

# So Far, So Good: Government Insurance of Financial Sector Tail Risk

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## Summary:

The US government has intervened to provide extraordinary support 16 times from 1970 to 2020 with the goal of preventing or mitigating (or both) the cost of financial instability to the financial sector and the real economy. This article discusses the motivation for such support, reviewing the instances where support was provided, along with one case where it was expected but not provided. The article then discusses the moral hazard and fiscal risks posed by the government's insurance of the tail risk along with ways to reduce the government's risk exposure.

## Key findings:

1. The financial system is crucial to the real economy and at risk of instability. As a result, one reason for the Federal Reserve's discount window and the Federal Deposit Insurance Corporation's (FDIC) provision of deposit guarantees is to help stabilize banks.
2. Nevertheless, the FDIC, Fed, and Treasury provided extraordinary support on 16 occasions from 1970 to 2020 to prevent or mitigate (or both) financial instability. These interventions have not only supported US banks but also domestic nonbank financial firms, domestic nonfinancial firms, and some foreign participants in the global US dollar market.
3. Private market participants may take this extraordinary support to indicate that similar actions may be taken in response to future instability incidents, suggesting the government is insuring a large share of the tail risk in the financial sector.
4. Perceived and actual absorption of the tail risk may distort wealth allocation, increase moral hazard, and even pose a risk to the United States' taxpayers.

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# So Far, So Good: Government Insurance of Financial Sector Tail Risk

## Summary:

The US federal government has intervened to provide extraordinary support 16 times from 1970 to 2020 with the goal of preventing or mitigating (or both) the cost of financial instability to the financial sector and the real economy. This support has extended beyond domestic banks to include domestic nonbank financial firms, domestic nonfinancial firms, and even to foreign participants in the market for US dollars. These interventions may reasonably lead private sector market participants to believe that the federal government is likely to absorb losses and provide guarantees in future cases where financial stability is threatened. This article discusses the motivation for such support, provides an historical review of the 16 instances where the government provided support, along with one case where it was expected but not provided. The article then discusses the moral hazard and fiscal risks posed by the government's insurance of the tail risk along some ways to reduce the government's risk exposure.

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The perfect optimist, you know, is the fellow who falls from a 10-story building and when he passes the fifth floor they hear him say: “Well, so far so good!”<sup>1</sup>

## 1. Introduction

The potential for financial instability to aggravate or even cause economic downturns has been a concern in the United States dating back at least into the 1800s.<sup>2</sup> The Federal Reserve was established in 1913 in large part to provide an “elastic currency” that increased as needed to mitigate the instability arising from bank panics. However, the Great Depression of the 1930s was exacerbated by the Federal Reserve’s failure to effectively deploy its powers to contain bank runs.<sup>3</sup> As a result, the Federal Deposit Insurance Corporation (FDIC) was created in part to reduce banks’ exposure to runs, and the federal government adopted a more activist fiscal policy intended both to restore the functioning of the banking system and support the growth of real economic activity. More recent times, however, have seen a dramatic increase in the scale and scope of interventions by the FDIC, the Federal Reserve and the US Treasury in cases of incipient financial instability. So far, these actions appear to have limited the short-run damage to the financial system, but the actions may have some significant adverse consequences in the future.

The potential for financial sector problems to spill over into the real economy results from the sector’s central role in processing payments and channeling funds from those who have excess funds to those who need funds. The financial sector is vulnerable to instability because of a paradox: the financial sector exists in part to allocate financial risk, but the normal operations of many parts of the sector depend upon agents agreeing that certain claims are essentially riskless. Although these claims are riskless almost all the time, they can become risky when the claim’s issuer is hit with a very large adverse shock drawn from the lower tail of return distributions. If a tail event hits that makes the claims of an important part of the financial sector risky, these parts of the financial system can become unable to perform their normal functions. When such events are realized or appear likely to be realized, the federal government must decide whether and how to intervene to reduce the risk of instability, mitigate the damage, or both.

This paper shows that over the last fifty years the FDIC, the Fed, and the Treasury have chosen to intervene in ways that go beyond their ordinary operations at least 16 times to offset

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<sup>1</sup> A variety of versions of this expression exist, with this one coming from *Theater Magazine* in 1917. See <https://quoteinvestigator.com/2019/03/09/fall/>. Kane (1993) notes that he had used this expression in the early 1980s with regards to problems in the S&L industry.

<sup>2</sup> See Jalil (2015) for an analysis of banking panics between 1825 and 1929. Based on his analysis of the macroeconomic effects of the seven major panics between 1933 and 1907, he noted that “banking panics have rapid, large, and strongly negative effects on both output and price.”

<sup>3</sup> See, for example, Bernanke and James (1990).

shocks to the financial system that were perceived to threaten financial stability. In effect, these interventions have provided a form of insurance for financial sector participants against the risk of financial instability. Most interventions involved explicit commitments of government support, with the period from 2007 to 2020 in particular having witnessed two episodes of massive intervention to provide liquidity and absorb potential losses. Moreover, contrary to some who equate financial stability with banking system stability, this survey will demonstrate that government action to preserve financial stability over this 50-year period has extended well beyond the banking system to include domestic nonbank financial firms, domestic nonfinancial firms, and even the global US dollar (USD) market.

These interventions might nevertheless not be a source of concern if they were one-off events with no implications for the future, especially if one also believes that each of the interventions to date was handled appropriately.<sup>4</sup> However, by revealing political leaders' reaction function, each intervention tends to increase expectations that similar or worse threats to stability in the future will be met with similar or greater intervention. The expectations of such future support are likely to reduce concerns about the private costs of future instability. The result is likely to be misallocation of private resources to riskier assets and less efficient firms and ex-post potential to divert taxpayer funds from projects with a higher social value.

However, perhaps the most serious concern is that the government will sometime take such large losses on its financial sector guarantees that its fiscal position is impaired. Reinhart (2018) raises concerns about the level of US public debt and a continuing US stock-flow problem. She notes that the United States has long had a problem with the Triffin dilemma, and that problem is potentially growing more acute as the US share of world GDP declines even as the dollar's international role increases.<sup>5</sup> However, Reinhart observes that although this dynamic had historically been mostly a flow problem for the United States, gross US public debt to gross domestic product (GDP) has increased to the point where it is near the top

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<sup>4</sup> This article intentionally avoids analyzing whether the incidents it discusses could have been resolved with either no intervention or with less intrusive intervention. Whether the interventions were appropriate is an important question for the future conduct of public policy. However, a fair evaluation of the actions discussed in this paper would need to take into account the costs and benefits of the intervention, as well as estimating the costs and benefits of one or more unobservable and counterfactual situations where less or no support was provided. The resulting analysis would be far longer, and the discussion of the counterfactuals would likely distract from this paper's main message: that the government's past actions suggest that it has taken ownership of a very large fraction of the tail risk in the financial system and this risk absorption has the potential to have serious adverse consequences.

<sup>5</sup> In broad terms, the Triffin dilemma states that the country providing the reserve currency will need to run ever-larger current account deficits to provide the rest of the world with adequate liquidity. See US Congress Joint Economic Committee (1959, pp. 205–214).

relative to other developed countries.<sup>6</sup> At some point the higher debt level might force higher federal tax rates, or it could create pressure to use price inflation to reduce the real value of the debt outstanding. Looked at from an international perspective, one result referenced by Reinhart (2018) is that it could lead to a “crashing US dollar a la early 1970s.” Since 2018, the debt to GDP ratio has increased further as a result of COVID, and her concerns are more significant now.

The article is organized as follows. The next section provides a conceptual overview of the government’s support of the financial sector, including discussions of the importance of the financial sector to the real economy, why the financial sector is more vulnerable to instability, and how the government provides support to the financial sector. The third section reviews 16 potential crises where extraordinary intervention and support was provided and one where it was not. The fourth section considers the future of government support, including the costs of providing that support and some ways of reducing the support. The last section provides some concluding remarks.

## **2. Government Support**

The financial sector is like other sectors of the economy in that unexpected developments can lead to significant losses and even widespread insolvency.<sup>7</sup> The financial sector is distinct, however, in the extent to which it receives government support. Economists sometimes refer to the financial support provided to banks as the banks’ “safety net.” Yet as section 3 will demonstrate, this safety net has not been limited to banks but extends more broadly throughout the financial system.

This section provides a conceptual overview of that safety net as background to the actual interventions discussed in section 3. The first subsection discusses the government’s motivation for intervening in the financial sector by reviewing the pivotal role of the financial sector in the operation of the real (nonfinancial) economy. The second subsection discusses why the financial sector may be more vulnerable than most other sectors to instability. The third section discusses some of the ways the government supports the sector.

### **2.1. Costs of Financial Instability**

Financial distress and failure among financial firms could adversely affect the economy through its effect on employment in the financial sector, but financial firms are not unique in this respect. Financial firms also supply a variety of essential services to other parts of the

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<sup>6</sup> The potential market impact of government financial sector risk absorption may extend even to countries in relatively strong financial positions. Jappelli, Pelizzon, and Plazzi (2021) find evidence that the spreads on corporate credit default swaps (CDS) of the core countries in Europe became more highly correlated with their sovereigns CDS during the COVID-19 pandemic.

<sup>7</sup> See Wall (2020) for a high-level discussion of the costs and benefits of supporting the corporate sector during the COVID-19 shock.

economy, but so do many other industries.<sup>8</sup> What sets the financial sector apart from most other sectors is that financial services are an essential input to almost every sector of the economy. Almost every business depends upon the operation of the payments system run by banks, and a large fraction of businesses depend upon the provision of credit by the financial system. The provision of these services by a strong financial sector can help the rest of the economy work through large adverse economic shocks. On the other hand, a lapse in the provision of these services because of systemic failures in the financial system can cripple the rest of the economy even if the fundamentals are otherwise strong. The experience of both the Great Depression (1930s) and the Great Recession (2007–09) showed that financial instability could have substantial adverse effects on the real economy in practice as well as in theory. Moreover, economic downturns are not only macroeconomic events but also have severe adverse microeconomic impacts on many individuals’ economic prospects as well as on other aspects of their life.<sup>9</sup>

Further, decisions as to whether to take government action to avoid or mitigate financial instability are political questions and must ultimately be supported by the political system if they are to be repeated. In this case, the self-perceived incentives of the political authorities are generally aligned with minimizing the threat and impact of financial instability that could lead to a recession. As Kuklinski and West (1981) observed: “Members of Congress, especially those of the administration’s party, view a deteriorating economy much as a parent might view an impending flu epidemic—with fear and trepidation.”<sup>10</sup>

## **2.2. Financial Sector Vulnerability**

The traditional concern about financial stability has focused on banking sector stability. Individual banks invest in illiquid assets financed by liquid deposits. If depositors’ estimates of the value of the bank’s assets fall sufficiently far, the depositors may “run” on the bank by demanding that the bank redeem their deposits.<sup>11</sup> To repay the depositors in a timely manner, the bank may be forced to engage in “fire sales” in which it sells assets at prices below their long-run value in an attempt to raise funds to meet the deposit withdrawal. Moreover, the run on an individual bank could spark a wider run on other banks to the extent it causes depositors

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<sup>8</sup> Kaufman (1996) observed that many of the costs of an individual bank’s failure were similar to the disruptions of supplier-customer relationships that result from the failure of a nonfinancial firm of comparable size.

<sup>9</sup> For example, see Schwandt and Von Wachter (2019) for a discussion of the economic impact of recessions on those entering the labor market, and Forbes and Krueger (2019) for a discussion of the effect of the Great Recession on mental health.

<sup>10</sup> Similar views were also expressed in then presidential candidate Ronald Reagan’s question, “Are you better off today than you were four years ago?” and in James Carville’s (then adviser to presidential candidate Bill Clinton) statement that “It’s the economy, stupid.”

