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Abstract

The Federal Reserve created the Commercial Paper Funding Facility (CPFF) in the midst of severe disruptions in money markets following the bankruptcy of Lehman Brothers on September 15, 2008. The CPFF finances the purchase of highly rated unsecured and asset-backed commercial paper from eligible issuers via primary dealers. The facility is a liquidity backstop to U.S. issuers of commercial paper, and its creation was part of a range of policy actions undertaken by the Federal Reserve to provide liquidity to the financial system. This paper documents aspects of the financial crisis relevant to the creation of the CPFF, reviews the operation of the CPFF, discusses use of the facility, and draws conclusions for lender-of-last-resort facilities in a market-based financial system.

Key words: Federal Reserve, lender of last resort

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1. Introduction

The commercial paper market experienced considerable strain in the weeks following Lehman Brothers' bankruptcy on Monday, September 15, 2008. The Reserve Primary Fund---a prime money market mutual fund with $785 million in exposure to Lehman Brothers---broke the buck on September 16, triggering broad investor flows within the money market sector. By Friday, September 19, investors had reallocated $315 billion from prime to Treasury-only funds; by October 27, the reallocation amounted to $955 billion. This unprecedented flight to quality from high-yielding to Treasury-only money market funds severely disrupted the ability of commercial paper issuers to roll over their short term liabilities.

As redemption demands accelerated, particularly in high-yielding money market mutual funds, investors became increasingly reluctant to purchase commercial paper, especially for longer-dated maturities. As a result, an increasingly high percentage of outstanding paper had to be refinanced each day, interest rates on longer-term commercial paper increased significantly, and the volume of outstanding paper declined sharply. These market disruptions had the potential to constrain the economic activities of commercial paper issuers. Indeed, a large share of outstanding commercial paper is issued or sponsored by financial intermediaries, and the difficulties they faced in placing commercial paper further reduced their ability to meet the credit needs of businesses and households.

In light of these strains, the *Commercial Paper Funding Facility (CPFF)* was announced by the Federal Reserve on October 7, 2008, with the aim of supporting the orderly functioning of the commercial paper market. Registration for the CPFF started on October 20, 2008, and the

facility became operational on October 27, 2008. The CPFF operates as a lender of last resort facility for the commercial paper market. It effectively extends access to the Federal Reserve's discount window to issuers of commercial paper, even if these issuers are not chartered as commercial banks. Unlike the discount window, the CPFF is a temporary liquidity facility that was authorized under section 13(3) of the Federal Reserve Act due to "unusual and exigent circumstances" and is set to expire on February 1, 2010.[1]

The goal of the CPFF is to address temporary liquidity distortions in the commercial paper market by providing a backstop to U.S. issuers of commercial paper. This backstop provides assurance to both issuers and investors that firms will be able to roll over their maturing commercial paper. By shielding issuers from these distortions, the facility enables them to engage in term lending funded by commercial paper issuance which, in turn, enhances the ability of financial intermediaries to extend crucial credit to U.S. businesses and households. Note that the CPFF does not address the solvency of issuing firms. Rather, the focus is on shielding the allocation of real economic investment from liquidity distortions arising from the run on high-yielding money market instruments triggered after the bankruptcy of Lehman Brothers.

To accomplish these objectives, the CPFF uses financing provided by the Federal Reserve Bank of New York to purchase three-month unsecured and asset-backed commercial paper from eligible U.S. issuers through a special purpose vehicle (SPV). The SPV holds the commercial paper until maturity, and then uses the proceeds from maturing commercial paper and other assets of the SPV to repay its loan from the New York Fed.

[1] Initially the CPFF was set to expire on April 30, 2009, but was then extended to October 30, 2009 and, subsequently, to February 1, 2010.

The CPFF is explicitly designed to protect the Federal Reserve from potential credit losses. Issuance to the CPFF is either secured by collateral or subject to an additional surcharge, which is calibrated so as to protect the Federal Reserve against any potential credit losses. The CPFF accepts paper backed by a U.S. government guarantee, as well as paper that is secured by collateral (the latter is called asset backed commercial paper, or ABCP). The haircut on the paper provides an additional protection for the Federal Reserve. Credit analysis by the staff of the Federal Reserve Bank of New York resulted in adjustments to limits and restrictions of issuance separate from eligibility requirements, providing additional safeguards to the Federal Reserve against credit losses.

This paper offers an overview of the Commercial Paper Funding Facility. We explain the economic role of the commercial paper market as a source of funding for various financial intermediaries. We briefly review the events surrounding the turmoil that led to the creation of the CPFF in the fall of 2008. We also present operational details of the CPFF and document its usage and effectiveness. In addition, we discuss the economics of the facility within the context of the financial system and in relation to the Federal Reserve's role as lender of last resort. Also considered are key issues associated with both the supervision of financial institutions and the risk of moral hazard that have been raised following the launch of the CPFF.

The remainder of the paper is organized in four sections. In section 2), we provide background explaining the functioning of the commercial paper market and describing the market disruptions of 2008 prior to the creation of the facility. In section 3), we describe the design and operation of the CPFF in detail. In section 4), we discuss the usage of the CPFF, its impact on the commercial paper market, and linkages to other funding markets. In section 5), we

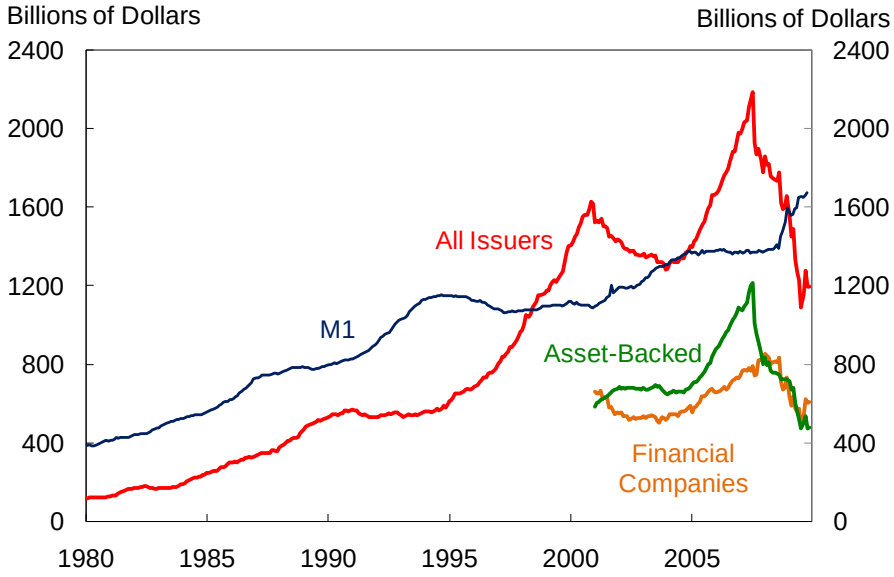
discuss exit from the CPFF and provide broader conclusions concerning the provision of public liquidity to non-bank financial intermediaries.

2. Background on Commercial Paper and Market Conditions

The commercial paper market is used by commercial banks, non-bank financial institutions, and nonfinancial institutions to obtain short-term external funding. There are two main types of commercial paper: unsecured and asset-backed. Unsecured commercial paper consists of promissory notes issued by financial or nonfinancial institutions with a fixed maturity of one to 270 days, unless the paper is issued with the option of an extendable maturity. Unsecured commercial paper is not backed by collateral, which makes the credit rating of the originating institution a key variable in determining the cost and ease of issuance. A primary reason for institutions to issue commercial paper is that the yield curve typically slopes up, so that short term funding tends to be cheaper than longer term funding in debt markets. Asset-backed commercial paper (ABCP) is a form of commercial paper that is collateralized by other financial assets and therefore is secured form of borrowing. Historically, senior tranches of asset-backed securities (ABS) have frequently served as collateral to the ABCP. As such, ABCP is a financial instrument that provides a maturity transformation: while the underlying loans or mortgages in the ABS are of long maturity (typically 5-10 years), the commercial paper is of maturity between 30 days and 270 days. Institutions that issue ABCP first sell their assets to a bankruptcy-remote SPV. The SPV then issues the ABCP, which is backed by the assets in the vehicle and backup credit lines of the sponsoring institution. In the case of bankruptcy of the sponsoring institution, the assets of the SPV do not enter into the asset pool of the sponsor. All commercial paper is

traded in the over the counter (OTC) market, where money market desks of securities broker-dealers and banks provide underwriting and market making services. In the U.S., commercial paper is cleared and settled by the Depository Trust Company (DTC), see http://www.dtcc.com/.

Figure 1: Outstanding Commercial Paper and Money Stock M1



Source: Federal Reserve Board

Outstanding commercial paper peaked with a total market value of $2.2 trillion in August 2007 (see Figure 1). Between August 15, 2007, and September 15, 2008, the market experienced a notable decline associated with mounting credit problems of ABCP collateral and the first wave of the financial crisis. The bankruptcy of Lehman Brothers sharply accelerated the contraction of the commercial paper market. Between the bankruptcy of Lehman Brothers and the start of CPFF, total commercial paper fell sharply, from $1.8 trillion to $1.5 trillion. Amid ongoing balance sheet deleveraging, improving liquidity conditions in markets and a cyclical reduction in financing needs, the total outstanding size of the commercial paper market fell to

$1.2 trillion by December 2009. In comparison, CPFF purchases peaked in the week of January 21 at $350 billion, representing over 20 percent of the market at that time.[2]

Commercial paper provides institutions with direct access to the money market. In traditional bank-intermediated financial systems, borrowing institutions obtain loans from commercial banks, which are, in turn, primarily funded by deposits. Since the early 1980's, however, the U.S. financial system has undergone a major transformation as an ever increasing fraction of credit intermediation migrated from banks to financial markets. One way to gauge the degree to which this process of disintermediation affected the commercial paper market is to compare the growth of outstanding commercial paper to the money stock. Commercial paper represented only 30% of the money stock measure M1 in 1980; it overtook M1 in mid-1998; and it was 60% larger than M1 at its peak in August 2007 (see Figure 1).[3] The sharp contractions of commercial paper in 2007 and 2008 have led the ratio of commercial paper to M1 to fall below 72% in the second half of 2009, a fraction not seen since the mid-1990's.

