before gradually declining to zero in July, where it stayed until September. Bear Stearns was consistently the largest PDCF borrower until April 2008 during its purchase by J.P. Morgan Chase in March 2008 (Ibid; GAO 2011; Adrian, Burke and McAndrews 2009).

Figure 2: PDCF Loans Outstanding



Source: GAO 2011

Borrowing spiked shortly after the Federal Reserve expanded eligible collateral following the Lehman bankruptcy filing. The expanded collateral included all of the types of instruments that could be pledged in the triparty repo systems of the two major clearing banks, which included equity securities and whole loans.

Lending rose to $59.7 billion on September 17, and peaked at $130 billion on September 26, 2008 in just PDCF loans. Including loans to London affiliates ("London Loans"), as discussed below, the peak was $156 billion reached on September 29, 2008, the day Congress rejected the administration's first proposed bank bailout bill (GAO 2011). Following those events, as market conditions improved, usage of the facility gradually declined to zero in May 2009.

In total, 18 of the 20 eligible primary dealers ultimately utilized the facility and the Federal Reserve made 1,021 loans under the PDCF with the five largest borrowers accounting for 82.5% of all PDCF loans, as shown in Figure 3. (Adrian and Schaumburg

2012, GAO 2011) The biggest borrowers overall were Citigroup, Morgan Stanley, and Merrill Lynch, with each borrowing over $1 trillion in loans. Of course, these figures represent the sum of multiple overnight draws. The largest single loan of $47.9 billion went to Barclays Capital on September 18, 2008, the day after Barclays agreed to buy most assets of Lehman Brothers' U.S. broker-dealer (Reuters, 2010). Including London loans, the largest PDCF borrowing for a firm at one time was by Morgan Stanley, which had a total of $61.3 billion outstanding through the PDCF on September 29, 2008, about one-third of which was through London. Notably, Citigroup borrowed into April 2009 and Bank of America took out its last loan in May 2009; both banks had received other targeted assistance from the government (Ibid.).

Figure 3: Largest PDCF Borrowers by Total Dollar Amount

Dollars in billions

Rank	Primary dealer	Total PDCF loans	Percent of total
1	Citigroup Global Markets Inc.	$1,756.8	23.8%
2	Morgan Stanley & Co. Inc.	1,364.4	18.5
3	Merrill Lynch Government Securities Inc.	1,281.8	17.3
4	Bear Stearns & Co., Inc.	850.8	11.5
5	Banc of America Securities LLC	845.6	11.4
6	Goldman Sachs & Co.	433.6	5.9
7	Barclays Capital Inc.	410.4	5.6
8	J. P. Morgan Securities Inc.	112.3	1.5
9	Lehman Brothers Inc.	83.3	1.1
10	Countrywide Financial Corporation	75.6	1.0
11	BNP Paribas Securities Corp.	66.4	0.9
12	Mizuho Securities USA Inc.	42.3	0.6
13	UBS Securities LLC.	35.4	0.5
14	Cantor Fitzgerald & Co.	28.1	0.4
15	Credit Suisse Securities (USA) LLC	1.5	0.0
16	Deutsche Bank Securities Inc.	0.5	0.0
17	Daiwa Securities America Inc.	0.4	0.0
18	Dresdner Kleinwort Securities LLC	0.1	0.0
Total		**$7,389.4**	**100.0%**

Source: GAO-11-696

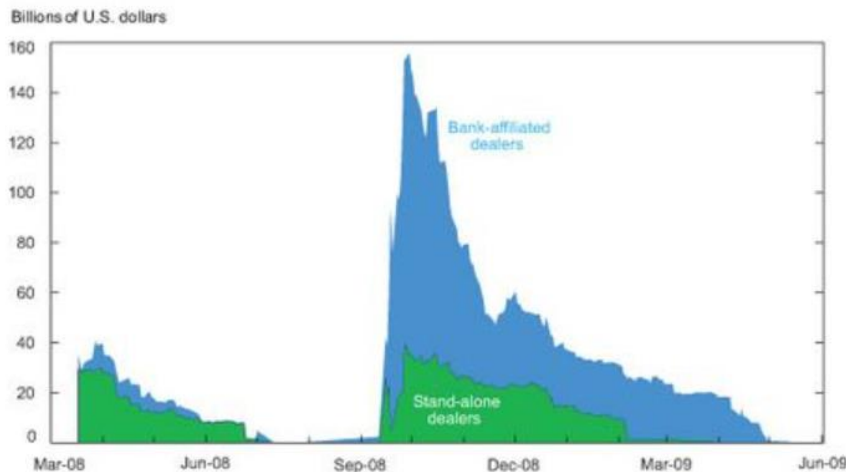
Note: Total borrowing for JP Morgan Securities reflects consolidation of total borrowing by Bear, Stearns & Co., Inc. after the acquisition was completed. Amount shown for Bank of America Corporation reflects consolidation of total borrowing by Merrill Lynch and Countrywide following the completion of those acquisitions.