<sup>11</sup> The incentive to run on banks arises in part because banks follow a sequential service constraint in which those first in line to withdraw their funds obtain the money before others farther back in the line.

in other banks to doubt the solvency of their bank.<sup>12</sup> A run on a large fraction of the banking system is often referred to as a “bank panic.” A bank panic may result inability of creditworthy borrowers to obtain new loans and, even worse in the short run, the inability of banking system to process payments.

As the financial system has become more sophisticated, a broader set of financial system participants have become exposed to something like bank runs and panics. In setting the price for a financial instrument, investors (broadly defined to include anyone holding financial assets) price at least three important characteristics: the asset’s expected return, the risk of the asset, and the liquidity of the asset.<sup>13</sup> A more liquid asset provides the investor with a lower-cost option to obtain funds for consumption or investment in another asset. Although safety and liquidity are different concepts, they are related, as emphasized by Gorton (2017). Assets that are widely perceived to be very safe can be regarded as informationally insensitive. That is, neither the buyer nor the seller of these instruments will seek to obtain additional information as the cost of obtaining the information will almost surely exceed the value of that information in pricing the claim. These informationally insensitive assets can then be used to make payments or provide collateral at very low cost to the parties.

On the other hand, individuals and nonfinancial business borrowers generally prefer to issue lower-cost debt with longer maturities. Retail borrowers benefit from longer maturity loans as the added repayment time reduces the risk to individuals that they will be forced to reduce consumption to repay their debt. Business borrowers benefit in that longer-maturity debt reduces the risk the firm will have to prematurely liquidate a project to repay the debt.

The financial sector may profit from these preferences to the extent it can offer borrowers the longer-term obligations they prefer while supplying investors with the liquidity they prefer. The key to providing this liquidity is that although almost all investors prefer the ability to liquidate their investment on short notice, only rarely will a large fraction of investors seek to liquidate their investment at the same time. This allows the financial system to provide investors with the liquidity they desire as well as the longer maturity preferred by borrowers in two ways.

First, financial institutions such as banks take longer-dated claims and issue short-term (often on demand) obligations. In doing so, financial institutions rely on fund inflows approximately equaling outflows at the institutional level. Moreover, to the extent any one

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<sup>12</sup> The run on one bank could spark concerns in other banks in two ways. First, banks tend to hold similar portfolios, and thus information that suggests one bank’s assets have fallen in value can result in depositors in other banks imputing similar losses to their banks. Second, one bank’s engaging in a fire sale may reduce the value of the assets held by other banks.

<sup>13</sup> For example, see Acharya and Pedersen (2005) for a model in which all three asset characteristics are priced.

institution has an imbalance, loans from other financial institutions that have the opposite flow imbalances can likely offset it.

Second, financial markets may provide liquidity by providing opportunities to buy and sell assets. Ideally, the markets provide this opportunity with minimal delay and at low cost (both transactions cost and market impact). Financial markets differ in liquidity based on a variety of characteristics, including the extent to which participants are concerned about adverse selection and the extent to which the market attracts the most buyers and sellers. The process of building liquidity is self-reinforcing—the more buyers and sellers are attracted to a market, the more other buyers and sellers will want to use that market. The process of building liquidity applies at the level of individual financial instruments—such as US Treasuries—but it also applies at the level of sovereign currencies. Given that the United States dollar (USD) denominated financial markets are the most liquid in the world, the desire for liquidity creates an incentive for issuers to sell securities denominated in USD and for investors to purchase those obligations regardless of the home currency of the issuer and investor.

The provision of liquidity by the financial sector works well, until it does not. Dang, Gorton, and Holmstrom (2019) argue that the primary reason why liquidity erodes is that the value of the collateral backing the debt drops enough so that some traders can gain by gathering private information, and the price of an asset suddenly becomes sensitive to new information. Regardless of whether it is the information story or some other reason, a decline in the liquidity of an asset will change the optimal portfolio of investors in that asset. These investors will want to immediately recontract to at least move part way back to their prior liquidity position and avoid potential losses. However, the resulting run on a bank or sale of a previously safe assets puts even more stress on the institution or market that had been supplying the liquidity.<sup>14</sup>

If the liquidity is being provided by a financial institution, the resulting run on that institution's liabilities may force the institution to engage in fire sales to be able to honor its obligations in a timely manner. If the institution is unable to honor the request in a timely manner, then it will be forced into bankruptcy or—in the case of US banks—into resolution by the FDIC. In either case, the institution's ability to continue to meet the liquidity needs of its borrowers is impaired.

If a market becomes illiquid, the issuers of maturing debt obligations may be unable to roll over their debt into a new obligation, exposing these issuers to the risk of bankruptcy. Investors may be unable to liquidate their obligations, which may result in them defaulting on

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<sup>14</sup> A widely cited paper by Diamond and Dybvig (1983) analyzes the potential for bank runs in a model in which loans that are held to maturity have no credit risk.



obligations owed to third parties.<sup>15</sup> Even if neither is threatened by bankruptcy, both incur a significant opportunity cost in the form of a forgone ability to invest in a new asset (for both firms or individuals) or make a timely purchase for consumption (individuals). The macro implications of higher bankruptcy rates, reduced investment, and reduced consumption is likely to be a reduction in the rate of growth in the economy.

### **2.3. Forms of Assistance**

The following subsections discuss the extraordinary ways in which the FDIC, the Federal Reserve, and the Treasury may provide support to the financial sector. This section also discusses the evolution of the rules under which these bodies can provide support on a discretionary basis without first obtaining congressional approval. The ability to act without congressional authority is important for addressing illiquidity in markets and institutions. Solvency problems usually develop over a period of months, which in principle means that Congress could address these problems before they become critical. However, the change from an institution or market being liquid to it becoming illiquid can happen within days or even hours, which is not nearly enough time for Congress to act in most circumstances.<sup>16</sup>

Although this article focuses on extraordinary assistance, it is also the case that the normal operations of the FDIC, the Fed, and the Treasury reduce the risk borne by creditors and equity holders of financial firms and/or reduce the extent to which financial sector instability adversely affects the flow of financial services to the real economy. The FDIC's normal operations include the provision of deposit insurance to insured depositors and in some cases to uninsured depositors. These actions reduce the risk of a run on a bank and so reduce its risk of failure. The Federal Reserve's normal operations include the provision of collateralized credit through the discount window on terms available to all banks. The Federal Reserve's normal operations also includes the Fed's routine use of its conventional monetary policy tools to boost aggregate demand in response to an actual or incipient downturn in demand.<sup>17</sup> The normal operations of the Treasury (fiscal policy) include automatic stabilizers that buffer regional or national shocks to income. Examples of such stabilizers are

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<sup>15</sup> See Gorton, Laarits, and Metrick (2020) for an example of what happens when a financial market starts to break down.

<sup>16</sup> One could argue that liquidity problems almost always stem from solvency problems, and thus Congress has time to intervene. However, Congress almost never acts in a preemptive fashion to address emerging solvency problems. One possible reason why Congress almost never acts preemptively is that many incipient solvency problems resolve themselves without the need for congressional intervention. If Congress were to act preemptively whenever a potential problem arose, the time available for addressing other legislative priorities may be significantly reduced, and the resulting congressional response may be to provide many more bailouts than is observed in practice.

<sup>17</sup> Some argue that the low rates used to boost economic activity may contribute to the formation of asset price bubbles that result in subsequent bouts of financial instability. For example, see Allen and Carletti (2013).

unemployment insurance, which increases during a downturn, and progressive income taxes, which decrease during a downturn. The Federal Reserve's routine conduct of monetary policy and the Treasury's automatic stabilizers are intended to reduce the variability of national and regional income which has the effect of reducing the risks borne by the private sector.

The next two subsections look at the discretionary authority provided to the FDIC and the Federal Reserve. The third section discusses both the Treasury's ability to act on a discretionary basis and some of the types of extraordinary support authorized by Congress in response to specific crisis. Finally, the fourth section discusses the role regulatory forbearance for insolvent or almost insolvent financial firms, especially in circumstances where investors might reasonably anticipate a bailout if the firm ultimately fails.

### **2.3.1. Federal Deposit Insurance Corporation**

The FDIC was created in 1933 with an initial insurance coverage limit of \$2,500. That limit had been increased to \$20,000 by the start of the 1970s. The limits were subsequently increased to \$40,000 in 1974, \$100,000 in 1980, and \$250,000 for all accounts starting in 2008. These coverage limits are minimums that are ordinarily enforced if a bank is liquidated. However, FDIC's preferred resolution method for failed banks is a purchase-and-assumption transaction, in which a financially strong bank acquires the failed bank and assumes its deposits. This approach has the benefit of preserving some of the going-concern value of the bank, but it can also lead to de facto protection of uninsured deposits, depending upon whether the acquiring bank assumes all deposits or just the insured deposits. Thus, the FDIC provides some protection to bank creditors as a part of the normal conduct of its business.<sup>18</sup>

The FDIC, however, has also provided expanded coverage of deposits and even sometimes non-deposit liabilities in extraordinary situations. The legal standards under which this expanded coverage varies through time. Nurisso and Prescott (2017) discuss the early development of too big to fail when the legal standard for a bailout was that the bank in danger of failing was "essential to provide adequate banking service to the community."<sup>19</sup> They note that the Garn-St. Germain Act of 1982 changed the standard to "in excess of that amount which the Corporation determines to be reasonably necessary to save the cost of liquidating." They also observe that the standard changed again with the Federal Deposit Insurance Corporation Improvement Act of 1991 to the FDIC being required to follow least cost resolution unless the failure of the risk was deemed to pose a systemic threat.

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<sup>18</sup> See Part I of FDIC (1998) for a discussion of FDIC resolution practices.

<sup>19</sup> See Gary and Tallman (2016) for a discussion of too big to fail during the pre-FDIC National Banking Era.

### 2.3.2. Federal Reserve

The Federal Reserve provides banks with access to collateralized loans through its discount window.<sup>20</sup> One of the primary purposes of the discount window has been to provide liquidity for the normal operation of the banking system. Direct access to the discount window was limited to member banks until the passage of the Depository Institutions Deregulation and Monetary Control Act in 1980, which opened the discount window up to any institution holding a reserve account at the Fed. The rate on most discount window loans had been less than market rates prior to the expansion of discount window access, and it remained so for a period after the expansion.<sup>21</sup> Instead of relying on price to limit borrowing, the Fed instead limited access to the window. As Chairman Volcker testified in 1980, “Borrowing [from the discount window] is a privilege and not a right.”<sup>22</sup> That changed in January 2003, when the Reserve Banks raised their discount rate above market rates, but in return the discount window was open to sound banks at their discretion without the Fed imposing administrative costs.<sup>23</sup> Other important changes were the restrictions on discount window lending to undercapitalized banks resulting from the FDIC Improvement Act of 1991 and the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 requirement that the Federal Reserve disclose detailed information on discount window loans with a two-year lag.<sup>24</sup>

Along with meeting the temporary liquidity needs of banks, the discount window has also been an important tool for meeting the financial system’s need for liquidity during periods of stress. In some cases, this function has meant illiquid banks have turned to the discount window—either directly through the window or via a procedure that auctioned discount window loans to banks. Additionally, the Federal Reserve has used the window to provide funds indirectly to illiquid nonbank borrowers by telling banks that the discount window would be available to help provide the funds so that the banks could meet the needs of these borrowers.

Along with going through banks to provide funds indirectly to nonbank borrowers, the Federal Reserve also has the authority under Section 13(3) of the Federal Reserve Act to provide direct financing to firms.<sup>25</sup> The original version of Section 13(3) provided the Fed with the authority to lend in “unusual and exigent circumstances” to any individual, partnership, or

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<sup>20</sup> This summary of discount window operations is based on Carlson and Wheelock (2013) and Clouse (1994).