The ABCP market experienced a sharp decline starting in August 2007, more than one year before the announcement of the CPFF. Outstanding ABCP accounted for more than 52 percent of the total market in August 2007, while financial commercial paper accounted for an additional 38 percent, and nonfinancial commercial paper accounted for approximately 10 percent. The initial decline of outstanding ABCP is often used to date the beginning of the first

[2] Amounts of Federal Reserve lending via the CPFF are reported in the Federal Reserve's H.4.1 release "Factors Affecting Reserve Balances" which can be found at http://www.federalreserve.gov/releases/h41/.

[3] M1 consists of (1) currency outside the U.S. Treasury, Federal Reserve Banks, and the vaults of depository institutions; (2) travelers checks of nonbank issuers; (3) demand deposits; and (4) other checkable deposits.

wave of the current financial crisis.[4] During the summer of 2007, the U.S. housing market started to deteriorate rapidly, increasing the riskiness of the ABS that was used as collateral in ABCP transactions. As a result, ABCP issuers found it increasingly difficult to issue commercial paper. Between September 2007 and January 2008, total assets of commercial banks grew unusually fast as many ABS that were previously funded in the ABCP market were moved from ABCP issuers to commercial bank balance sheets. As a result of the drying-up of funding in the ABCP market, commercial banks started to fund the ABS in unsecured money markets such as Libor and Eurodollar markets, which, in turn, lead to a widening of the Libor-OIS spread. This spread, which had typically ranged around 10 basis points prior to the crisis, subsequently rose to levels as high as 350 basis points in a reflection of extreme credit risk in unsecured funding markets.

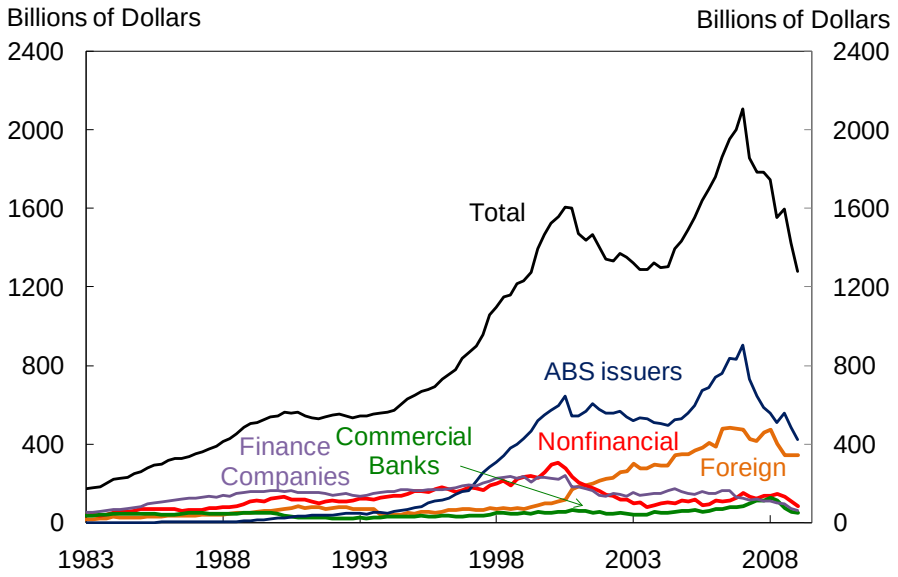
The mix of unsecured commercial paper and ABCP in the market has varied considerably over the last few years with ABCP comprising over 45% of the market between 2001 and 2007. The rise of ABCP is tightly intertwined with the growth of securitization. Since 1998, financial intermediaries have increasingly relied on ABCP as a source of funding for assets warehoused for securitization.[5] In the decade prior to the crisis, ABCP increased from $250 billion in 1997 to over $1 trillion by 2007 (i.e., from roughly 20 percent to as much as 50 percent of outstanding commercial paper), fueled by the considerable distribution of residential mortgage exposure through structured finance products. However, increasing investor risk aversion to credit exposure, general concerns about the functioning of the ABCP market, and heightened concerns about rollover risk in the second half of 2007 precipitated a $500 billion reduction in total commercial paper outstanding in the market.

[4] For a comprehensive timeline of the financial crisis, see http://timeline.stlouisfed.org/.
[5] For an overview of asset-backed commercial paper see Covitz, Liang, and Suarez (2009) and Schnable and Kacperczyk (2009).

2.1 Major Commercial Paper Issuers

Figure 2 provides an overview of issuers in the commercial paper market since the early 1980's according to the Flow of Funds of the Federal Reserve. In the past decade, ABS issuers were the largest issuer of commercial paper, usually in the form of ABCP. Commercial paper funding of ABS stopped growing after the Enron fraud was revealed in 2001, as changes in accounting and regulatory practices concerning conduits required that additional capital be held against off-balance sheet entities. At the end of 2003, capital regulation regarding off-balance sheet conduits changed, resuming the growth of ABS-issued commercial paper. Indeed, the growth in ABS issuance corresponds highly with the growth of outstanding ABCP.

Figure 2: Issuers of Commercial Paper

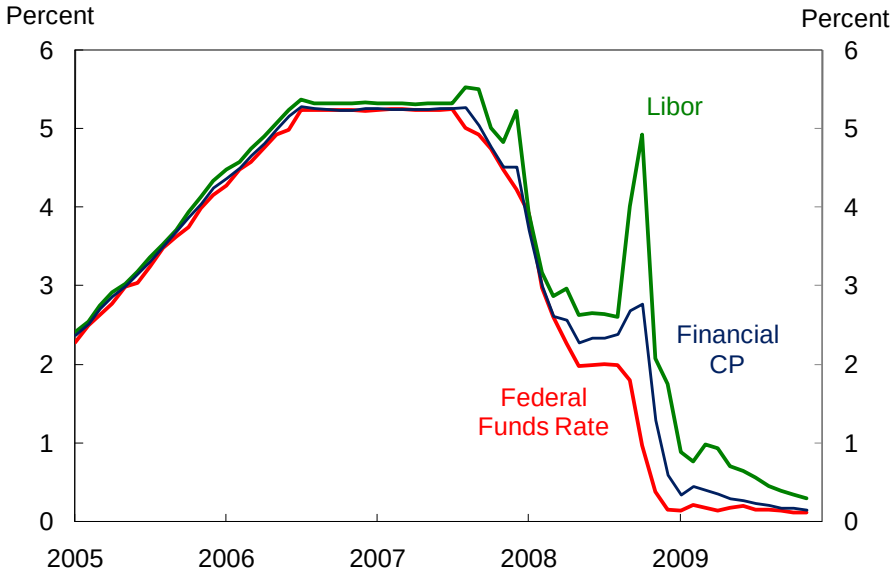


Source: Federal Reserve Board

The second largest issuers of commercial paper in recent years have been foreign issuers of U.S. dollar denominated paper, which include foreign banks and other financial institutions. Other issuers of commercial paper include finance companies, nonfinancial corporations, and

commercial banks. For commercial banks, commercial paper issuance is relatively expensive; a combination of deposits ---checking deposits, term deposits, or certificate of deposits---and borrowing in the Federal Funds market are usually cheaper funding alternatives than commercial paper (see Figure 3), though bank holding companies might more readily issue commercial paper given the limited availability of deposits and financing that can be transferred from its commercial banks. However, commercial paper does provide a marginal source of funding to the commercial banking sector and, at times and at least for certain issuers, commercial paper rates are actually cheaper than other money market rates such as Eurodollar rates.

Figure 3: Federal Funds Rate and 1-Month Libor and CP Rates



Source: Federal Reserve Board

As credit conditions deteriorated in the second half of 2007, many commercial banks took obligations that were formerly held in off-balance sheet vehicles and funded in the ABCP market back onto their balance sheets. As a result, funding for these loans, mortgages, and securities migrated from the ABCP market to the unsecured interbank market, leading to a widening of the Libor-Fed Funds spread. In order to stabilize the uncollateralized term interbank

money market (i.e., the Eurodollar market), the Federal Reserve introduced the Term Auction Facility (TAF) in December 2007 as an alternative to the Discount Window (see Armantier, Krieger, and McAndrews (2008)) and temporary reciprocal currency arrangements with other central banks.