Acharya, et. al (2014) found that many firms that borrowed heavily from the TSLF also borrowed heavily from the PDCF. Other findings by Acharya were that companies that pledged greater shares of equity to the TSLF tended to be heavy borrowers at the PDCF, suggesting that the expansion of collateral to include equity in September created a strong incentive for dealers to borrow at the PDCF. Moreover, dealers that pledged large proportions of equity at the PDCF also pledged large proportions of other risky

assets such as MBS/CMOs, ABS, corporate securities and municipal securities at both the PDCF and TSLF. (Ibid.)

Notably, despite the Fed having greatly expanded liquidity resources for banks, bank affiliated primary dealers also heavily borrowed from the PDCF as can be seen in Figure 4.

Figure 4: PDCF Usage by Type



Source: Adrian and Schaumburg 2012

The PDCF expired February 1, 2010, having been extended four times after its initial six-month term due to market conditions. All credit extended was repaid without loss and $593 million in interest and fees was collected. (OIG 2010).

II. Key Design Decisions

1. **The legal authority for the PDCF came from Section 13(3) of the Federal Reserve Act.**

Specifically, it was established under the Fed's emergency authority under Section 13(3) of the Federal Reserve Act as a lender in "unusual and exigent circumstances."

2. **The PDCF extended loans to primary dealers.**

The PDCF utilized its existing operational relationships with the primary dealers and the tri-party repo system which it used for its OMO repo operations and in which JP Morgan Chase & Co. and Bank of New York Mellon were the two triparty repo clearing banks (GAO 2011). Affiliates of foreign banks, such as Barclays, BNP Paribas Securities, Daiwa Securities America, Deutsche Bank Securities, and UBS Securities LLC, that operated in the U.S. as primary dealers were eligible to utilize the PDCF, and did (Reuters, 2010). The disclosure of just how much these foreign-related entities

borrowed from the facility became a point of contention in public perception (Ibid.) However, on an aggregate basis, dealers with European parents were often heavy borrowers from the TSLF, but very light borrowers from the PDCF. RBS, for example, borrowed from the TSLF on 57 occasions, but never borrowed from the PDCF (Achayra et. al 2014).

3. The PDCF allowed the Federal Reserve to lend directly to investment banks to provide liquidity to securitized markets.

The Bear Stearns crisis highlighted the importance of investment banks to the liquidity of securitization markets. Even though it had previously taken steps through its OMOs program and the TSLF to address the stresses in the short-term wholesale funding markets, there was concern that these vehicles would might not fill any gap in liquidity that might occur. The TSLF was announced first but not yet operational. More information on TSLF can be found in Leon Hoyos Term Securities Lending Facility Case (Leon Hoyos, 2019). Establishment of the PDCF reflected a determination that in the brewing situation, and given the critical role of the primary dealers, lender-of-last-resort financing needed to be extended beyond commercial banks, allowing the Fed to provide short-term funding directly to investment banks as well.

4. Collateral requirements were initially restricted to investment grade securities, but were expanded to all types of collateral eligible in the tri-party repurchase agreement system.

Initially, the PDCF was restricted to collateral eligible for OMOs, investment-grade securities, municipal securities, and asset-backed securities (ABS), including mortgage-backed securities. In September 2008, accepted collateral was expanded to include all types of collateral eligible in the tri-party repurchase agreement system, which included noninvestment grade securities. This potentially provided access to a greater amount of funding since a primary dealer could now bring a wider range of collateral to the PDCF if it could not finance it in the market.

5. The Fed took steps to mitigate risk.

The Fed included several design features that were intended to mitigate the risk inherent in the PDCF. These included having collateral valued by the clearing banks at the least available value and applying haircuts.

For collateral eligible in OMOs, haircuts assigned were equivalent to haircuts under the open market operations. For collateral not eligible in OMOs, haircuts were determined by the asset's risk and were generally higher than those under OMOs. However, the Fed's haircuts were less than market haircuts would have been during the crisis, thus providing to borrowers more funding against a particular collateral than they might have received elsewhere. (Adrian, Burke and McAndrews 2009).

6. The lending rate was the Primary Credit Rate.

The lending rate was equivalent to the discount window's primary credit rate at the FRBNY, a standard that reinforced the Fed's intent to have the PDCF operate similar to the discount window and to make the funding financially accessible. The primary credit rate is the discount windows most favorable rate.

However, under normal conditions, the discount rate exceeds the overnight repo rate for most eligible securities, with the result that the PDCF would not be an especially attractive means of financing an inventory of securities in normal market conditions. This meant that the eligible borrowers would be incentivized to use the PDCF only as a backstop not a primary funding source as markets returned to normal levels. (Adrian, Burke and McAndrews 2009). Additionally, the Fed actively counselled borrowers to seek funding in the markets before utilizing the PDCF (Ibid.)