<sup>21</sup> The rate on longer-term loans, called extended credit, was above market rates during this period.

<sup>22</sup> See p. 23 of

[https://fraser.stlouisfed.org/files/docs/historical/senate/cmp/1980s/CMP\\_96S\\_02251980.pdf](https://fraser.stlouisfed.org/files/docs/historical/senate/cmp/1980s/CMP_96S_02251980.pdf).

<sup>23</sup> See Stevens (2003).

<sup>24</sup> See [https://www.federalreserve.gov/monetarypolicy/bst\\_lendingdepository.htm](https://www.federalreserve.gov/monetarypolicy/bst_lendingdepository.htm) for a discussion of current discount window policy and for links to the disclosure of detailed discount window lending for the period since the enactment of the Dodd-Frank Act.

<sup>25</sup> This summary of Section 13(3) authority is based on Eveson (2021).

corporation, but that authority was limited to discounting notes, drafts, and bills of exchange. The FDIC Improvement Act expanded this authority in 1991 to include any collateral satisfactory to the lending Reserve Bank. Although not explicitly stated, the Federal Reserve has interpreted this provision as authorizing the Fed to lend to special purpose vehicles set up solely for the purpose of providing liquidity to one or more individual, partnership, or corporation. The Dodd-Frank Act scaled back this authority in a variety of ways, including a requirement that the program be broad-based and not limited to a single company, that 13(3) authority should not be used to prevent a single company from avoiding bankruptcy, and that any 13(3) program have the prior approval of the Secretary of the Treasury.

Along with its authority to directly lend to domestic borrowers, the Federal Reserve has also used swap lines with foreign central banks, in which the Fed supplies dollars to a foreign central bank and the foreign central bank in turn supplies an equal value of its currency to the Federal Reserve.<sup>26</sup> The purpose of these lines when they first opened in 1962 was to help the Fed obtain foreign currency with which to intervene in foreign exchange markets to maintain the value of the dollar. However, the general structure of the swap lines lends itself to other uses. A swap line may be provided to a foreign country to help it deal with dollar-denominated debt. Additionally, the swap lines may also be used to provide US dollar liquidity to foreign financial firms with the foreign central bank acting as an intermediary.

### **2.3.3. The Treasury**

The Treasury, and more generally federal fiscal policy, can take on a variety of roles in reducing the tail risk borne by the private sector. Along with the automatic stabilizers, Congress often enacts special “stimulus” packages that increase government spending and/or temporarily reduce taxes to support economic activity, which benefits the financial sector.

In addition to these actions that boost the overall economy, the Treasury may obtain funds from the Congress to be used to alleviate stress in the financial system. Congressional appropriations set some limits on the Treasury’s actions but often provide the Treasury with considerable discretion in exactly how the funds are to be used.<sup>27</sup> The appropriations to support the financial sector typically take the form of investments and guarantees. However, sometimes the aid involves a transfer of realized losses from the private sector to the Treasury, for example to fund the resolution of failed savings and loans in the 1980s.

The Treasury’s investments include both the purchase of equity (typically senior preferred stock) and the granting of loans to financial services firms. The Treasury has also worked with the Federal Reserve to increase the total amount of funds available for

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<sup>26</sup> This summary of swap lines is based on Bordo, Humpage, and Schwartz (2015).

<sup>27</sup> For example, the Treasury has used the Exchange Stabilization Fund for a variety of purposes. The home page for the Exchange Stabilization Fund is <https://home.treasury.gov/policy-issues/international/exchange-stabilization-fund>.

investment. The Federal Reserve has access to unlimited liquidity, but its ability to lend is restricted by the requirement that its loans be adequately collateralized. The Treasury has helped to satisfy this requirement for some 13(3) facilities by agreeing to take a first loss position up to a fixed dollar amount, with the Federal Reserve bearing the residual risk.<sup>28</sup>

#### **2.3.4. Forbearance for Firms with Explicit and Implicit Guarantees**

Tail risk may be shifted to the government even cases where a firm ultimately does not receive any explicit governmental assistance. Depositors and other creditors will respond to the risks being taken by a firm only to the extent they perceive they are bearing those risks. Thus, depositors covered by explicit deposit insurance have limited incentive to run on distressed or even insolvent banks. Moreover, depositors and other creditors will take account not only of explicit insurance but also with their perception of the probability a firm will benefit from implicit government guarantees. (That perception is the extent to which they believe that if a particular financial firm were to become insolvent that it would be receive government assistance that would protect some creditors from loss and could even protect all investors.) Investors may infer the existence of implicit guarantees based on their perceptions of the systemic importance of the institution and statements made by leaders in the congressional and executive branches, along with those of the FDIC and Fed. Additionally, investors may learn about the government's reaction function and thereby infer implicit guarantees from prior government bailouts. Among the institutions that have been thought to benefit from implicit guarantees are the largest banks and the government sponsored enterprises (GSE).

Those financial firms benefiting from sufficient explicit and implicit guarantees may be able to continue normal operation even when the economic value of their capital drops to levels that would result in other firms becoming illiquid and forced into bankruptcy. The resulting reduction in market discipline shifts much of the burden for disciplining the risk taking by implicitly guaranteed, undercapitalized firms to the firm's prudential supervisor. If the prudential supervisor exercises forbearance, the firm's existing equity and debt holders are effectively receiving a subsidy from the government.<sup>29</sup> The equity holders retain their interest in the firm and can benefit if it recovers, whereas they would have lost their investment in bankruptcy or resolution. Debt holders benefit to the extent they have the option of refusing to

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<sup>28</sup> Allocating the risk of losses on Fed loans between the Treasury and the Fed is more an accounting issue than an economic issue. The Treasury has a claim on the Federal Reserve's profits through a tax the Federal Reserve pays on its issuance of currency. The exact calculation of this tax has varied through time, but it effectively implies that any losses borne by the Fed will ultimately be passed through to the Treasury in the form of lower remittances from the Fed to the Treasury.

<sup>29</sup> For example, see Kane and Yu (1995) estimate the how the Federal Savings and Loan Insurance Corporation's losses evolved in the 1980s as the thrifts supervisor (the Federal Home Loan Bank Board) exercised forbearance.

roll over the loan and thereby avoiding any risk of loss. Alternatively, if the debtholder roll over the loan, they may charge a higher rate for doing so.

The cost of such forbearance is borne by the FDIC and/or the Treasury to the extent that the implicit guarantee is not disowned. Of course, an implicit guarantee is not, by definition, written into law. Thus, the government authorities have the option of refusing to provide support if the firm's distress reaches the point where it is unable to continue operations. However, failing to ratify expectations of an implicit guarantee can have serious consequences for financial stability, especially if other systemically important, implicitly guaranteed firms are also in financial distress. If the government lets one implicitly guaranteed firm fail with losses to its creditors, market participants are likely to doubt the value of other financial firms' guarantee. The result could easily be runs on other undercapitalized firms that heretofore had been thought to benefit from an implicit guarantee. Thus, the decision to not support a firm considered by market participants to be too big to fail may result in runs on other distressed firms that had also been considered too big to fail.

### **3. Potential Crises and Responses**

This section reviews 16 times between 1970 and 2020 when extraordinary assistance was provided to address incipient or actual instances of financial instability, and one unusual instance where a private nonbank financial firm expected such support, which did not arrive.<sup>30</sup> The final subsection will then summarize the breadth of areas that have received extraordinary support.

#### **3.1. Penn Central**

The Federal Reserve support of the commercial paper market after the failure of Penn Central Railroad in 1970 was an early indication that the Fed's concern about financial stability extended beyond domestic banks to include domestic financial markets. Penn Central was the largest railroad and a significant issuer of commercial paper in 1970.<sup>31</sup> Its financial condition had weakened during the recession of 1969 and 1970 to the point where it unsuccessfully

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<sup>30</sup> Garbade and Keane (2020) and Garbade (2021) discuss a number of instances where the Federal Reserve intervened in the US Treasury market to prevent disorderly market conditions. Most of this discussion relates to pre-1970 events and, hence, is outside the period considered in this article. One recent Federal Reserve intervention that clearly falls within this article's parameters is the disruption in the US Treasury market in September 2019 (see Afonso et al. 2020). One could view this as primarily about the Fed intervening to support financial institutions. However, I think the more reasonable case is that the Federal Reserve was intervening to resolve problems that it and other bank regulators largely created. That is, the problems arose from the interaction of Federal Reserve monetary policy reducing the supply of reserves while the bank regulators had increased banks' demand for reserves.

<sup>31</sup> This summary of Penn Central's failure and the Fed's response is based upon Brimmer (1989), Calomiris (1994), and Carlson and Wheelock (2013).

sought support from the Nixon Administration and then from the Federal Reserve.<sup>32</sup> The firm declared bankruptcy on June 21, 1970.

Calomiris (1994) provides several reasons for concern about the potential impact of the Penn Central failure on the functioning of the commercial paper market. First, both the number of firms issuing commercial paper and the amount outstanding had increased rapidly in the second half of the 1960s, which made the market relatively more important than it had been. Moreover, the 1969–70 recession was the first recession faced by the market during this period of growth, and Penn Central was the first failure. For this reason and others, Calomiris (1994) observes that the market was learning about the vulnerabilities of commercial paper borrowers in real time. The Federal Reserve Board shared concerns that Penn Central’s failure could adversely affect the commercial paper market. In particular, the Fed was concerned the bankruptcy of a large issuer could adversely affect other firms’ ability to roll over maturing obligations in the commercial paper market, potentially forcing these other firms into bankruptcy, according to Federal Reserve governor Brimmer (1989). Calomiris (1994) further reports that concerns about the commercial paper market were justified, with the market shrinking from \$32 billion to \$29 billion and most of the decline occurring in the first week.

Given this concern about the reaction of commercial paper investors to the failure of Penn Central, Brimmer (1989) reports that the Federal Reserve Bank of New York and some of the other Reserve Bank presidents contacted their banks around the time of the bankruptcy filing to encourage them to meet the credit needs of their customers. As a part of this, banks were told that they could obtain the necessary additional funding by borrowing from their local Reserve Bank but that the banks would be retaining the credit risk associated with the additional lending. As Calomiris (1994) explains, the real significance of the Fed’s contacting the banks was that it indicated they could borrow from the Fed without bearing the nonpecuniary costs ordinarily imposed on discount window borrowers during this period. Additionally, the Federal Reserve Board, the FDIC, and the Federal Home Loan Bank Board voted to suspend the Regulation Q ceiling on deposit interest rates for all deposits greater than \$100,000, thus allowing banks to raise additional funds in the markets to support the additional lending. Finally, Calomiris (1994) notes that a statement by Chairman Burns to Congress on July 23, 1970, reiterated that the Fed had the authority to lend directly to make direct loans to firms in “unusual and exigent circumstances.”

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<sup>32</sup> Brimmer (1989) reports that prior to the denial by the Federal Reserve Board, that the Federal Reserve Bank of New York had determined that such a loan would fail one of the statutory requirements for Fed lending to a nonbank firm: that the borrower be creditworthy, and the loan secured by acceptable collateral. The New York Fed advised the Board that Penn Central would not be able to repay a loan from the Fed.

Neither the Federal Reserve nor the Treasury suffered any credit losses because of Fed’s support of the commercial paper market in 1970. The Federal Reserve did take opportunity losses to the extent the rate it earned on discount loans was below the federal funds rate. Arguably, the relaxation of Regulation Q was a benefit rather than a cost as it relaxed a regulatory distortion of money markets. Importantly, the Federal Reserve’s move helped signal that it would provide liquidity to nonfinancial firms during periods of stress.