2.2 Lenders in the Commercial Paper Market

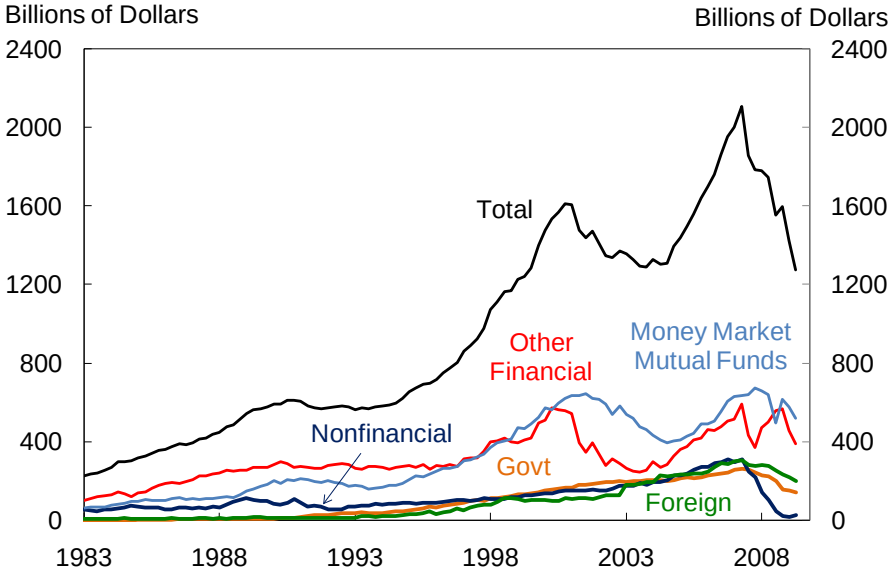
Figure 4 plots the holdings of commercial paper by different investors. The largest share of ownership is by money market mutual funds, followed by the foreign sector, and by mutual funds that are not money market mutual funds. Other financial institutions that hold commercial paper include non-financial corporations, commercial banks, insurance companies, and pension funds.

The creation of the CPFF is intimately tied to the operation of money market mutual funds. Money market funds in the U.S. are regulated by the Securities and Exchange Commission's (SEC) Investment Company Act of 1940. Rule 2a-7 of the act restricts investments by quality, maturity and diversity. Under this act, money funds are limited to invest mainly in highly-rated debt with maturities less than 13 months. A fund's portfolio must maintain a weighted average maturity of 90 days or less, and money funds cannot invest more than 5% in any one issuer, except for government securities and repurchase agreements (repos). Eligible money market securities include commercial paper, repurchase agreements, short-term bonds or other money funds.

Money market funds seek a stable $1 net asset value (NAV). If a fund's NAV drops below rises above $1, the fund is said to have "broken the buck." In order to allow money market

funds to preserve a stable NAV, securities must be liquid and have low credit risk. Since the first money market fund was created in the U.S. in 1971, and prior to September 2008, only one 2a-7 fund had "broken the buck": the Community Bankers U.S. Government Money Market Fund of Denver in 1994. In light of the disruptions to the sector in 2008, the SEC is currently reevaluating 2a-7 guidelines, including the consideration of floating NAVs and shorter weighted average maturity requirements.[6]

Figure 4: Holdings of Commercial Paper by Investor Classes



Source: Federal Reserve Board

2.3 The Commercial Paper Crisis of September 2008

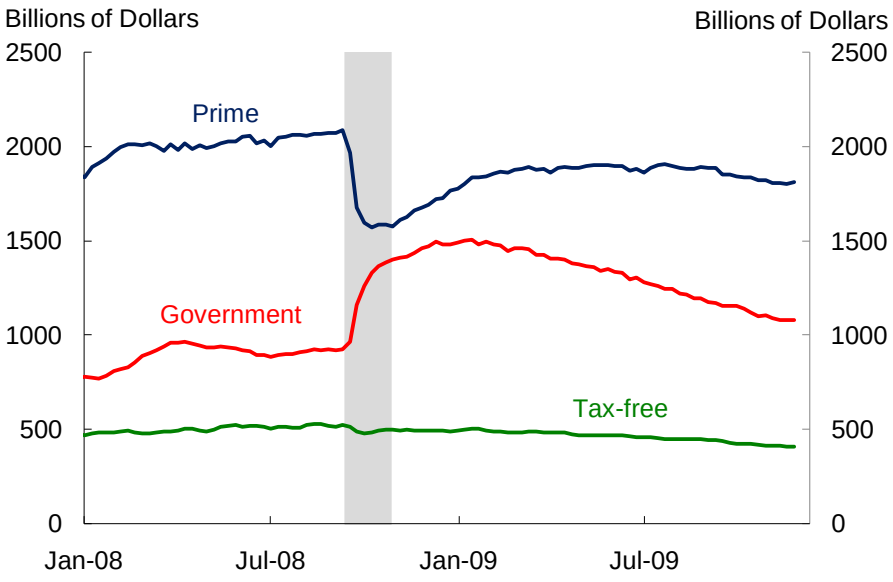
[6] See http://www.sec.gov/answers/mfmmkt.htm for more detail on the money market mutual fund universe, and the regulation of 2a-7 funds.

Considerable strains in the commercial paper market emerged following the bankruptcy of Lehman Brothers Holdings Inc. on September 15, 2008. Exposure to Lehman forced the Reserve Primary Fund to 'break the buck' on September 16, 2008 and, as a result, money market investors rushed to reallocate their funds from prime money market funds to funds that hold only government securities (see Figure 5). This reallocation unleashed a tidal wave of redemption demands that overwhelmed the funds' immediate liquid reserves. In the week following the Lehman bankruptcy, prime money market mutual funds redeemed over $117 billion to investors who were concerned about losses on presumably safe investments, possible contagion from Lehman's bankruptcy, and financial institutions with large exposures to subprime assets. The end result was that 2a-7 money market mutual funds were reluctant and, in some cases, unable to purchase commercial paper (or other money market assets with credit exposure). Any purchases that were made were concentrated in very short maturities; shortening the duration of their asset holdings made it easier for the money market funds to manage the uncertainty about further redemptions. As demand from money market funds shrank, commercial paper issuers were unable to issue term paper and, instead, issued overnight paper. Thus, with each passing maturity date of commercial paper outstanding, an issuer's rollover risk increased sharply. Banks bore the increasing risk of having their credit lines drawn by issuers unable to place commercial paper in the market precisely at a time when the banks themselves were having difficulty securing funding from the market and were attempting to reduce risk.

In many ways, the commercial paper market was vulnerable to the risks that, though minimal in a period of stable rates and high liquidity, emerged in this crisis. In particular, the commercial paper market was vulnerable to credit risk, rollover risk, and liquidity risk --- all of which were exacerbated in the wake of the Lehman crisis. Credit risk-averse investors shunned

commercial paper issuers who had previously been considered high-quality, but suddenly were considered as likely candidates for default. Domestic financial paper issuance plummeted 24 percent in late 2008. Likewise, rollover risk, whereby investors are compensated when the issuer rolls the maturing paper, is magnified when issuers face lack of demand. A combination of liquidity and jump-to-default risk manifested itself through sharp increases in the rates on A2/P2 nonfinancial paper, whose spreads in excess of OIS rose from 296 basis points on the Friday prior to Lehman Brother's bankruptcy to 504 basis points one week later. Over the period from September 15 to December 31, the spread averaged 539 basis points. These inherent risks in commercial paper were heightened as money market mutual funds, the principal investor in commercial paper, pulled back.

Figure 5: U.S. Money Market Fund Assets by Fund Type



Source: Moneyfundanalyzer Note: Shaded area September 16 - October 21

In the month following the Lehman Brothers bankruptcy, commercial paper outstanding shrank by $300 billion. 70 percent of this sharp decline was led by the financial commercial paper sector, while 20 percent was attributed to a shrinking of the ABCP market. Notably, the

nonfinancial sector was responsible for only a 6% retrenchment in the size of total commercial paper outstanding. Following the launch of the CPFF, the market increased temporarily. This suggests that, in the weeks following the Reserve Primary Fund's insolvency, available funding in the commercial paper market decreased at a much more rapid rate than issuers' ability to deleverage and downsize. Since then, the market has continued to gradually decline, suggesting that the facility has not only served as a liquidity backstop for issuers whose funding was disrupted by market instability, but also as a mechanism that allowed firms to repair their balance sheets and reduce the maturity mismatch between assets and liabilities. For financial institutions, in particular, the facility bought time to transform short-term unsecured liabilities into longer-term liabilities, and to reduce their asset-to-liability maturity mismatch. ABCP conduits were given time to wind down, either through asset sales or amortization, restructuring, or consolidation by parent entities.

2.3 The Response of the Federal Reserve

The creation of the CPFF was part of a series of extraordinary policy interventions by the Federal Reserve and other U.S. government agencies. These include the expansion of eligible collateral for the Primary Dealer Credit Facility (PDCF) and the Term Securities Lending Facility (TSLF), as well as a temporary exception to Section 23A of the Federal Reserve Act on September 14; the expansion of foreign exchange swap lines with foreign central banks on September 19; the creation, also on September 19, of the Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), which extends non-recourse loans at the primary credit rate to U.S. depository institutions and bank holding companies to finance their purchase of high-quality ABCP from money market mutual funds; the announcement of a

temporary guarantee program for money market mutual funds on September 19; and by the announcement of the Money Market Investor Funding Facility (MMIFF) on October 21. [7] In addition, on October 14, the FDIC announced the creation of the Temporary Liquidity Guarantee Program (TLGP) to guarantee the senior debt of all FDIC-insured institutions and their holding companies, as well as deposits in non-interest-bearing deposit transactions. Finally, on November 25th, the Federal Reserve announced the creation of the Term Asset-Backed Securities Lending Facility (TALF), under which the Federal Reserve Bank of New York will lend up to $200 billion on a non-recourse basis to holders of AAA-rated ABS and recently originated consumer and small business loans.