7. The PDCF was designed to last for six months, subject to extension based on market conditions.

At the creation of the PDCF, the Federal Reserve announced its intention to maintain the program for six months. The hope was that by then, fear in the markets would have abated to a sufficient level and that primary dealers would have been able to arrange other methods of financing. However, the Fed cautiously kept an open-ended timeline, noting that the program "may be extended as conditions warrant to foster the functioning of financial markets". In the end, the program was extended a total of four times before being terminated in February 2010.

8. To avoid stigma and encourage participation, few details regarding PDCF participants were published at time of use.

In creating the PDCF, the Fed was worried that primary dealers would not take advantage of this opportunity due to stigma, a serious concern that threatened to inhibit the facility's effectiveness and one that the Fed had previously encountered with respect to its Discount Window (Wall Street Journal, 2008). If a bank was particularly weak and in need of a loan, but was the only bank known to be in that situation, the bank might be reluctant to borrow, despite need, for fear of identification. Even if the Fed didn't publish the names of its borrowers, creditors might surmise whom the user was, creating a negative reputation around that particular bank. Thus, PDCF activity was only publically reported in aggregate on a weekly and monthly basis. It was not until December 2010 that the Fed released transaction details, including participants and their individual loan amounts, after Congress mandated such disclosures.

9. A frequency-based fee applied.

The FRBNY incorporated a frequency-based penalty fee to primary dealers who accessed the facility more than 45 days out of the preceding 180 business days, so as to discourage usage when other means of funding were available. The fee would increase as the primary dealer continued to access the facility past the 45-business day mark:

(i) First 45 days: no fees

(ii) 46-90 days: 10 basis points, annualized rate

(iii) 91-135 days: 20 basis points, annualized rate

(iv) 136-180 days: 40 basis points, annualized rate

We have not located any information that suggest that any borrower paid the frequency-based fee.

10. Loan Size and Type were not limited

The PDCF terms did not impose a borrowing limit on the size of loans that primary dealers could take but allowed the borrowing dealer to choose the size of their loan request. The amount of money available to a primary dealer under the PDCF was thus limited by the amount of haircut-adjusted eligible collateral that each primary dealer could present to its clearing bank. However, although not limited as to amount, loans were subject to a frequency fee.

11. The Federal Reserve worked closely with the SEC to mitigate risk and establish a monitoring program at each of the major primary dealers.

Under the PDCF, the Federal Reserve became a potential lender to primary dealers. To manage the accompanying risks, the Federal Reserve positioned analysts at each of the major independent primary dealers, thus creating a monitoring program to improve lines of communication between the Federal Reserve and the dealers. In July, the Federal Reserve entered a Memorandum of Understanding (MOU) with the SEC, which affirmed the SEC as the ultimate supervisor of the investment banks. This was also intended to show concerned individuals and government agencies that the Federal Reserve had not unduly expanded its oversight powers through the PDCF (Geithner, 2010; Adrian, Burke and McAndrews).

12. The Fed modelled loans to certain London-based affiliates on the PDCF.

In September and November 2008 the Federal Reserve extended credit to London-based affiliates of three investment banks that were becoming bank holding companies, and Citigroup, respectfully. Although not formally PDCF loans, the loans to these affiliates were under terms similar to the PDCF with a few differences. With respect to these “London Loans,” however, the Fed accepted collateral denominated in foreign currencies from the London-based affiliates, and it applied higher haircuts to this collateral. (GAO, 2011). See the Appendix for more discussion of the London Loans.

III. Evaluation

Adrian, Burke and McAndrews (2009) concluded that the existence of the PDCF reassured primary dealers and their customers, and contributed to the lull in emergency lending in late July of 2008. They also attribute it to helping to protect prudentially managed institutions from the spillover effects of risks taken by highly

leveraged firms, enabling these firms to maintain their securities inventories and to fulfill their obligations to creditors and clients. (Adrian, Burke and McAndrews 2009).

However, the PDCF's specific role in alleviating liquidity constraints in the market is difficult to determine with precision given that the Fed announced other similar programs in March 2008, such as the TSLF, which was also created to address funding challenges faced by primary dealers. As a result, some of the research considers the two programs together. Nevertheless, the PDCF's design as an overnight loan facility, as well as its broader range of eligible collateral compared to the TSLF, were key elements in responding to deteriorating liquidity conditions in the repo market. (Ibid).