### **3.2. Franklin National Bank**

The bailout of Franklin National Bank in 1974 was arguably the first case where market participants could have perceived a bank as being bailed out because of its size and importance to financial markets.<sup>33, 34</sup> Franklin National Bank was originally oriented toward retail banking in Nassau County, New York. However, the bank decided to become a money center bank, opening offices in Manhattan and overseas and starting to participate in the eurodollar market. Shortly before its collapse, Franklin National Bank became the 20th largest bank in the United States, with assets of about \$5 billion. Franklin had grown lending to “riskier borrowers” and relying on money markets to fund the growth with one-sixth of its liabilities coming from the federal funds market, according to Carlson and Wheelock (2013).

The bank was unprofitable and poorly run in its core operations, according to Rose (1974). Additionally, the collapse of the Bretton Woods system of fixed exchange rates in the early 1970s resulted in many countries adopting a floating exchange rate, creating an opportunity for banks and investors to take unhedged positions in the foreign exchange market. Franklin National took advantage of this opportunity to put on some relatively large positions, but these positions resulted in substantial losses, according to Nurisso and Prescott (2017). Bank regulators became concerned about Franklin’s weakened condition in May 1974,

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<sup>33</sup> Nurisso and Prescott (2017) label the Bank of the Commonwealth as the first too big to fail bailout as the Federal Reserve argued for a bailout using the “domino theory”: that the failure of one large bank could threaten the condition of other large banks. However, it is not at all obvious that the stability of the banking system was the determining factor in the support provided by the FDIC to Bank of the Commonwealth in 1972. Nurisso and Prescott (2017) observe that the FDIC’s press release referred to the Bank’s service to the Black community and its contribution to banking competition before discussing the “the effect it might have on public confidence in the nation’s banking system.” Nurisso and Prescott (2017) also refer to an interview with former FDIC official and later banking consultant Carter Golembe, who argued that the bailout was partly because of an upcoming national election and partly because the Fed did not want to have a large state member bank fail.

<sup>34</sup> This subsection is largely based on the accounts of Franklin National Bank’s failure by Carlson and Wheelock (2013) and a court deposition of Comptroller of the Currency James E. Smith on pages 195–201 of “Oversight Hearings into the Effectiveness of Federal Bank Regulation (Franklin National Bank Failure).” Hearings before a House Subcommittee of the Committee on Government Operations on February 10; May 25, 26; and June 1, 1976, accessed on August 19, 2021, at <https://fraser.stlouisfed.org/title/oversight-hearings-effectiveness-federal-bank-regulation-franklin-national-bank-failure-747>.



with the Office of the Comptroller of the Currency (OCC) urging the bank to retrench. Perhaps more importantly, the Board of Governors of the Federal Reserve System (1974, pp. 458–59) publicly denied Franklin’s request to acquire another bank on safety and soundness grounds.

The bank started losing deposits and funding from money markets (fed funds and repo) in early May 1974 after the market received a series of new adverse information about Franklin, including the bank announcing that its management was recommending that the bank suspend dividends on its common and convertible preferred stock; the bank’s announcement of significant losses in unauthorized foreign exchange dealings; and the firm’s request to the Securities and Exchange Commission to suspend trading in its stock. Franklin replaced the lost funding with loans from the Federal Reserve, with the amount of the loan climbing to \$1.125 billion by May 22. Over the following weekend, the Federal Reserve, the Treasury, and the FDIC agreed that the Fed would lend to Franklin to keep the bank from collapsing. Their concern was that the failure of Franklin could destabilize money markets and possibly cause the failure of other banks.

After the Fed started lending but before Franklin was ultimately resolved, the Herstatt Bank in Germany failed on June 26, 1974. The handling of Herstatt’s failure had resulted in significant losses to some of Herstatt’s foreign exchange counterparties and shaken foreign exchange markets. Given that Franklin had even larger foreign exchange positions, US regulators became concerned about the potential consequences of Franklin’s failure on the foreign exchange market. Eventually, the Federal Reserve Bank of New York assumed Franklin’s foreign exchange positions after consulting with the Federal Reserve Board and the US Treasury. The ultimate resolution of Franklin National was its sale to European American Bank, in which the buyer assumed all of Franklin’s deposit liabilities (that is, the FDIC covered deposits in excess of the deposit insurance coverage limit). Franklin National also had a \$1.7 billion loan from the discount window at the time of closure, which the FDIC agreed to assume.

The support provided to Franklin National Bank transferred risks that could have been borne by uninsured creditors and foreign exchange counterparties to the Federal Reserve and ultimately the FDIC. The FDIC assumption of the discount window loan protected the Federal Reserve from taking any out-of-pocket losses, and the FDIC projected that its resolution of the bank would not ultimately result in any losses to the deposit insurance fund (FDIC 1977). The support provided to Franklin National Bank signaled that a bank would be provided with extraordinary support if its failure could impair the function of an important market, such as the one for foreign exchange.

### **3.3. Hunt Brothers and the Silver Market**

When the Hunt brothers’ attempt to corner the silver market collapsed, the Federal Reserve took a variety of actions to resolve the potential problems in a way that did not result in the failure of the investment firms and banks that had lent money to the Hunts. The Hunt brothers

took sizeable positions in silver and silver futures contracts in 1979, thus driving up the price of silver.<sup>35</sup> In response to the persistent and high degree of concentration in contracts and concern about liquidating contract in an orderly manner, the Commodity Exchange (COMEX) imposed position limits on the beneficial ownership of silver futures contracts on January 7, 1980. The COMEX followed that imposition on January 21, 1980, with a rule that no new positions could be taken in silver futures except for liquidation.

The COMEX's policies sent silver prices tumbling, but they eventually stabilized until early March, when they took another dip. The March decline sparked a round of margin calls for those long in silver, including the Hunts. The Hunts initially obtained loans from their broker, Bache Metals, and its parent firm, Halsey, Stuart & Co. However, eventually the Bache group was forced to demand additional maintenance margin from the Hunts to maintain the group's capital adequacy. When the Hunts failed to meet a margin call on March 25, Bache started to liquidate some of the Hunts' silver to raise cash. These sales led to further price declines, putting further pressure on Bache and some other dealers. The risk to those dealers who were also New York Stock Exchange members (including Bache) was that they would fall out of compliance with the exchange's minimum capital requirements and be prohibited from taking on new business. Along with loans from the Bache Group, the Hunts had also obtained loans from commercial banks.

The solution to the Hunt brothers' situation came at the annual meeting of the Reserve City Bankers (an association of the largest banks) in Boca Raton, Florida. The meeting brought together key commercial bankers as well as Federal Reserve chairman Paul Volcker, who was delivering a speech at the meeting. The resolution involved the Hunts' providing additional collateral in form of claims on oil wells and large banks providing loans needed to fund the Hunts' position.

The role of the Federal Reserve in the resolution is unclear. The Fed could potentially influence the outcome in at least three ways. The first two ways apply to almost all financial market disturbances: the Fed's ability to use its supervisory clout with large banks and the Fed's ability to provide funding through the discount window. The third way relates to recently issued Federal Reserve guidance discouraging bank lending to finance speculation. Volcker's written testimony downplays his role in the negotiations leading to resolution of the problem, portraying his role as primarily that of making sure the result did not violate the Fed's guidance on lending for speculative activities.<sup>36</sup> The written testimony also reviews the relevant banks' usage of the discount window and concludes (p. 246) that there was "no evidence of unusual

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<sup>35</sup> This account of the events leading up to the Fed's involvement is largely based on Brimmer (1989).

<sup>36</sup> See pages 235–57 of "Silver Prices and the Adequacy of Federal Actions in the Marketplace, 1979–80." Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives, March 31; April 14–15 and 29–30; and May 2 and 22, 1980.

activity at the discount window.” On the other hand, Volcker’s assistant E. Gerald Corrigan provides a different take on Volcker’s role. Corrigan explains the priority Volcker attached to a prompt resolution as follows: “Paul wanted that transaction closed on Sunday before the markets opened on Monday. That’s not easy to do, but it got done.”<sup>37</sup> Corrigan’s comments on his and Volcker’s role was that they “had a very dramatic weekend in which Volcker, as usual, was at his best in helping to negotiate an arrangement.”<sup>38</sup>

Although the record on the Federal Reserve’s involvement contains some ambiguity, there is no doubt that the Fed was concerned about the potential for market disruption and was kept in the loop as key decisions were being made. Arguably, this may have been taken by some of the banks as a commitment by the Fed to provide discount window funding if necessary for the banks to fund their new loans to the Hunts. At a minimum, the Fed’s involvement with the resolution of the Hunts’ silver position would reinforce the notion that the Fed’s interests extended to the maintenance of orderly financial markets.

### **3.4. First Pennsylvania Bank**

The 23rd largest US bank in 1980 was bailed out amid claims that its failure “would snowball into other bank failures here and abroad.”<sup>39</sup> First Pennsylvania, like Franklin National, was a “very ordinary bank” until a new CEO decided to adopt a high-growth strategy starting in 1968. The Bank’s risky lending strategy led to losses in 1974–75. The bank sought to make up for the losses by taking increased interest rate risk starting in 1976, funding longer-term Treasury securities with shorter-term funding. However, this strategy started producing losses in 1980 as Volcker’s disinflationary policy resulted in sharply higher interest rates.

First Pennsylvania approached the FDIC in April 1980 with a bailout proposal that would have been very generous for the existing shareholders and would not have allowed the bank supervisors to “unduly hamper” the bank’s operations. This plan was rejected by the FDIC, but the agency soon came under pressure from the Fed and OCC to provide a bailout under the domino theory that First Pennsylvania’s failure would create a crisis of confidence that would cause other bank failures. Moreover, in a sense, a bailout of at least some creditors was already happening with Sprague (1980, p. 18) observing that the Federal Reserve was lending heavily to the bank and that Fed chairman Paul Volcker said he planned to continue funding “indefinitely until we could work out a merger or bailout to save the bank.” This

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<sup>37</sup> See page 40 of “Federal Reserve Board Oral History Project Interview with E. Gerald Corrigan” (2009 and 2010) at <https://www.federalreserve.gov/aboutthefed/files/e-gerald-corrigan-interview-20090714.pdf>.

<sup>38</sup> See page 39 of “Federal Reserve Board Oral History Project Interview with E. Gerald Corrigan” (2009 and 2010) at <https://www.federalreserve.gov/aboutthefed/files/e-gerald-corrigan-interview-20090714.pdf>.

<sup>39</sup> See Sprague (2000, p. 89). This subsection is largely based on the accounts of Sprague (2000) and FDIC (1998, vol. 2, chapter 2).

continued funding not only allowed the bank to continue operations but also allowed some uninsured creditors to escape without loss.<sup>40</sup>

The FDIC had three options for addressing First Pennsylvania: a merger with another bank, liquidating the bank, or providing a bailout. A merger with the only bank capable of running First Pennsylvania was rejected on antitrust grounds.<sup>41</sup> A liquidation of the bank raised not only the domino theory but would also have stretched the FDIC's financial position, as the FDIC would be obligated to repay depositors immediately but would only have collected on the bank's assets as they came due. The FDIC eventually chose to provide a bailout. The FDIC purchased a five-year subordinated note, 27 banks also purchased a subordinated note, and the Fed provided a line of credit. The FDIC and the banks also obtained warrants for the bank's stock. Contrary to First Pennsylvania's original proposal, the FDIC gained substantial control, including the right to object to the bank's choice of directors and principal officers. Eventually, First Pennsylvania was able to repay the FDIC's loans and to repurchase the warrants from the FDIC.

The bailout of First Pennsylvania shifted risks to the FDIC that would otherwise have been borne by the bank's owners, uninsured depositors, and other creditors. It also amplified the message of Franklin National Bank: that the Fed and FDIC would provide a bailout if they thought it necessary to prevent a spillover to other banks.