The commonality of the CPFF, the PDCF, the TSLF and the AMLF is that they are all liquidity facilities aimed at stabilizing funding in the money markets, and were created in order to counteract the financial market turbulences that threatened the stability of the system as a whole. [8] Effectively, these facilities extend the Federal Reserve's lender of last resort to include non-depository institutions (this is the case for the PDCF, the TSLF, and the AMLF) or specific securities markets (as is the case for the CPFF and TALF). The facilities are based on the Federal

[7] See Adrian, Burke, and McAndrews (2009) for the PDCF, and Fleming, Hrung, and Keane (2009) for the TSLF, Davis, McAndrews, and Franklin (2009) for an overview of MMIIF, and Adrian and Shin (2009) for an overview of the liquidity facilities in a broader context. The impact of the CPFF and other credit and liquidity programs on the Federal Reserve's balance sheet and its income statement can be found at http://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm.

[8] See also the testimony of Federal Reserve chairman Ben Bernanke before the Committee on Financial Services, U.S. House of Representatives, on the Troubled Asset Relief Program and the Federal Reserve's liquidity facilities on November 18, 2008, http://www.federalreserve.gov/newsevents/testimony/bernanke20081118a.htm.

Reserve's ability to extend credit to "any individual, partnership, or corporation" under "unusual and exigent circumstances" as per section 13(3) of the Federal Reserve Act.[9]

3. The Design and Operation of the CPFF

By the end of September 2008, more than 75% of commercial paper financing was rolled over each day, leaving the market unusually exposed to additional liquidity shocks. As rollover risk escalated, institutions relying on commercial paper were increasingly vulnerable to bankruptcy should money market fund investors pull away from the commercial paperr market. Concerned by this risk, the Federal Reserve considered ways to stabilize short term funding markets by providing added sources of funding to stave off liquidity-driven defaults and to help reduce rollover risk.

3.1 Operational Design of the CPFF

For the facility to be effective in realizing its desired impact, the CPFF needed to be simple to use, compliant with existing market conventions, open to a large cross section of the commercial paper market while minimizing credit risk to the Bank, priced to relieve funding market pressures, and erected quickly to forestall another liquidity event. The facility's terms and conditions ultimately address these objectives.[10] A market backstop requires accessibility by

[9] http://www.federalreserve.gov/aboutthefed/section13.htm.

[10] A comprehensive overview of terms and conditions, frequently asked questions, announcements, and operational details relating to the CPFF can be found at http://www.ny.frb.org/markets/cpff.html.

any issuer in the market. However, purchases of commercial paper could not be open to any firm needing access to short-term funding, as this would deviate from the intent of offering a backstop to issuers whose short-term funding was disrupted by exogenous liquidity events rather than the firm's own credit event. To minimize credit risk, purchases were limited to top-tier paper, rated A-1/P-1/F1 or higher,[11] consistent with 2-a7 fund conventions in place at the time. In late 2008, top-tier commercial paper accounted for nearly 90 percent of the market, indicating that the criterion would allow the facility to backstop the vast majority of the market, while also shielding the Federal Reserve from lower-quality credits in the market.

To effectively reduce rollover risk, the CPFF needed to offer term financing beyond what the Federal Reserve had extended to date. The Fed had started the 28-day Term Auction Facility (TAF) in December 2007, and an extension to an 84-day maturity had been announced on July 30, 2008, effective August 11, 2008. However, access to TAF was still limited to the Federal Reserve's traditional counterparties. Since term commercial paper is most liquid at 1- and 3-month tenors and funding concerns for the year end were mounting, 3-month commercial paper became the logical tenor to offer issuers under the CPFF.

In establishing the CPFF, the Federal Reserve faced the added complication of engaging in transactions that fell outside of the central bank's traditional operating framework. Prior to the creation of the CPFF, temporary emergency lending facilities created under section 13(3) of the Federal Reserve Act were forms of secured borrowing with traditional counterparties-- i.e., depository institutions or primary dealers. But, to address the risks that had emerged in the commercial paper market, the Federal Reserve had to expand its lending to include U.S.

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[11] A split rating is acceptable if two ratings are top-tier ratings.

corporations and financial institutions---such as finance companies---that would otherwise not have direct access to the central bank's market operations.

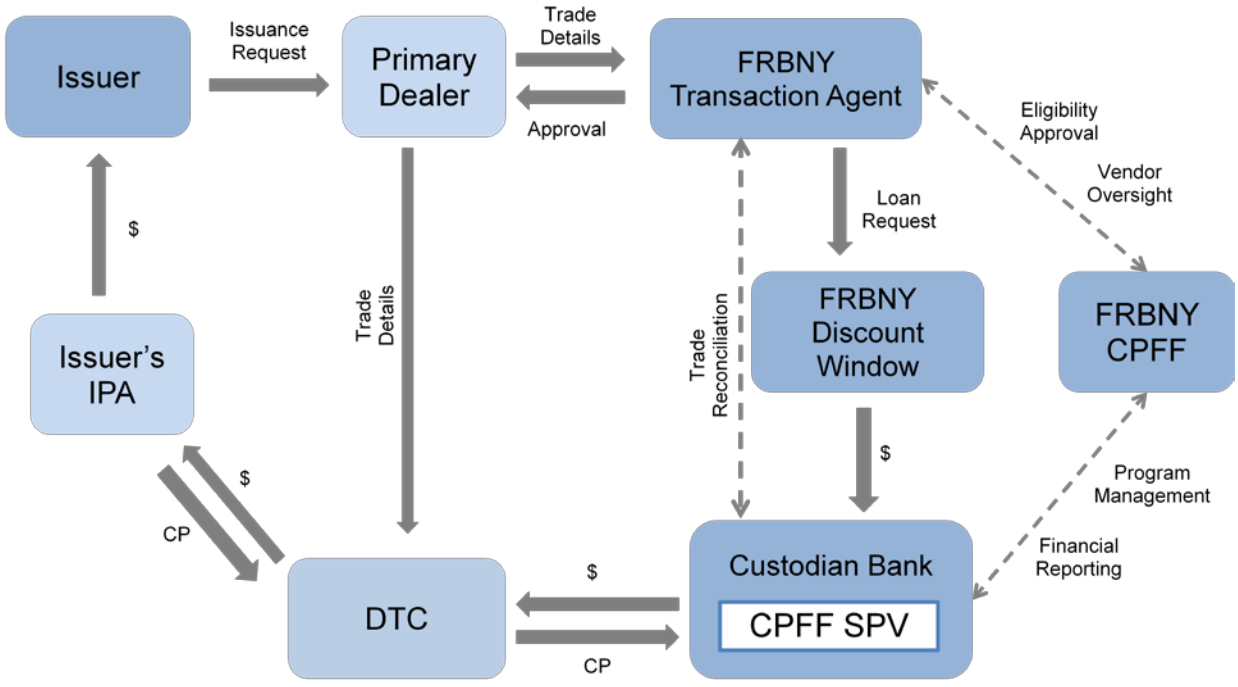
The Federal Reserve's financial transactions were also limited to open market operations[12] with the primary dealers or loans to depository institutions via the Discount Window. The CPFF operation marries aspects of both types of Fed operations with the market conventions of the commercial paper market. To execute CPFF transactions, the Federal Reserve Bank of New York uses its primary dealers as agents to the transactions between the Fed and commercial paper issuers. Primary dealers actively underwrite, place, and make markets in the commercial paper market, and they have the ability to funnel CPFF issuance from its clientele to the facility each day. By designating primary dealers as agents to the CPFF transactions, the facility effectively expanded its reach to hundreds of firms looking for backstop financing. Trade execution is conducted electronically, with controls and accuracy checks, and processed "straight-through", allowing multitudes of trades to be quickly and accurately executed and settled same-day. The same-day settlement feature gives firms comfort that an unexpected liquidity need can be met by the CPFF.

Building the facility's infrastructure in a compressed time frame proved a substantial challenge and, therefore, the Federal Reserve enlisted the services of experienced market participants including PIMCO and State Street. The Federal Reserve created an SPV---CPFF LLC---which is held in custody at State Street Bank and Trust, a depository institution. The creation of the SPV facilitates the extension of the discount window to the commercial paper market. Each day, CPFF purchases are matched by a loan of the Federal Reserve Bank of New

[12] These included cash and securities loans and purchases or sales of U.S. Treasury and government agency debt.

York's discount window to the custodian bank, which then transfers the loan amount to the SVP in order to fund the purchases. At maturity, the transaction unwinds: the issuer pays the CPFF LLC the loan principal plus interest, which is determined by the interest rate set on issuance date, and the SPV pays the New York Fed the principal and interest on its loan, set at the Fed Funds target[13] on the original loan date. As the custodian, issuing paying agent (the financial institution hired by the issuer to administer the issuance and payments of the commercial paper), and all primary dealers clear commercial paper through the DTCC, the CPFF has in place a mechanism that allows the facility to purchase commercial paper efficiently through the market's standard clearing institution. The facility's construction and use are fairly straightforward; the mechanics of the CPFF are illustrated in Figure 6.

Figure 6: Issuance to the Commercial Paper Funding Facility



[13] If the target federal funds rate is a range, then the loan is set at the maximum rate within the range.