Acharya et. al (2014) consider the two programs available to primary dealers and find that generally, participation in the PDCF and TSLF (measured by average borrowings) was greater for dealers with weaker financial conditions (as measured by their average pre-crisis cumulative equity return and leverage). The authors also found that borrowers who were weaker were more likely to participate in auctions and seek to borrow significantly larger amounts utilizing collateral of lower quality. Additionally, borrowers with more non-Fed-eligible collateral on their balance sheets prior to the facilities were more likely to borrow from the two programs. This is likely a function of the higher cost of securing market funding. In some respects, it also makes the point that solvency and liquidity problems tend to be correlated. Another relationship found was greater usage by those entities having a higher ratio of repos to total liabilities. (Ibid.)

Although it is difficult to attribute solely to PDCF, the London Interbank Offered Rate-Overnight Indexed Swap (LIBOR-OIS) spread (a general measure of financial market stress and banks' willingness to loan to one another), seemed to indicate improved functioning of the overall markets during the facility's tenure. Historically the spread hovered around 10 basis points. In March 2008 it increased from 60 to 83 basis points, and spiked to 360 points in October 2008. The LIBOR-OIS spread decreased significantly in mid-January 2009 and returned to a 10-15 point range by September 2009 reflecting that financial market conditions had improved. (OIG 2010). More importantly, as the spread fell, utilization of the PDCF decreased (Ibid.)

Moral hazard continues to be one of the strongest criticisms of the PDCF. Some have commented that by offering primary dealers a liquidity backstop, the PDCF effectively encouraged continued risky behavior. Primary dealers could have delayed raising equity because they knew that they could easily borrow from the Federal Reserve instead. But it should be noted that the facility did include design features (such as a frequency usage fee) intended to mitigate moral hazard. (Adrian, Burke and McAndrews 2009).

It is worth noting that although the post-crisis financial reforms enacted by Dodd-Frank placed restraints on some portions of the Federal Reserve's powers under Section 13(3), the PDCF would be allowable under the current form of the law because it provided relief to a class of firms.

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VI. Appendix

Loans to London Affiliates

On September 21, 2008, the Federal Reserve Board (Fed) announced that it would extend terms similar to the PDCF to the U.S. and London affiliates of three primary dealers: Merrill Lynch & Co., Goldman Sachs, and Morgan Stanley to provide support to these entities as they became bank holding companies that would be regulated by the Fed. (GAO, 2011). In November 2008, the Fed also authorized a PDCF loan to the London affiliate of Citigroup Inc. (Citi) as part of a larger package of aid to Citi (Ibid).

The Fed considered this to be separate from the PDCF (Ibid). However, the Fed at times has included this data with reports of PDCF data. Several researchers have also considered them together, and so we discuss these London Loans here.

The Fed made 355 loans to London affiliates of the four primary dealers with the total amount of these loans aggregating to $1.56 trillion as shown in Figure 5 below. The largest amount of outstanding London loans occurred on September 29, 2008, when there were $26 billion outstanding contributing to the combined PDCF-London Loan peak of $156 billion, as shown in Figure 4.

The interest rates and collateral requirements for the London Loans were the same as those for the PDCF. Notable differences, however, were that the FRBNY accepted collateral denominated in foreign currencies from the London-based affiliates, and it applied higher haircuts to this collateral. (GAO 2011).

It is unknown who the Fed received the collateral, which would be a key concern in cross-border lending.

Figure 5 - Total Dollar Amount Borrowed by London-based Primary Dealer Affiliates

Dollars in billions

	Primary dealer	Loans to London affiliates	Percent of total
1	Morgan Stanley & Co. Inc.	$548.2	35.1%
2	Merrill Lynch & Co.	493.1	31.6%
3	Citigroup Global Markets Inc.	263.5	16.9%
4	Goldman Sachs & Co.	155.7	10.0%
5	Banc of America Securities LLC	101.2	6.5%
Total		**$1,561.6**	**100.0%**

Source: GAO 2011

Note: Amount shown for Banc of America Securities reflects borrowings by the London affiliate of Merrill Lynch Government Securities subsequent to completion of Bank of America Corporation's acquisition of Merrill Lynch.

A U. S. Government Accountability Office (GAO) report would later question the Fed's rationale for extending this funding. (See *Evaluation* above). In the GAO report, the Fed's response is described as follows:

> Federal Reserve Board officials told us that the Federal Reserve Board did not consider the extension of credit to these subsidiaries to be a legal extension of PDCF but separate actions to specifically assist these four primary dealers by using PDCF as an operational tool. Federal Reserve Board officials told us that the Federal Reserve Board did not draft detailed memoranda to document the rationale for all uses of section 13(3) authority but that unusual and exigent circumstances existed in each of these cases as critical funding markets were in crisis. However, without more complete documentation, how assistance to these broker-dealer subsidiaries satisfied the statutory requirements for using this authority remains unclear. (GAO 2011).

The GAO suggests that a lack of complete documentation of how this extension satisfied the requirements for usage of Section 13(3) authority resulted in problematic transparency and accountability issues.