### **3.5. Drysdale Government Securities**

The Federal Reserve officials participated in discussions to resolve the failed gambles of Drysdale Government Securities, and during those discussion they offered discount window assistance should any of the banks have an unusual liquidity problem in May 1982.<sup>42</sup> Drysdale was a dealer in the US government securities market that found a way to exploit conventional market practices to take outsized positions in government securities relative to its capital. When rates moved against the firm it was unable to make timely interest payments on securities it had shorted. A dispute then arose as to whether the banks that had intermediated Drysdale's security trades were responsible for the payment of the interest. Drysdale's counterparties argued that the banks as brokers in "blind trading" were legally principals to the transaction and should make the payment regardless of whether Drysdale paid the banks. The banks took the position that they were merely agents and did not owe the counterparties

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<sup>40</sup> The Federal Reserve's loans were secured by good collateral, with the understanding that any losses stemming from the bank's failure would be borne by the FDIC.

<sup>41</sup> Banks outside the state of Pennsylvania could not legally acquire a bank in Pennsylvania at this time, and only one banking organization in Pennsylvania was large enough to credibly acquire First Pennsylvania.

<sup>42</sup> This account is largely based on the statement of Federal Reserve Bank of New York president Anthony Solomon at the hearing "Disturbances in the U.S. Securities Market" before the House Subcommittee on Securities of the Committee on Banking, Housing, and Urban Affairs, May 25, 1982.

anything. The lack of a resolution of the issue could have an adverse impact on liquidity in the US Treasury market.

The Fed first got involved on Monday, May 17, when Chase Manhattan Bank asked the Federal Reserve Bank of New York to call a meeting of major market participants to be held at the New York Fed. The Reserve Bank agreed to the meeting, where it expressed concerns about the market consequences of leaving the issue unresolved. The Fed also said it was not taking any position on any proposals advanced by Chase. The Fed then notified officials in the Treasury Department and other relevant agencies, along with having staff going through Drysdale's books to better understand the situation.

Tuesday afternoon (May 18) the New York Fed held a meeting with the 12 New York Clearing House banks to indicate the Fed was watching the situation and to say that the discount window was available to assist any commercial bank dealing with unusual liquidity problems resulting from the situation. Federal Reserve Bank of New York president Anthony Solomon's statement to a House Committee said that the Fed (p. 27) "had discussions with senior officials of Chase and Manufacturers Hanover reviewing the options for a resolution of the situation, to reduce or, eliminate the uncertainty, and restore more normal conditions in the Government securities market." Solomon (p. 27) added that "market pressures were building for Chase and Manufacturers to take action to deal with the problem," where the one action that would help calm markets would be for the banks to pay the interest for Drysdale.

The relevant banks announced they would make the payments on Wednesday, May 19. The result, according to Solomon's testimony (p. 28), was that "[m]arket apprehensions had greatly diminished by mid-day Wednesday, following the announcements by the banks." Chase also announced that it would liquidate the securities held by Drysdale, which had been processed by Chase. The Fed in turn told primary dealers early on Thursday that the New York Fed would provide more flexible terms for the short-term loan of government securities from the Federal Reserve's portfolio.

The resolution of Drysdale is like that of the Hunt brothers in that the Federal Reserve clearly played an active role, but what all the Fed did to mediate a solution is unclear. One possible difference is that in the case of Drysdale it is clear that the Fed was offering to provide liquidity through the discount window and access to government securities from the Fed's portfolio, albeit in both cases this would have required the borrower to post sufficient good collateral. The most important similarity in both cases is that the Fed showed that its interests extended beyond commercial banks to include important financial markets.

### **3.6. Debt Crises in Less Developed Countries**

The bank regulators and the US Treasury took a variety of actions to reduce the risk of one or more of the largest US banks from failing due to economic losses on their loans to less

developed countries (LDC), primarily in Latin America in the 1980s.<sup>43</sup> US banks expanded their international operations in the 1950s and 1960s, in part because of relatively fast growth in developing markets. The run-up to the debt crisis began with a dramatic increase in the price of oil starting in 1973, which led to balance of payments problems in many developing countries that were oil importers, while providing oil exporters with substantial inflows that needed to be deposited or invested somewhere. Banks in the United States and other developed countries stepped into this void to recycle the petrodollars earned by exporters to the developing countries that needed funding. The banks' LDC loans generated mixed reactions from the official sector. Some in the US government encouraged banks to recycle the petrodollars to help stimulate growth in developing countries, especially in Latin America (FDIC 1997). However, bank supervisors in the United States (FDIC, 1997) expressed concern about the rapid growth.<sup>44</sup>

The situation facing many LDCs took a turn for the worse in the late 1970s and early 1980 because of a second oil price shock in 1979 and the appreciation of the US dollar in 1981 and 1982. Some countries also suffered from capital flight because of fears of their citizens that their country's exchange rate would be devalued. The dam broke in August 1982, when the Mexican finance minister said that his nation could no longer meet its debt service requirements. Around 40 countries were behind on their interest payments by the end of the year, and 27 were in negotiations to restructure their loans the following year. Among the 27 debtors that sought to restructure their obligations in 1983 were four large Latin American borrowers: Argentina, Brazil, Mexico, and Venezuela.

High on the list of the concerns of the US regulators during this period was the large amount of distressed international loans relative to the capital of the large US banks. The FDIC (1997, p. 207) quotes FDIC chairman Lewis as saying that seven or eight of the largest US banks might have been found to be insolvent if the banks were forced to increase their loan loss allowance to cover losses on the debt.

Unlike some European regulators, the US regulators exercised forbearance and did not require an immediate write-down of the loans. Instead, an effort was made to restructure the loans and keep them from becoming so delinquent that the banks could avoid being forced to recognize losses on their financial statements. This process typically involved the banks and official lenders providing funds to the country so that it could honor its pending debt service requirements. Although the banks were putting in some additional money, they were frequently receiving more than they lent, with the result that the eight US money center banks

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<sup>43</sup> This summary of the Latin American debt crisis is based on the FDIC (1997, chapter 5), Clement and Maes (2013), and Sachs (1989).

<sup>44</sup> See also Clement and Maes (2013) for a discussion of the concerns of the Bank for International Settlements and international supervisory organizations about rising debt levels.

loans outstanding to Latin America fell from \$56 billion in 1983 to \$44 billion in 1989.<sup>45</sup> Along with the reduced exposure, banks also increased their loan loss reserves and, under considerable regulatory pressure, increased their book value capital.

The banks had strengthened their financial condition by 1989 to the point where they could write off a substantial part of the debt without the risk of insolvency. Treasury Secretary Nicholas Brady developed a debt relief plan that ultimately resulted in private lenders taking losses of approximately \$61 billion for the 18 countries that participated in the plan's reductions.

The handling of the Latin American debt showed that the supervisors were not prepared to put a substantial fraction of the large US banks into resolution. Instead, the banks would be given forbearance and a chance to recover from their economic losses. The banks were also indirectly supported via risks and losses being shifted to the taxpayers through the mechanism of US loans (direct and through its support of international agencies) to distressed countries. The result was an increased potential for moral hazard on the part of individual banks, especially to the extent other large banks were taking similar risks.

### **3.7. Penn Square, Seafirst, and Continental Illinois**

The failure of collapse and bailout of Continental Illinois helped popularize the phrase “too big to fail.” Continental Illinois was the seventh-largest US bank when it was effectively nationalized after a run in May 1984.<sup>46</sup> To understand Continental's collapse, however, it helps to start with a small bank in Oklahoma City called Penn Square Bank, N.A. Penn Square was a reckless lender to the oil exploration and drilling industry with weak to nonexistent risk management policies.<sup>47</sup> The bank's lending exceeded its capacity to fund the loans, so it sold participations in its energy loans to a number of other large banks, including Continental Illinois. The inadequacies in Penn Square's loan underwriting became obvious after the oil price declines that started in 1981. Sprague (1986, p. 110) reports that the OCC first informed the FDIC that the bank was “headed for certain failure” in June 1982 and that its problems would spill over to at least five of the largest US banks. The OCC and the Federal Reserve initially argued for that the failed bank should be sold to another bank. However, the FDIC concluded that Penn Square did not meet the requirement for open bank assistance of being “essential” to its community and that a purchase and assumption transactions was not feasible due to the magnitude of the bank's contingent liabilities.<sup>48</sup> Thus, the FDIC was left

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<sup>45</sup> See also Sachs (1989).

<sup>46</sup> This summary of the Latin American debt crisis is based on the FDIC (1997, chapter 7) and Sprague (1986, chapter 6).

<sup>47</sup> See Zweig (1985) for some examples of Penn Square's grossly inadequate approach to risk management.

<sup>48</sup> See FDIC (1998, Part II, Chapter 3).

with no choice but to liquidate Penn Square and pay off the bank's insured depositors. Leading up to Penn Square's closure, the Federal Reserve provided discount window loans to the Bank immediately before the closure (Clouse 1994, p. 973) and the Fed also provided discount window access to banks holding FDIC receivership certificates arising from Penn Square's failure (FDIC 1997, p. 534).

As then FDIC director Sprague (1986, pp. 114–115) put it, the FDIC was correct on the law, but OCC examiner Homan “was correct about the havoc a Penn Square failure would cause with other large banks.” The first large bank succumb to the pressure was Seattle First National Bank (Seafirst) in 1983. Seafirst had both loan participations with Penn Square and an even larger portfolio of oil and gas loans it had originated. The Federal Reserve provided temporary liquidity to allow the bank to continue operation according to Rowe (1983). Sprague (1986) reports FDIC was prepared to provide a loan of \$250 million to Seafirst on an open-bank basis to facilitate an orderly sale of the bank, going so far as to have completed the necessary paperwork. However, BankAmerica was prepared to buy Seafirst on an unassisted basis after the state of Washington changed its laws to permit interstate banking. The state completed the legal changes, and the takeover was approved by the OCC and Fed just in time to avoid the need for the FDIC loan, according to Sprague (1986).

Next up was Continental Illinois in 1984. Continental had significant exposure to loans to less developed countries, but it was the bank's domestic loan portfolio—highlighted by its Penn Square participations—that caused the bank to collapse. Prior to Penn Square's failure, Continental had received some favorable press reviews in the 1970s for its rapid growth and relative strong profitability. However, market perceptions of Continental Illinois were changed with the failure of Penn Square.

Severe branching restrictions had limited Continental Illinois's ability to fund its rapid growth with core deposits and forced it to rely heavily on funds obtained in the money market. The bank's ability to obtain this funding from domestic sources was greatly reduced after the failure of Penn Square, so the bank turned to foreign funds. This situation was sustainable into 1984 but was made more vulnerable by the bank's deteriorating conditions, as reported in its financial statements for the first quarter of that year. Amid rumors about the bank's condition, foreign depositors started running in May.

In determining how to respond to the problems at Continental Illinois, supervisors expressed concern about the potential spillover to other banks small and large. Continental Bank had an extensive correspondent network of almost 2,300 banks. The FDIC found that 66 banks with assets of almost \$5 billion had deposits worth more than 100 percent of the bank's equity, and another 113 banks had between 50 and 100 percent of their capital invested in Continental. These numbers, however, are easily misinterpreted to suggest that these banks were all at risk of failure should Continental Illinois default. In fact, very few if any were at risk



given that these banks would likely have eventually gotten most of their investment back. However, the supervisors had other reasons for serious concern, such as the potential spillover from Continental's failure to other large vulnerable institutions.<sup>49</sup> If Continental were allowed to fail with losses to depositors, these institutions might also be run.