In the twenty days that followed the CPFF's announcement, Federal Reserve staff fine-tuned the facility's terms and conditions, commissioned external vendors to assist with building the legal, trading, investment, custodial and administrative structure, prepared the necessary legal documentation for operating the facility, created and tested an operational framework consistent with the trading and settlement conventions used by market participants, established GAAP compliant accounting and financial reporting practices and essential controls, and processed the first registrants. The first purchases by the CPFF from registered issuers began on October 27.

Note that, in order to sell commercial paper to CPFF LLC, issuers are required to register with the CPFF.[14] The registration process allows the Federal Reserve Bank of New York to verify eligibility criteria (including the maximum amount the issuer may sell to the facility), review the issuer's credit quality, and, among other logistics, process the registration fee that will allow a transaction to take place. This fee effectively serves as an insurance premium, whereby the issuer incurs an initial fixed cost in order to retain the option of issuing to the facility at any time over the life of the program. The CPFF charges 10 basis points on the maximum issuance amount. This helps ensure that issuers apply for the liquidity support either because they find issuing to the facility, inclusive of upfront costs, economic relative to alternatives at the time of registration or find value in holding an option that allows an issuer to access an additional source of liquidity. While the vast majority of registrants issued to CPFF shortly after registering, some registered to retain the option of future issuance should the need arise. The pricing of the registration fee is not dissimilar to a commitment fee that a bank would charge to a borrower for

[14] For the purposes of registration in the CPFF, an "issuer" is defined by the legal entity that issues commercial paper. If a parent company and a subsidiary issue commercial paper separately, they are considered separate issuers for the purposes of the CPFF. Only U.S. issuers of commercial paper, including U.S. issuers with a foreign parent, are eligible to sell commercial paper to the SPV.

an available line of credit. The CPFF's registration period began on Monday, October 20, 2008, one week prior to the first purchase date, to allow time for processing the large number of issuers who wanted the option of issuing to the facility at its inception.[15] The majority of registrations occurred in the first few weeks of the program's life.

The issuer is charged 10 basis points on the maximum amount an issuer may sell to the CPFF LLC, or the greatest amount of U.S. dollar-denominated commercial paper the issuer had outstanding on any day between January 1 and August 31, 2008. The maximum amount of issuance to the CPFF LLC is reduced by any commercial paper outstanding with investors at the time of issuance, including the CPFF LLC. These criteria support the backstop nature of the facility by limiting issuance to the amount of paper that the institution maintained prior to the market disruptions in September, rather than providing additional funding to grow or leverage balance sheets. These terms also disqualify firms who were not previously active participants in the commercial paper market from accessing funding via the CPFF. A few months after the facility's inception, the Federal Reserve clarified these terms for ABCP issuers, announcing that the CPFF LLC would not purchase ABCP from issuers that were inactive prior to the creation of the CPFF.[16]

3.2 CPFF as Liquidity Backstop

[15] To access the facility on October 27, 2008, an issuer must have registered no later than Thursday, October 23, 2008. Thereafter, issuers were required to register two business days in advance of their intended use of the CPFF.

[16] An issuer is deemed inactive if it did not issue ABCP to institutions other than the sponsoring institution for any consecutive period of three-months or longer between January 1 and August 31, 2008.

Eligibility requirements addressing tenor, credit quality, pricing, and maximum issuance were structured so as to aid in limiting the use of the facility to backstop financing.[17] Among these requirements, the facility's pricing structure is the most influential. It was absolutely essential that the rates on CPFF issuance be precisely calibrated to ease financial market stress by offering financing at a rate below the extreme levels in the market. At the same time, the Federal Reserve needed to ensure that the rates were not too attractive; otherwise, issuers would rely heavily on the CPFF, potentially impairing long-run liquidity and market functioning in the commercial paper market. On October 14, the Federal Reserve released the pricing structure for the facility, as reported in Table 1.

Table 1: CPFF Pricing Structure

Rates and Fees (per annum)	Unsecured Commercial Paper	Asset-Backed Commercial Paper
Lending Rate	3-month OIS + 100 basis points	3-month OIS + 300 basis points
Credit Surcharge	100 basis points	None
All-in Cost	3-month OIS + 200 basis points	3-month OIS + 300 basis points

[17] The special purpose vehicle may only purchase 3-month U.S. dollar-denominated unsecured and asset-backed commercial paper that is rated at least A-1/P-1/F1 from U.S. issuers or U.S.-based issuers of a foreign parent company. While split ratings (such that one rating is Tier 2) are accepted, A2/P2 paper---which represents about 5 percent of issuance in the commercial paper market----is ineligible.

The facility controls for changes in interest rates and short-term interest rate expectations by setting the price of commercial paper issuance to the CPFF at a fixed spread above the daily 3-month overnight index swap (OIS) rate. As is common practice in the market, commercial paper issued to the CPFF is sold at a discount from the face value, as determined by the lending rate, using the standard interest calculations and actual-over-360 day count convention. The all-in costs of OIS plus 200 and 300 basis points per annum on unsecured and asset-backed commercial paper, respectively, were determined subsequent to performing historical analysis of several factors including investment grade financing rates in recent interest rate cycles, average spreads between unsecured and asset-backed paper, and estimation of potential losses on a diversified portfolio of commercial paper. The higher funding costs for ABCP in the market (and in the CPFF pricing structure) relative to unsecured issuance that is backed by the full faith and credit of the issuing entity are indicative of the riskiness and illiquidity of the underlying collateral in ABCP conduits. In addition to empirical analysis, Federal Reserve staff surveyed a large number of market participants to disentangle the credit and liquidity components of commercial paper rates at the height of the crisis. At inception, rates charged on CPFF issuance ranged from 1.88 percent to 3.88 percent, according to asset type. By comparison, 3-month LIBOR rates, the benchmark rate for commercial paper, reached a high of 5 percent in October 2008 --- thus, CPFF rates were well below market rates. By the end of 2008, however, **CP** rates had fallen below CPFF rates, providing an incentive for issuers to seek more financing in the market.

Purchases of commercial paper need to be secured to the satisfaction of the Federal Reserve. As financial and non-financial commercial paper is unsecured, the Federal Reserve needed to find alternative means to secure the loans. Although financial institutions could

pledge financial assets as collateral against a loan, similar to a discount window transaction, non-financial commercial paper issuers would not necessarily have the same luxury. Assessing the value of non-financial assets would further complicate lending. Lenders are generally compensated for taking risk by charging higher rates or, in the case of a line of credit, assessing fees on usage. An assessment of a credit surcharge[18] more closely approximated market practices and, thus, became the default practice for securing the loan. Participation in the FDIC's Temporary Liquidity Guarantee Program (TLGP) qualifies as a satisfactory guarantee for unsecured commercial paper, as the U.S. government ensures repayment on the commercial paper at maturity, thus removing credit risk. TLGP issuers are not required to pay the unsecured credit surcharge. As the TLGP was not fully operational on the inception date of CPFF, TLGP issuers were initially charged an unsecured credit surcharge for paper sold to the facility; however, these fees were subsequently reimbursed once it was established that the entity was covered by the TLGP.

The CPFF's pricing structure and other program requirements help ensure that the facility plays a constructive role in restoring stability to the market. At the same time, they also serve to (a) prevent artificial inflation of issuance beyond what may be absorbed by investor demand under normal conditions, (b) ensure the facility is used as a backstop in times of stress while also providing a disincentive to issue to the facility in more liquid market conditions, and (c) mitigate the credit risk associated with adverse selection to minimize the Federal Reserve's exposure to loss relative to its accumulated capital from program fees.

[18] For each unsecured commercial paper transaction to the CPFF, the issuer is charged 100 basis points per annum, calculated from the face value of the commercial paper at the time of settlement. When distributing the proceeds of the new commercial paper issuance, the SPV reduces the proceeds due to the issuer by an amount equal to the unsecured credit surcharge.

3.3 The Fed's Counterparty Credit Risk Management

From the Federal Reserve's perspective, CPFF lending rates are analogous to setting haircuts on a non-recourse loan. In setting CPFF rates for eligible commercial paper, the Federal Reserve faces a trade-off: on the one hand, higher haircuts protect the central bank from credit risk, but, on the other, they limit the amount of liquidity available to the financial system. For a given CPFF interest rate, a lower rate than the rates available in the market could potentially provide market participants with arbitrage opportunities. The trade-off between liquidity provision and the structure of pricing and haircut setting was first discussed by Walter Bagehot in his 1873 book Lombard Street, in which he recommended that central banks lend freely at a penalty rate against good collateral. In essence, the Federal Reserve lends against specific collateral types at a penalty rate, and holds a margin of excess collateral that should protect it against any loss under normal market conditions.

The anticipated credit risk of the facility's aggregate exposure was an important factor that guided the selection of registration and credit enhancement fees, as well as rates for unsecured and asset-backed paper. An initial analysis of the facility's credit risk was conducted to determine ranges of expected and unexpected loss under normal and stressed market conditions. Hypothetical stress losses of 1.03 percent to 1.38 percent reflect historical loss probabilities based on downgrade probabilities of short-term and long-term ratings.