The bailout of Continental took part in three acts. The first act was a short-lived attempt to deal with just the liquidity issues. The bank borrowed \$3.6 billion from the Federal Reserve on Friday, May 11, and 16 banks tried to put together a loan package to keep Continental afloat over that weekend. However, that package quickly proved inadequate as the run continued. To prevent an immediate failure, the regulators then took several steps (the second act), including a package that included assistance from other major banks, an FDIC capital injection of \$1.5 billion, and the Federal Reserve's agreement to meet any of Continental's liquidity needs. The FDIC also agreed to cover any losses that might otherwise be borne by the bank's depositors or general creditors. This package bought the FDIC time to come develop a permanent rescue package (the third act), which resulted in the FDIC acquiring 80 percent of the bank's equity, bailing out the creditors of Continental's parent holding company as well as the bank and the bank continuing to receive support from the Federal Reserve.

The ultimate out-of-pocket cost was only \$1.1 billion, according to the FDIC (1998).<sup>50</sup> This relatively favorable outcome, however, masks the larger transfer of risks from depositors and other creditors to the FDIC and, ultimately, the Treasury. Although the risks associated with Continental Illinois were manageable from a US fiscal perspective, there was no guarantee that the risks associated with the group of banks collectively viewed as systemically important would remain manageable. Moreover, although there were precedents for the bailing out banks to avoid financial instability, it was congressional hearings into the bank's failure and bailout that popularized the term "too big to fail."<sup>51</sup> The perception that some banks are too big to fail not only creates the potential for increased moral hazard but also creates competitive inequities among banks of different sizes. The easiest way to reduce such inequities is to provide depositors at smaller banks with increased guarantees, which would in turn help to extend the increase in moral hazard to even smaller banks.

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<sup>49</sup> Recounting supervisory discussions, Sprague (2000, p. 155) says that the consensus was that "[t]wo very large institutions ... probably would not survive a Continental collapse." See also Wall and Peterson (1990) for an analysis of the effect of Continental's problems and bailout on other large banks.

<sup>50</sup> FDIC (1988, p. 544).

<sup>51</sup> See Inquiry into Continental Illinois Corp. and Continental Illinois National Bank. Hearings before the House Subcommittee on Financial Institutions, Supervision, Regulation, and Insurance of the Committee on Banking Finance and Urban Affairs, September 18–19 and October 4, 1984. (accessed June 17, 2021) <https://fraser.stlouisfed.org/title/inquiry-continental-illinois-corp-continental-illinois-national-bank-745>.

### **3.8. Housing Finance and Volcker Disinflation**

The US housing finance system in the late 1970s and early 1980s relied heavily on institutions that were funding long-term, fixed-rate mortgages with short-term liabilities. This mismatch led to widespread insolvencies in the savings bank and savings and loan (S&L) industries, along with the market value insolvency of Fannie Mae. The regulators responded to these insolvencies with a combination of forbearance in the hope that the problem would go away and costly resolution in those cases where the hopes were not realized.

In the 1970s the thrift industry, S&Ls, and mutual savings banks specialized in making long-term, mostly fixed-rate mortgage loans and funding those loans with short-term passbook savings. S&Ls were the largest US participant in the market for home mortgages, with their market share peaking at 51 percent in 1977 (see Hendershott, 1994). Mutual savings banks were a smaller part of the market, being concentrated in nine, primarily northeastern states. Mutual savings banks were also different in that most were regulated by the FDIC, whereas the FHLBB was responsible for the supervision of savings and loans.

The maturity mismatch between mortgages and passbook savings exposed thrifts to interest rate risk was mitigated by the existence of ceilings on the interest paid on deposits (often referred to as Regulation Q). The problem with deposit rate ceilings is that they could result in thrifts and banks being disintermediated when market rates rose above the rate ceilings. The problem with the maturity mismatch and disintermediation increased through the 1970s as higher inflation rates led to higher interest rates, ultimately culminating in the very high rates seen as the Federal Reserve under Chair Volcker, who tightened monetary policy to reduce the rate of inflation. Congress responded to the liquidity crunch caused by deposit rate ceilings in 1980 with the passage of the Depository Institutions Deregulation and Monetary Control Act of 1980 (DIDMCA). This act phased out deposit rate ceilings but did so at the cost of large interest rate losses to thrifts—rendering many of them economically insolvent.

The FDIC (1997b, chapter 6) explains two innovative ways in which the FDIC dealt with distressed and failing mutual savings banks. First, in the case of 17 banks that were considered not viable on their own, the FDIC encouraged the failing bank to be acquired by another mutual savings bank in an assisted transaction. Ordinarily the FDIC would close the failing institution and then auction the bank off to the highest qualified bidder. The FDIC instead elected to have the failing bank be sold in an open bank transaction where it was not first put into resolution. This structure had the advantage to the FDIC of preserving the tax benefits of the failing bank's tax-loss carryforwards, albeit the full cost of this benefit was borne by the US Treasury in the form of reduced future tax income. To further provide incentives to potential acquirers to buy failing thrifts, the FDIC agreed to make periodic payments to the acquirer based on the difference between the return on the assets acquired and the average cost of funds. The second approach—applied to 29 savings banks—was to

issue net worth certificates to distressed mutual savings banks. These net worth certificates counted as capital but provide no new cash or income to the bank. As the FDIC (1997b, p. 228) states, the Net Worth Certificate program “was basically a form of capital forbearance.” Along with these innovative programs, the FDIC also applied its traditional resolution procedures to 58 failed mutual savings banks.

The FDIC’s innovative programs worked in the sense they allowed the FDIC to manage the widespread distress among mutual savings banks. The FDIC (1997b, p. 229) acknowledges however, that the cost of these programs was reduced by declining interest rates as the crisis progressed, implying that the FDIC was taking considerable risk in providing forbearance for which the agency was not compensated.

The FHLBB faced a similar problem with distressed and failing S&Ls but took a very different approach. Part of the problem, according to Kane (1989), was that the Federal Savings and Loan Insurance Corporation (FSLIC) would have depleted their reserves by the early 1980s. Additionally, he asserts, they feared runs on other S&Ls and banks, felt political pressure, and feared personal embarrassment. As an alternative, the FHLBB lowered net worth requirements, adopted new rules that encouraged rapid deposit growth, adopted more lax accounting requirements, issued income capital certificates, and liberalized the regulatory accounting treatment of supervisory goodwill, according to FDIC (1997b, chapter 4). S&Ls also obtained additional authority to invest in higher-return assets whose earnings could offset embedded losses, provided that the higher risk of loss on these assets was not realized. The result was the rapid growth of the S&L industry, with especially rapid growth among new entrants exploiting the power to invest in more risky assets. Along with facilitating high risk strategies, some S&Ls experienced insider abuse and fraud.<sup>52</sup>

As losses among S&Ls mounted, Congress started considering measures to recapitalize the FSLIC so that it could resolve more insolvent thrifts. The FDIC (1997b, p. 186) reports that these efforts were fought by the industry with the consequence that the first effort in 1987 failed to provide the FSLIC with sufficient resources. Congress returned to the problem in 1989, providing sufficient funds. The General Accountability Office estimated the final cost of resolving failed S&Ls at more than \$160 billion, \$132 billion of which came from the taxpayers.

The GSE Fannie Mae also suffered considerable losses in the early 1980s from high interest rates. The Government Accountability Office (1990) reports that on a book value basis, Fannie Mae reported cumulative net losses in 1981, 1982, 1984, and 1985. The Government Accountability Office (2009) observes that Fannie Mae benefited from regulatory forbearance and changes in the tax law to help Fannie Mae recover. Treasury Secretary John Snow (2005)

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<sup>52</sup> See General Accounting Office (1989).

goes further, stating that “Fannie Mae became insolvent on a mark-to-market basis” and that it took “a combination of legislative tax relief, regulatory forbearance and a decline in interest rates” for Fannie Mae to recover. Foster and Kane (1986) provide estimates of the extent to which Fannie Mae was insolvent in terms of market value.

The large losses incurred by the housing finance system was not a crisis in the sense of posing an imminent threat to the operation of the broader financial system provided that, first, the FDIC and FSLIC made good on their obligations to insure deposits and, second, market participants believed that the government would protect Fannie Mae’s creditors from losses. However, the actions taken to protect the depositors, creditors, and investors in the thrifts and Fannie Mae also again highlighted that government support was not necessarily limited to the creditors of distressed institutions but could also be extended via forbearance to the equity holders and management. They also helped reinforce market expectations that the liabilities of the GSEs had an implicit government guarantee.

### **3.9. Agricultural Finance in the 1980s**

The crisis in agricultural finance showed that even widespread insolvency is not necessarily sufficient to attract extraordinary government support if the banks are small and not systemic, but it showed that GSEs were likely to be bailed out rather than allowed to fail. Demand for agricultural land increased substantially in the 1970s, driven by rising crop prices and credit availability.<sup>53</sup> The increase in demand was accompanied by an increase in farm real estate debt from \$29 billion in 1970 to \$71 billion in 1979. These high levels of debt proved unsustainable after the Federal Reserve tightened monetary policy in 1979 to reduce the rate of inflation. Declines in exports of some agricultural products, as well as declines in some prices, further aggravated the problem in some parts of the country. As a result, many farmers who had borrowed heavily for land purchases became financially distressed, especially farmers in the Midwest, West North Central, and West South Central regions.

The financial distress that reduced farm income caused, combined with falling land prices, resulted in a sharp increase in the failure rate of banks specializing in agricultural finance. Belongia and Gilbert (1990) report 244 bank failures between 1984 and 1988, where the bank had a ratio of agricultural loans to total loans above the national average. Although the failures could have locally adverse impacts, Belongia and Gilbert (1990) observe that other agricultural banks in the same areas that had proportionately less of their portfolio invested in ag loans remained profitable. Additionally, the failed banks tended to be small, rural banks that did not threaten the stability of the financial system. As a result, the FDIC could follow its normal resolution procedures for the failed agricultural banks.

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<sup>53</sup> This description of the agricultural problems of the 1980s and its impact on banks is based on the FDIC (1997b, chapter 8).

Along with ag banks, the Farm Credit System (FCS) was a major supplier of credit to farmers. The federal government created the FCS as a network of lenders to provide credit to the agricultural sector. The FDIC (1997b, p. 273) states the FCS offered loans at lower rates with proportionately less collateral than banks. Thus, when conditions changed and many farmers became distressed, the FCS also found itself in a distressed condition and appealed to Congress for financial support. Congress responded in 1987 by giving the FCS the authority to raise funds by issuing up to \$4 billion in new bonds that were guaranteed by the federal government and for which the federal government would pay the interest for the first five years according to Hill (2010). The final total for bonds issued under this authority was \$1.261 billion. As Hill (2010) observes, this bailout had the effect of protecting all investors in the FCS: both the equity holders (farmers who borrowed from the FCS) and the creditors.

The agricultural finance crisis of the 1980s led to many bank failures. However, these banks were not systemically important to the national financial system and had other local competitors that could at least partially offset the local consequences of their failure. Thus, the FDIC followed its normal failed bank resolution procedures. However, the FCS was a large participant in the ag economy and one of several GSEs specializing in providing finance to selected sectors of the economy. The support provided to the FCS, combined with that provided to Fannie Mae, helped reinforce the belief that the GSEs had an implicit government guarantee, a belief that would be again tested in the early 2000s when Fannie Mae and Freddie Mac became financially distressed.

### **3.10. Southwest Banks in the 1980s**

The banking crisis in the Southwest again showed that small, not systemic banks would not receive a bailout but that depositors at failed large banks and some other creditors might. The FDIC (1997b, Chapter 9) asserts the “most severe of the regional banking crises” of the 1980s and early 1990s “was the one in the southwestern region,” which accounted for half of the FDIC’s resolution costs from 1986 to 1994. This region was hit not only with the downturn of the agricultural sector but also with a substantial shock to energy prices. Some banks in the region tried to offset the decline in oil prices with increased lending to commercial real estate, a move that proved to be ill-timed as commercial real estate eventually felt the downturn in oil prices and was also adversely affected by 1986 changes to the tax code.