Any estimated potential credit losses by the CPFF SPV are offset by the facility's invested income from fees and interest received on maturing paper. In this regard, the cumulative invested income represents the capital available to absorb potential credit losses. The large flow of interest income from the first wave of maturities increased the facility's total capital to over $2

billion, yielding a leverage ratio of nearly 3.4 percent (the leverage ratio is the book value of total commercial paper in the facility, divided by the book equity accumulated through the fee income). This capital cushion provides a sufficient buffer to absorb the portfolio's stress losses at a 99 percent confidence level, as calculated by a team of FRBNY economists and PIMCO credit analysts. Nevertheless, the facility's credit exposures are more concentrated than a highly granular loan portfolio at a commercial bank, and so its ex-post loss results may vary significantly from historical loss trends.

3.4 Relation of the CPFF to the MMIFF and the AMLF

To address the strains in dollar funding markets that emerged immediately after the Primary Reserve Fund 'broke the buck', the Federal Reserve introduced two other facilities under section 13(3) in addition to the CPFF. All three facilities supported short-term funding markets and thereby increased the availability of credit through various mechanisms, though the CPFF was used more heavily than the other facilities. Two factors help to explain the CPFF's considerable use. First, the CPFF addressed problems in short-term debt markets directly at their root – through lending directly to issuers – at a period when issuers faced potential liquidity shortfalls due to market dislocations. Indeed, the main factor distinguishing the CPFF from the other two facilities is that the CPFF serves as a backstop to issuers, while the MMIFF and AMLF provide emergency lending to institutional money market investors. Second, the CPFF backstopped issuance of both unsecured and secured commercial paper, while the AMLF only funded ABCP and the MMIFF SPVs only purchase certificates of deposit, bank notes and commercial paper from specific financial institutions.

On September 19, 2008, the Federal Reserve Board launched the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF). It authorized the Federal Reserve Bank of Boston to make loans to U.S depository institutions and bank holding companies to finance purchases of asset-backed commercial paper (ABCP) from money market mutual funds. This program specifically sought to aid money market mutual funds facing elevated redemption requests to meet their funding needs.

The AMLF was quickly put in place after the reallocation of money market assets began in response to the Reserve Fund breaking the buck. The AMLF operates via a custodian bank, and lending is done directly via the discount window. Money market mutual funds transfer ABCP to the custodian bank against cash, which then puts the ABCP to the discount window, and receives cash. It was possible to make the AMLF operational in a very short time frame, as its operational complexity is much lower than that of the CPFF. However, the major shortcoming of the AMLF is that it only accepts highly rated ABCP and not unsecured commercial paper. As such, the AMLF is unable to reach an important share of commercial paper issuers. AMLF usage peaked on October 8th. Part of the reason why it was possible for the Federal Reserve to put the AMLF in place quickly was that ABCP---as it is a collateralized note---is automatically secured to the Federal Reserve's satisfaction and lending through existing Discount Window channels were leveraged. In contrast, for the operation of the CPFF, a special purpose vehicle had to be created, which then achieved the "secured to the Federal Reserve's satisfaction" criterion due to the fee income of the facility, and a mechanism for lending to non-traditional borrowers needed to be created.

On November 24, 2008, the Money Market Investor Funding Facility (MMIFF) was introduced by the Federal Reserve Board to support a private sector initiative with the intent of

providing liquidity to U.S. money market investors. [19] The MMIFF established a set of special purpose vehicles to purchase commercial paper, CDs, and bank notes from eligible investors. While the set of eligible investors was initially limited to U.S. money market mutual funds, it was later expanded to include other funds as well. The program was designed to increase the willingness of investors to invest in term money market instruments. Although the MMIFF served as a backstop liquidity resource to money market mutual fund investors, it was never used. In part, the program's lack of use could be attributed to its redundancy. By the time MMIFF became operational the CPFF had been providing backstop funding to the commercial paper market and the AMLF had provided a means for money market mutual funds to access emergency funding to counteract redemption needs. The MMIFF thus served as an additional safeguard for money market investors against another extreme market dislocation in money markets.

[19] The economic rationale of the MMIFF is described in detail in the companion paper by Davis, McAndrews, and Franklin (2009).

4. Usage and Impact on the Commercial Paper Market

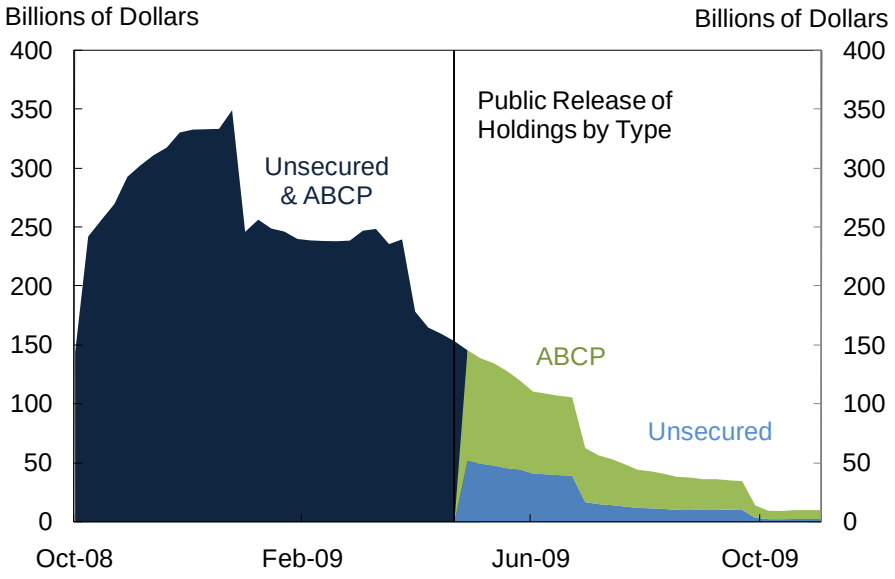
An issuer's decision to use the CPFF is in part predicated on the cost of issuance to the facility relative to the cost of issuance in the market or other alternative funding sources. As explained in the previous section, the facility's pricing is designed to be cost-effective during times of market stress, but prohibitively expensive during times of normal market function. This characteristic structures the facility as a lender of last resort for the commercial paper market, achieving self-liquidation as market conditions normalize. Accordingly, as conditions in financing markets normalized in 2009, CPFF usage progressively declined.

4.1 Usage

The facility's assets grew rapidly at inception. In the first week of operation, it bought $144 billion; it held $293 billion after one month and $333 billion by the end of December 2008 (see Figure 7). The peak of the CPFF was reached in the third week of January 2009, exactly three months after the first issuance date, with approximately $350 billion in commercial paper held in the SPV. Throughout 2009, usage of the CPFF steadily declined, reaching a level around $10 billion in December 2009. At its peak level, the portfolio was primarily comprised of financial commercial paper. The composition of the CPFF's portfolio became more and more tilted towards ABCP after the first vintage of the CPFF matured at the end of January 2008.[20] The large share of ABCP in the facility, which continued to increase during 2009, illustrates the continuing difficulties in obtaining funding in collateralized money markets.

[20] The breakdown of CPFF holdings into unsecured and ABCP is only publicly available in December 31 financial statements and transparency reports beginning in June 2009.

Figure 7: CPFF Outstanding



Source: Federal Reserve Board of Governors

Issuers include a variety of ABCP conduits---including single seller, hybrid, multi-seller, and securities arbitrage conduits--- and other financial institutions that conduct banking, insurance and credit finance in the U.S. Issuance trends vary widely across registrants, reflecting issuers' ability to finance in the market, reduced leverage in the financial system, consolidation of issuers in the market place, and access to other government programs among other factors.

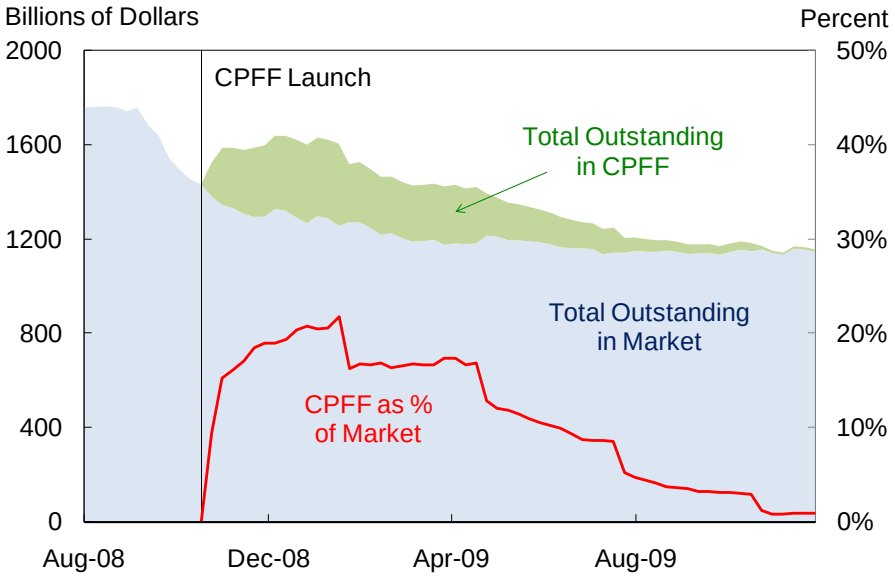
As of December 31, 2008, two-thirds of CPFF holdings were unsecured and the remaining one-third comprised ABCP. The unsecured paper was issued predominantly by banks and non-bank financials ("diversified financials"), some of which included TLGP-guaranteed paper. Insurance companies also issued unsecured paper, though to a lesser degree. By the end of 2009, many insurance companies faced losses in light of their exposure to mortgage financing, among other sectors adversely affected by the financial crisis and economic downturn. Ratings agencies subsequently downgraded the commercial paper ratings of several insurance companies

and, as a result, eligibility for CPFF was compromised. Once downgraded to tier-2 commercial paper, issuers are no longer able to access additional funding or refinance maturities in CPFF.

ABCP issuance has accounted for a growing proportion of assets in the CPFF, suggesting that ABCP conduits have had greater difficulty reentering the market. Over the last few years, ABCP conduits were widely used as a means to finance "hard-to-finance" assets and, consequently, it is not surprising to observe a more gradual retrenchment from the facility in this sector. However, as assets amortized, securitization slowed, and assets were consolidated to parent balance sheets, ABCP issuance in the market and CPFF naturally declined. As banks and non-bank financials created ABCP conduits to warehouse loans and other assets for securitization and relied on independent multi-seller conduits to finance collateral, they could have obtained financing through multiple venues by issuing unsecured paper as well as by issuing ABCP to the CPFF. In addition, ABCP programs have been shrinking due to regulatory capital changes, and changes to accounting rules.

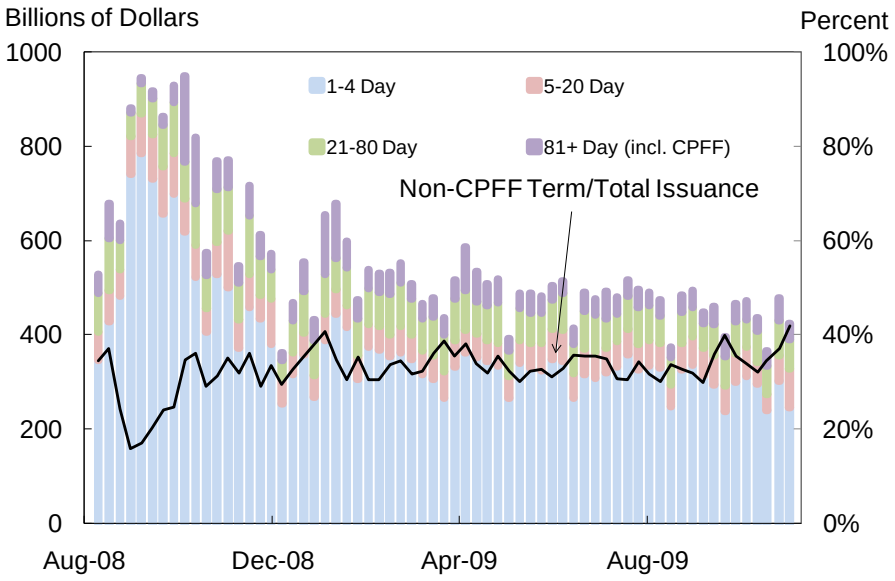
The stabilizing role that the CPFF played for the commercial paper market can best be seen in Figure 8, where the size of the CPFF, the total outstanding amount of commercial paper, and the share of CPFF in total commercial paper are plotted. At the peak of the facility in December 2008 / January 2009, the CPFF held over 20 percent of all outstanding commercial paper. More recently, the facility has only comprised 1 percent of market issuance. The self-liquidating feature of the CPFF is illustrated by the steady decline of the outstanding amount throughout 2009.

Figure 8: Total Commercial Paper Outstanding



Source: Federal Reserve Board of Governors

Figure 9: Weekly Commercial Paper Issuance



Source: Federal Reserve Board of Governors

Figure 9 shows the maturity structure of commercial paper issuance. The crisis period after Lehman's bankruptcy, and prior to the operation of the CPFF, is highlighted in grey. During the crisis period, the fraction of term commercial paper issuance collapsed as money market

funds shortened the duration of their assets to insure against further redemption pressures. In fact, over 75% of commercial paper issued in the second half of September and in early October consisted of maturities of only 1-4 days. Once the CPFF started to operate on October 27th, term commercial paper issuance started rising, and quickly reverted back to a tight range between 30 and 40 percent of total commercial paper.

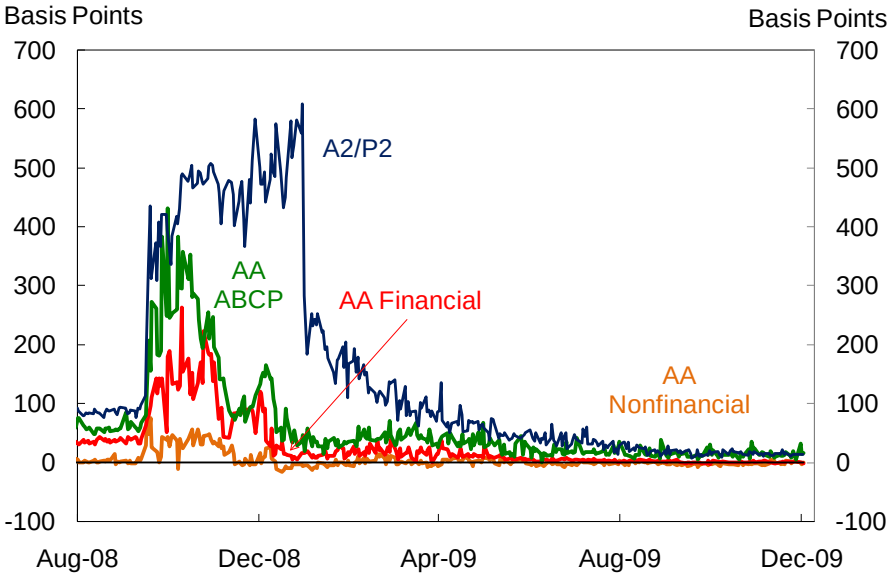
4.2. Market Impact

A key feature of the CPFF's design is to be self-liquidating as spreads tighten. Figure 10 shows commercial paper rates in excess of the OIS **rate** for AA financial and nonfinancial paper, AA ABCP, and A2/P2 paper. By comparing Figures 7 and 10, it becomes clear that CPFF holdings rose rapidly in the first three months following its creation because the rates charged by the facility were orders of magnitudes below average market rates. As average commercial paper rates began to decline throughout 2009, CPFF usage declined as well.

Figure 10 plots average rates on commercial paper issued in the market and, as such, mask the actual cross-sectional dispersion of rates across issuers within each credit rating bucket. This is partially due to the fact that investors, particularly money market fund investors, have policies that limit their concentrations to counterparties. In addition, as money market funds became more risk averse and attuned to credit differentiation, some funds responded to the financial crisis by either charging issuers higher rates to issuers perceived as more potentially risky or barring certain names altogether from their portfolios. As a result, despite the fact that the commercial paper interest rate charged for AA ABCP averaged 32 basis points in the second half of 2009 and never exceeded 62 basis points, ABCP issuance into the CPFF at the penalty rate of 300 basis points continued throughout the year. This suggests that some issuers continued

to find CPFF rates attractive relative to rates charged in the market. At the onset of the crisis, investors were less willing to hold large positions in commercial paper, thus issuers may have been left with no other option than to satisfy remaining liquidity needs by issuing to CPFF.

Figure 10: 1-Month CP Rates less 1-Month OIS



Source: Federal Reserve Board of Governors, Bloomberg

4.3. Roll

To date, there have been 4 rolls of 90-day paper in the CPFF. The first roll was most significant given that CPFF holdings represented 20 percent of the total commercial paper market. Analysts had speculated that the still fragile commercial paper market might come under additional strain if the maturing paper was reissued into the private market. However, the first roll went smoothly as issuance into the private market remained small. Throughout the second and third rolls, an increasing percentage of a smaller dollar amount came due and was paid down. By the fourth, and last, roll in October 2009, approximately 80 percent ($28 billion) of the commercial paper in CPFF matured, of which approximately $20 billion was paid down. As a result, commercial

paper holdings in the CPFF amounted to just one percent of the total commercial paper market following the last roll.

As Figure 7 illustrates, outstanding CPFF declined sharply with each roll. As commercial paper matured, the amount that was reissued to the facility declined for a variety of reasons. In some cases, the conditions in the private markets had improved to the point where it was more attractive for certain issuers to issue in the private market. In other cases, issuers who were eligible for the newly-created TLGP took advantage of its more favorable funding rates and longer-term financing option. Elsewhere, issuers opted not to reissue to the CPFF because their funding needs had diminished due either to shrinking balance sheets or to the passage of year-end as a liquidity risk event. By the spring of 2009, significant actions by the government to inject capital in the financial sector, unprecedented monetary policy stimulus and better-than-expected earnings reports helped further stabilize financial conditions and a market recovery. These conditions along with renewed interest from investors to seek higher yields given the low interest rate environment and a reduction in money-market issuance contributed to precipitous drops in holdings at subsequent large maturity dates.

The most dramatic effect of the rolls was on the composition of the CPFF holdings. With each roll, ABCP became an ever greater share of the CPFF holdings as money funds continued to shun secured paper, particularly those with worse credit quality. ABCP holdings as a share of total CPFF holdings increased from 30 to 70 percent, even as total CPFF holdings declined from a maximum of $350 billion to $10 billion. Most of the remaining ABCP may be of lower credit quality and have no natural buyer. For policymakers, this transformation in the CPFF composition raised concerns about adverse selection into the program.

4.4 Moral Hazard

The CPFF was created to serve as a liquidity backstop to U.S. commercial paper issuers that were adversely impacted by the broad market dislocations that arose in short-term credit markets in the second half of 2008. The mere existence of a liquidity backstop, however, raises concerns of moral hazard. In the case of the CPFF, expectations that the Fed will act as a lender of last resort and purchase commercial paper may lead issuers to engage in more risky behavior than they otherwise would.