Although most of the bank failures were handled in accord with standard FDIC resolution procedures, some notable exceptions occurred with the provision of open bank assistance on an interim basis to First Republic Bank Corporation and First City

Bancorporation, respectively the largest and fourth-largest banking organizations in Texas.<sup>54,55</sup> The open bank assistance provided to First Republic was a six-month, \$1 billion loan. Along with this loan, the FDIC guaranteed all the deposits and other general creditors of First Republic's bank subsidiaries. However, the FDIC did not guarantee the outstanding debt of the parent holding company, unlike what happened with Continental Illinois. Additionally, the Federal Reserve pledged to provide interim liquidity. First Republic was ultimately acquired by NCNB in a transaction that allowed NCNB to retain First Republic's tax loss carryforwards, shifting part of the cost of resolution from the FDIC to the Treasury.

The open bank assistance provided to First City was provided to allow an outside investor group to inject new capital into the banking organization with the goal of avoiding failure. The Government Accountability Office (1995) states that the FDIC provided open bank assistance because it was concerned that allowing the bank to continue to decline would adversely affect the regional banking industry.<sup>56</sup> The plan approved by the FDIC reduced the original shareholders' stake in First City to less than 2 percent of the total equity and reduced most bondholders' claims to an amount equal to 35 cents to 45 cents per dollar of principal. The proposal also gave the FDIC warrants for the purchase of equity. The restructured firm was ultimately unsuccessful, and its banking subsidiaries were sold by the FDIC to several acquirers in transactions where the acquirer assumed all the deposits and nearly all the other liabilities.<sup>57</sup>

The experience in the Southwest was like that of the ag states in that FDIC could apply its normal resolution procedures to most of the banks. However, the larger banks received additional assistance that offered additional protection to depositors and, in some cases, nondeposit liability holders.

### **3.11. 1987 Stock Market Crash**

The Federal Reserve again showed its concern for the stability of financial markets in 1987 when the Fed provided liquidity to banks and also encouraged them to lend to securities and

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<sup>54</sup> See FDIC (1998, Part I, Resolution and Asset Disposition Process) for a general discussion of FDIC resolution. Chapter 5 of this discussion observes that the FDIC provided assistance during this period but generally required that it reduce the cost of resolution and result in the shareholders and subordinated creditors bearing losses that approximate what they would have borne had the bank failed.

<sup>55</sup> This summary is based on FDIC (1998) for First Republic (Part II, Chapter 5) and First City (Part II, Chapter 4).

<sup>56</sup> The Government Accountability Office (1995) report indicates that the FDIC did not believe that it had the authority to put First City into resolution at the time it provided the assistance. The banks would first need to suffer additional losses before the OCC could close the bank due to insolvency.

<sup>57</sup> MCorp, another large bank holding company headquartered in Texas, also had most of its banks resolved in a transaction that protected all these banks' depositors.

derivatives firms during the stock market crash in October 1987.<sup>58</sup> The stock market decline started on Wednesday, October 14, with two announcements that had adverse implications for stock prices. The initial decline in stock prices was followed later in the same day by the selling of stock futures by portfolio insurers. Portfolio insurance as practiced at this time sought to limit insured investors' exposure to market downturns by dynamically buying and selling equities and equity futures contracts in responses to changes in stock prices.<sup>59</sup> Thursday and Friday of that week saw continued stock price declines driven in part by continued selling by portfolio insurers as well as sales by a small number of mutual funds and a few aggressively trading institutions who may have been front-running the portfolio insurers.<sup>60</sup> Despite the declines, trading remained orderly in the equity and futures markets.

Conditions deteriorated sharply on Monday, October 19. Portfolio insurers entered the trading on Monday needing to sell more in the equity and futures market given developments the prior week. The heavy volume of selling resulted in order imbalances for the specialists at the New York Stock Exchange, which caused many specialists to delay trading on their stock during the first hour. The market recovered somewhat during the late morning, but continuing heavy selling resulted in further losses in the afternoon. At the end of the trading day, the S&P 500 futures had fallen 29 percent. Once again, the models used by portfolio insurers dictated heavy selling during the day but actual selling was still “a small fraction of the sales dictated by the formulas of their models” according to the United States Presidential Task Force on Market Mechanisms (Brady Report 1988, p. 36). Prices in the stock and futures market opened above their Monday levels on Tuesday but soon resumed their sharp decline. Specialists in many cases temporarily closed trading on individual stocks and the futures and options exchanges closed at mid-day. The Brady Report (1988, p.41) stated that on Tuesday the “securities markets and financial system approached a breakdown” and “more serious, a widespread

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<sup>58</sup> This summary of the 1987 stock market crash and the resulting actions from the Federal Reserve is based on Carlson (2007) and the United States Presidential Task Force on Market Mechanisms (1988) (widely referred to as the “Brady Report”).

<sup>59</sup> Portfolio insurance is designed to limit losses the same way that an investor could limit losses by buying an out-of-the-money put option. However, the strategy as practiced did not involve buying a put option. Rather, it involved dynamically trading in a way that replicates a put option. This dynamic replication called for portfolio insurers to sell equity futures and/or equities as markets declined. The resulting selling shifts the supply of stock for sale out and, by itself, would lead to lower prices.

<sup>60</sup> Grossman (1988) notes that an important issue in whether portfolio insurance selling could drive down stock prices is whether other (nonparticipants in portfolio insurance) recognize the extent to which the increased selling is due to portfolio insurance. If other investors fully recognize the extent of selling portfolio insurance, they may step in to provide liquidity and hopefully make a small profit on the forced selling by insurers. However, if other participants underestimate the aggregate size of the portfolios covered by portfolio insurance, they may mistake the increased sales as potentially coming from investors with superior information. In this case, potential buyers may be unwilling to provide liquidity, leading to a sharper fall in stock prices.

credit breakdown seemed for a period of time to be quite possible.” This credit breakdown was being driven in large part by the need for futures and options clearinghouse members to cover losses incurred on their open positions. Clearinghouse members frequently relied on loans from their banks to cover their positions, but reports indicate the banks were concerned that the margin calls were exceeding the banks’ individual lending limits (Carlson and Wheelock, 2012).

The Federal Reserve took a variety of actions starting on Tuesday morning to help relieve the stress in the financial system. Before market open on October 20, 1987, the Fed issued a statement that said, “The Federal Reserve, consistent with its responsibilities as the Nation’s central bank, affirmed today its readiness to serve as a source of liquidity to support the economic and financial system,” and this statement reportedly boosted market sentiment. Additionally, the Federal Reserve Banks of Chicago and New York called banks in their districts to let them know the Fed would supply them with intraday loans and overnight credit as needed to fund their loans to CME Group clearinghouse members. Carlson (2007) reports that Fed also “leaned heavily on the big New York banks to meet Wall Street’s soaring demand for credit.” Additionally, the Federal Reserve liberalized its rules on lending government securities that dealers could use as collateral. The Fed took various supervisory measures to monitor developments and extended Fedwire’s operating hours.

As was the case with the intervention after the failure of Penn Central, the Fed’s provision of support during the October 1987 stock market crash demonstrated that the Fed would intervene to preserve financial system stability, even if the threat to that instability lay outside the banking system. The 1987 episode highlighted that the concerns about financial stability extended beyond the credit and foreign exchange markets to include equity markets.

### **3.12. Drexel Burnham Lambert**

The failure of Drexel Burnham Lambert showed that a relatively important securities firms could be allowed to fail without a bailout, at least in circumstances where other securities firms were not at risk and the failing firm had achieved a considerable level of notoriety. Drexel Burnham Lambert developed the financing of takeovers using high-risk bonds (called high-yield bonds by some, junk bonds by others). This method of financing allowed relatively small firms to bid for larger firms that seemed almost invulnerable to a takeover and which, in turn, made Drexel rather unpopular in some circles. The firm was brought down after the firm pled guilty to charges of insider trading and the head of its high-yield group, Michael R. Milken, was indicted on 98 counts, including racketeering and securities fraud.<sup>61</sup> Drexel was heavily invested in high-yield, longer-term bonds but relied heavily on funds obtained in the money

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<sup>61</sup> This summary of Drexel Burnham Lambert’s bankruptcy is based on Breeden (1990) and Eichenwald (1990).



markets. The firm became illiquid when it could no longer readily market its high-yield debt and money market counterparties would not accept it as collateral.

Drexel tried a variety of approaches, including seeking bank financing, but was unable to obtain adequate liquidity. Fromson (1990) reports that the Drexel CEO Fred Joseph made one last call to SEC chair Richard Breeden and Federal Reserve Bank of New York president Gerald Corrigan at 1:30 a.m. to inform them that the firm was unable to obtain bank funding. They replied that Drexel should file for chapter 11 bankruptcy the next day or face government liquidation. After reporting on the calls, Fromson concluded his article thus: “It was only then that Joseph realized his firm was history. As he said to a colleague, ‘God has spoken.’ ” The SEC and Federal Reserve Bank of New York worked to achieve an orderly liquidation of Drexel but provided no funds.

Drexel Burnham Lambert was allowed to fail—but in a unique set of circumstances. The firm was not popular, it had pled guilty to committing crimes, and there was no reason to expect Drexel’s problems to spill over to other securities firms. However, expectations of government support of major financial firms had reached the point where Drexel’s CEO apparently believed there was a good chance the Federal Reserve would provide liquidity rather than let the firm enter bankruptcy.

### **3.13. Northeast Banks in the Early 1990s**

Like the earlier problems in the Southwest, banking problems in the Northeast were mostly resolved through normal bank resolution procedures, but two cases involved a guarantee of all deposits and arguably (in one of the cases) forbearance. The banking problems in the Northeast were largely the result of bad real estate loans made in the 1980s during a period of strong growth.<sup>62</sup> However, the regional economy weakened late in the decade as the growth in military spending slowed, the computer industry in Boston weakened, and Wall Street firms cut back in the wake of the October 1987 stock market crash. The weaker economy led to a decline in housing prices in some major markets such as Boston and New York City and also to a dramatic decline commercial real estate conditions. The resulting weakness led to a spike in bank failures in the Northeast during 1990, 1991, and 1992.

CrossLand Savings, FSB—based in Brooklyn, New York—was the beneficiary of forbearance while the FDIC sought to market the \$7.3 billion institution in 1991.<sup>63</sup> Estimates show that the only bids for CrossLand in December 1991 would have been more costly than the FDIC liquidating the bank. However, rather than liquidating CrossLand, the FDIC instead transferred most of its assets and liabilities to a newly chartered institution and put the new

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<sup>62</sup> The summary of banking conditions in the Northeast is based on chapter 10 of Federal Deposit Insurance Corporation (1997b).

<sup>63</sup> This summary of the treatment of CrossLand Savings is based on Part II, Chapter 11 of FDIC (1998).

institution into conservatorship. This process resulted in the protection of uninsured depositors, but not the subordinate debtholders. The savings bank was ultimately sold in August 1993 to institutional investors in a registered public offering.

The bank subsidiaries of Bank of New England Corporation were transferred into one of three bridge banks in January 1991 pending their final resolution. As a part of this transaction, the FDIC protected the bank's uninsured depositors as well as trade creditors, employees, and qualified financial contracts such as foreign exchange contracts. However, nonsubordinated creditors and the creditors of the parent holding company were not protected. The Federal Reserve also announced that it was prepared to meet any unusual liquidity needs of the banks.