Through its eligibility restrictions, the CPFF was structured to address this concern of possible moral hazard. For example, several months into the program, the eligibility rules were altered to deter the unintended consequence of continuing ABCP conduits that previously had exited the market. As of January 23, 2009, the CPFF ceased purchases of ABCP from issuers that were inactive prior to the creation of the CPFF.[21] In addition, the CPFF only accepts paper rated A1/P1. Presumably, issuers who engage in more risky behavior will risk their top tier credit rating and, consequently, jeopardize their eligibility for the facility. [22] In this way, policymakers sought to limit moral hazard through issuance that no longer had a natural investor base.

[21] An issuer is considered inactive if it did not issue ABCP to institutions other than the sponsoring institution for any consecutive period of three-months or longer between January 1 and August 31, 2008.

[22] A DTCC white paper notes that commercial banks are the initial line of defense as a liquidity backstop to commercial paper. "As one criterion (sic) for rating commercial paper, rating agencies require that the issuer have in place lines of credit with commercial banks in a stipulated percentage of the maximum dollar amount of commercial paper that may be outstanding under the program. Among market participants these lines of credit are known as back-up liquidity lines." Issues and Recommendations Regarding Commercial Paper Settlement Practices, March 2003, DTCC White Paper.

Despite these eligibility restrictions, moral hazard may implicitly remain. As long as there exists a liquidity backstop in the commercial paper market, there will always be some risk that issuers will expect liquidity gaps to be filled for higher rated financial and asset-backed commercial paper. One way around this implicit moral hazard would be to publish information regarding participation with a lag, as the discount window currently does. The attendant cost of such publication, however, is the associated stigma. This creates a risk that the facility is not used when most needed, even in cases where the liquidity risk is broad-based rather than firm-specific. In fact, some financial institutions did not issue directly into the CPFF, but rather passed eligible collateral to intermediaries, who then borrowed from the CPFF via ABCP.

4.5 Impact on the Federal Reserve Balance Sheet

The launch of the CPFF expanded the asset-side of the Federal Reserve's balance sheet by over $240 billion within the first two weeks of the program, and eventually expanded the Federal Reserve's balance sheet to as much as $350 billion. Relative to other newly created liquidity facilities or outright purchases, the CPFF had, on net, one of the largest impacts on the Fed's balance sheet growth --- only the FX Swaps, and TAF had larger contributions. During this period of relatively rapid expansion in assets, the Fed's liabilities expanded primarily through excess reserve balances, though some of the balance sheet expansion was sterilized by increased issuance of Treasury SFP bills.[23] While the CPFF contributed to reserve growth on a large scale, the contraction in the facility's holdings has also outpaced other Federal Reserve programs given

[23]On September 17, 2008 Treasury announced the Supplementary Financing Program (SFP), where Treasury issues a series of Treasury bills, separate from Treasury's current borrowing program, and deposits the proceeds from these issuances in an account at the Federal Reserve Bank of New York. Funds in this account drain reserves from the banking system, and therefore offset the reserve impact Federal Reserve lending and liquidity initiatives.

its punitive rate structure. This significantly offset the reserve creation of later programs such as the Large-Scale Asset Purchase programs. Despite the program's contraction and the expiry in February 2010, CPFF may continue to impact the balance sheet until all paper is matured or paid down.[24] The penalty fee of the CPFF represents income for the Federal Reserve. As of September 2009, income generated by the facility is estimated by Fleming and Klagge (2009) to be $5.5 billion. This represents a relatively large share of total profits from the liquidity facilities, which is estimated to be $18.9 billion as of September 2009. These profits are transferred by the Federal Reserve to Treasury, and ultimately contribute to a reduction in the burden on U.S. taxpayers.

The economic interpretation for the income generated by the CPFF is as follows. During the fall of 2008, the private market for commercial paper became severely disrupted due to the reallocation of short-term savings from prime money market funds to Treasury-only funds. As a result, the Federal Reserve established the CPFF as a lender of last resort facility to address the temporary liquidity distortions created by the money market reallocations. However, by law, the Federal Reserve had to protect itself against any potential credit losses. It thus lent to commercial paper issuers at a penalty rate with relatively high haircuts which, in turn, generated income from the facility. While market rates for commercial paper were unusually high, commercial paper issuers were willing to pay the penalty rate, thereby transferring money to the tax payer. As such, U.S. households gained in the aggregate. While obtaining the fee income generated by the CPFF, taxpayers also benefited from the fact that the facility potentially prevented commercial paper issuers from being forced into bankruptcy and, thereby, distorting real investment decisions.

[24] The impact of the CPFF and other credit and liquidity programs on the Federal Reserve's balance sheet and its income statement can be found at http://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm

5. Conclusion

The CPFF serves as a noteworthy model for the Federal Reserve's role as a lender of last resort that reaches beyond depository institutions. In contrast to traditional discount window lending, the CPFF supports liquidity in a particular market, not the liquidity of a particular set of institutions. Similarly to the discount window, the CPFF is constructed as a backstop---not a permanent source of funding---by setting penalty rates for borrowing and by setting haircuts. Both the penalty rate and the haircut are set so as to ensure that the facility is an attractive source of funding in a liquidity crisis, but not in normal times. While the discount window accepts a very broad range of collateral---including loans, mortgages, and securities---the CPFF focuses on a particular asset class, but has less stringent requirements as to the types of institutions that can borrow. The CPFF can be considered as a model of liquidity provision in a market based financial system, where maturity transformation is done outside of the commercial banking sector in a quantitatively and economically important magnitude.

The legal basis for the CPFF stems from section 13(3) of the Federal Reserve act, requiring "unusual and exigent circumstances." As such, the Federal Reserve does not have the authority to make the CPFF a permanent liquidity backstop. This, in turn, has implications for the ongoing debate on regulatory reform. The financial market crisis of the fall and winter of 2008 demonstrated that the current financial architecture is vulnerable to liquidity crises emanating from non-depository institutions. As such, an important component of regulatory reform efforts focuses on the improvement of the resiliency of money markets to financial and economic shocks. Many ongoing reform efforts are aiming at reducing the vulnerability of

money markets to liquidity crises; these efforts focus particularly on reforming money market funds, the commercial paper market, and the repo markets.

However, even prior to the creation of the Federal Reserve, it has been long understood that the public sector plays a crucial role in the provision of liquidity. In times of aggregate liquidity shortages, only the monetary authority can act as lender of last resort, due to its ability to create money. While the majority of maturity transformation took place within depository institutions until recently, the rapid growth of the market based system since the mid-1980's has transferred maturity transformation roles to a wide range of institutions such as money market funds, finance companies, and security broker-dealers, among many others. It is possible that maturity and liquidity transformation will continue to be conducted in a quantitatively important magnitude outside of the traditional depository institutions, in the "shadow banking system." Though the life of the CPFF is limited (due to its reliance on the emergency lending powers based on Federal Reserve Act 13(3)), the facility provides a model for a market-based lender of last resort liquidity backstop.

References

Adrian, Tobias, Christopher Burke and James McAndrews (2009) "The Federal Reserve's Primary Dealer Credit Facility," Federal Reserve Bank of New York Current Issues in Economics and Finance, Volume 15, Number 4.

Adrian, Tobias, and Hyun Song Shin (2009) "The Changing Nature of Financial Intermediation and the Financial Crisis of 2007 – 2009," paper prepared for the Annual Reviews

Acharya, Viral and Philipp Schnabl (2009) "Do Global Banks Spread Global Imbalances? The Case of Asset-Backed Commercial Paper During the Financial Crisis of 2007–09," paper presented at the International Monetary Fund's 10th Annual Jacques Polak Research Conference.

Richard Anderson and Charles Gascon (2009) "The Commercial Paper Market, the Fed, and the 2007-2009 Financial Crisis" Federal Reserve Bank of St. Louis Review, November/December2009

Armantier, Olivier, Sandra Krieger, and James McAndrews (2008) "The Federal Reserve's Term Auction Facility," Federal Reserve Bank of New York Current Issues in Economics and Finance, Volume 14, Number 5.

Covitz, Daniel, Nellie Liang, and Gustavo Suarez (2009) "The Evolution of a Financial Crisis: Collapse of the Asset-Backed Commercial Paper Market," Finance and Economics Discussion Series 2009-36. Washington: Board of Governors of the Federal Reserve System, 2009.

Davis, Jeanmarie, Jamie McAndrews, and Kathryn Franklin (2009) "The Money Market Investor Funding Facility," unpublished working paper, Federal Reserve Bank of New York.

DTCC, Discussion Paper: Issues and Recommendations Regarding Commercial Paper Settlement Practices, March 2003, DTCC White Paper.

Fleming, Michael and Nicholas Klagge (2009) "Income Effects of Federal Reserve Liquidity Facilities," unpublished working paper, Federal Reserve Bank of New York

Fleming, Michael, Warren Hrung, and Frank Keane (2009) "The Term Securities Lending Facility: Origin, Design and Effects" Federal Reserve Bank of New York Current Issues in Economics and Finance, Volume 14, Number 2.

Schnabel, Isabel and Marcin Kacperczyk (2009) "When Safe Proved Risky: Commercial Paper During the Financial Crisis of 2007-2009," unpublished working paper, NYU Stern School of Management.