The Federal Deposit Insurance Corporation (1998, p. 638) notes that just before the formation of the bridge banks for the Bank of New England, 45 state-insured credit unions in Rhode Island had failed, but depositors were unable to obtain their funds because the state deposit insurer was insolvent. This situation created some concern that people would be unable to distinguish between state and federal insurance. FDIC chairman L. William Seidman justified the decision to protect uninsured depositors with the statement that "It was clear to us that to protect the stability of the system, we should protect all depositors."<sup>64</sup>

Along with the banks that were closed, claims persisted that Citibank had become insolvent but was shown forbearance. Milligan and Picker (1991) review the decline of Citibank's credit standards in the 1980s. Boone and Johnson (2011) argue that "Citi, for instance, has blown itself up three times in the past 30 years ... in the late 1980s from US commercial real estate." Alluding to the same time period, Macey (2011) argues that the "[t]he bank has failed three times since 1982—twice from bad bets on real estate; once from bad loans to borrowers in developing countries."

The banking problems in the Northeast showed that an FDIC bailout of all depositors and even some nondeposit creditors is a likely outcome if a large bank gets into trouble at a time when there is substantial regional distress.

### **3.14. Long Term Capital Management**

The Federal Reserve showed its concern for an individual hedge fund when it intervened to help rescue Long Term Capital Management (LTCM) in 1998. LTCM's primary strategy was "market-neutral arbitrage," in which the firm bought what it considered to be undervalued positions in bonds and shorted bonds it considered overvalued.<sup>65</sup> In early 1998, it thought the spread between high- and low-yielding bonds was excessively wide and that it would converge. This investment practice typically did not earn a high rate of return, so LTCM boosted

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<sup>64</sup> See Federal Deposit Insurance Corporation (1998, p. 639).

<sup>65</sup> This summary of the developments related to LTCM is drawn from Edwards (1999) and Carlson and Wheelock (2013).

its return on equity by having low levels of equity. This strategy meant that in early 1998, the firm had about \$5 billion in capital to support \$125 billion in securities and derivatives contracts with a notional principal of more than \$1 trillion, putting LTCM in a position to produce a high rate of return for its owners if spreads decreased, but it was at risk of having its equity wiped out if spreads increased.

Unfortunately for LTCM, the latter event came to pass. Spreads increased later in 1998 with the continuing Asian financial crisis and a default by the Russian government. Concerns about the hedge fund's huge bet led to margin calls and requests to provide more collateral. LTCM contacted the Federal Reserve Bank of New York to discuss its problems. Along with the concerns about the risks posed by LTCM, there was concern that many banks and securities firms had taken similar positions, with elevated credit spreads and market prices under considerable pressure. The president of the New York Fed called top executives to a meeting at the Reserve Bank the evening of September 22 in which he warned that "the systemic market risk posed by LTCM going into default was 'very real,' " according to Siconolfi, Raghavan, and Pacelle (1999). The next day a consortium with 14 members agreed to put in additional capital but to let the existing LTCM partners conduct the complex unwinding of the firm's positions.

As Haubrich (2007) notes, the Federal Reserve intervened to help resolve LTCM's problems but did not make any explicit commitment of funds. LTCM partner Myron Scholes argued that the Fed's intervention was necessary to prevent bankruptcy and greater social costs. However, others argued that the Fed has essentially bailed out LTCM's ownership. In any case, the LTCM intervention demonstrated that the Fed's interest extended beyond the banking system to the continued functioning of a major market segment. LTCM's resolution parallels the handling of the Hunt brothers' silver position and the failure of Drysdale Government Securities, when the Fed operated in the background and avoided explicit commitments to help prevent financial market disruption. It showed that although Drexel had been allowed to fail earlier in the decade, the Fed remained willing to act in situations where it perceived the risk of serious market disruptions, even if the firm raising that risk was a hedge fund.

### **3.15. Global Financial Crisis**

The FDIC, the Federal Reserve, and the US Treasury took a series of extraordinary measures in 2007–09 in response to the global financial crisis (GFC) that were intended to help maintain and restore the functioning of the financial system, both domestically and to a degree internationally.<sup>66</sup> The prelude to the GFC was a dramatic run-up in the residential real estate prices in the United States. A critical factor in the run-up was the belief by home buyers and

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<sup>66</sup> This summary of the global financial crisis and the policy responses is drawn in part from the Financial Crisis Inquiry Commission (2011).

financial markets that housing prices would continue to appreciate. Thus, many buyers were willing to take on substantial risk to finance their purchases and investors were willing to provide the financing in the belief that, at worst, they could always foreclose on the house and sell it for more than the value of the loan. This confidence in ever-increasing prices was punctured starting in 2006 as housing prices stabilized and started then started to decline. Initially the decline was expected to be contained to the markets for mortgages and mortgage-backed securities (MBS).

The problems in the mortgage market first broke through to the wider financial system on August 9, 2007, when BNP Paribas suspended redemptions from three of its investment funds because the “evaporation of liquidity ... made it impossible to value certain assets.” This announcement caused an immediate increase in the credit risk premiums charged in bank funding markets, as evidenced by increases in the spread between LIBOR and the overnight indexed swap (OIS) rate. The Fed responded by announcing that the discount window was available to banks and by lowering the rate charged on discount window loans. The Fed’s actions proved insufficient, however, as the LIBOR-OIS spread remained elevated and borrowing remained low. Some argued the reason for the low borrowing was the stigma associated with a bank obtaining funds from the discount window; that is, a bank’s need to borrow from the Fed suggested it was in too weak of a financial condition to obtain market funding.

On December 12, 2007, the Fed took two actions to increase market liquidity and reduce credit risk premiums. First, the Fed created the Term Auction Facility (TAF) to provide discount window funding in a way that would generate less stigma. The TAF was open to all banking organizations that were required to hold reserves, which included the US branches of foreign banks. Although it was not widely known at the time, most of the early TAF loans went to the US branches of foreign banks as the US banks met most of their liquidity needs through the FHLBs.<sup>67</sup> Second, the Fed opened temporary swaps lines in cooperation with the European Central Bank (ECB) and Swiss National Bank (SNB). Under the swap lines, the Fed would provide US dollars and in return receive euros and Swiss francs from the ECB and SNB, respectively. The ECB and SNB could then lend the money to banks in their jurisdiction.

These measures brought the spread between LIBOR and OIS down from their peaks, but levels remained elevated relative to the rates prior to August 2007. However, conditions continued to deteriorate in the market for MBS. Among those suffering from reduced liquidity were the primary dealers, a group that plays a central role in the operation of the Treasury market and the Fed’s conduct of monetary policy. In response to concerns about the primary dealers, the Federal Reserve announced on March 11 the creation of a new liquidity facility for

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<sup>67</sup> See Ashcraft, Bech, and Frame (2010) for a discussion of FHLB lending and Benmelech (2012) for an analysis of TAF lending to foreign banks.

primary dealers called the Term Securities Lending Facility (TSLF). The TSLF was created in part because many primary dealers did not have access to the discount window.

Bear Stearns, one of the primary dealers and the fifth-largest investment bank, saw a sharp drop in its liquidity around March 13, 2008. On March 14 the Federal Reserve Bank of New York made a direct loan to Bear Stearns after the Federal Reserve Board approved the loan under the Fed’s 13(3) authority to lend to individuals, partnerships, and corporations in “unusual and exigent” circumstances. The Federal Reserve subsequently arranged for the sale of Bear Stearns to JP Morgan Chase & Company. What made this transaction unusual was that the acquisition was financed by a \$29 billion loan from the New York Fed that was backed by collateral but for which the Fed would not have recourse should the collateral prove inadequate. In effect, the Fed was not only making a loan but also taking an equity position in \$30 billion of MBS, whereas heretofore the Fed had insisted on recourse to the borrower if the collateral proved inadequate. Additionally, the Federal Reserve created the Primary Dealer Credit Facility (PDCF) after it was too late to save Bear Stearns. The PDCF effectively provided a type of discount window for the primary dealers who previously had not been able to borrow from the Fed.

Credit spreads in money markets again dropped but remained elevated after the Bear Stearns bailout, but the prices for residential mortgages continued to fall. This decline adversely affected both housing GSEs, Fannie Mae and Freddie Mac, through both their guarantee of MBS and their portfolio.<sup>68</sup> The housing enterprises’ weak condition was highlighted in their second quarter financial statements, which showed book capital remained at adequate levels, but on a fair value (economic) basis they were becoming insolvent. The authorities decided to act in response to their weak condition, with the Federal Housing Finance Agency (their regulator) placing both into conservatorship on September 8. Additionally, to stabilize their finances, the Treasury entered into agreements with both enterprises that in the event their liabilities exceeded their assets on a book value basis, the Treasury would purchase senior preferred stock sufficient to cover the difference.

Financial conditions soon deteriorated further. Lehman Brothers, the nation’s fourth-largest investment bank, filed for bankruptcy on September 15, 2008. The following day American International Group (AIG) was experiencing increasing liquidity pressures and turned to the Federal Reserve for support. As AIG was an insurance company and not a bank, the Federal Reserve once again invoked its 13(3) lending authority on September 16 to provide a loan to AIG. This loan would subsequently be followed by additional support from the Treasury. Also, on September 16, the money market fund Reserve Primary Fund reported that the value of its assets had fallen below the \$1.00 par value of its shares. The decline in

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<sup>68</sup> This discussion of the bailout of Fannie Mae and Freddie Mac is based on Frame (2009).

Reserve Primary's asset values was due to it taking relatively large positions in commercial paper issued by Lehman Brothers. This "breaking of the buck" by Reserve Primary Fund led investors to start running on other money market funds.

The run on the money funds sparked concern among many banks and corporations about their ability to obtain adequate short-term funding. In response, the Federal Reserve implemented a variety of programs to support commercial paper issuers and money funds including the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility and the Commercial Paper Funding Facility. To provide support for the asset-backed securities market, the Federal Reserve later created the Term Asset-Backed Securities Loan Facility (TALF). The TALF provided nonrecourse loans to investors secured by asset-backed securities.<sup>69</sup> The Federal Reserve also opened additional swap line facilities with more central banks and uncapped, and removed the quantity limits on the swap lines with the Bank of England, the Bank of Japan, the European Central Bank, and the Swiss National Bank.<sup>70</sup> Additionally, the FDIC created the Transaction Account Guarantee Program to provide unlimited guarantees for bank transaction deposits and the Debt Guarantee Program to guarantee senior unsecured bonds issued by participating banks.<sup>71</sup>

A common feature of the Fed's facilities is that the cost of accessing the facilities was above what the borrower would experience in normal markets but sufficiently low so as to be attractive during periods of market stress. Thus, the volume of new lending in these facilities declined as the financial market crisis abated and the facilities were closed to new lending in February 2010.<sup>72</sup>

A few days after AIG's failure, the Treasury proposed the Troubled Asset Relief Program (TARP), which Congress eventually passed in a modified form. The funds appropriated for TARP were used for a wide variety of purposes including providing equity support for some of the Fed's lending facilities and to support some nonfinancial firms. Additionally, the funds were used to buy senior preferred stock from many banks. Initially the program was targeted at the largest banks, but it was ultimately opened to smaller banks.

All the large banks were initially pressed into selling senior preferred stock to the Treasury. This support, however, proved insufficient for Citigroup and the Treasury, the Federal Reserve, and the FDIC followed with a November 23, 2008, package that limited Citigroup's exposure to losses on a portfolio of up to \$306 billion in assets. Citigroup also sold an

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<sup>69</sup> See Agarwal et al. (2010) for a discussion of the TALF.

<sup>70</sup> See Goldberg, Kennedy, and Miu (2011).

<sup>71</sup> See FDIC (2017).

<sup>72</sup> A short history of these programs are available at [https://www.federalreserve.gov/monetarypolicy/bst\\_lendingprimary.htm](https://www.federalreserve.gov/monetarypolicy/bst_lendingprimary.htm) and [https://www.federalreserve.gov/monetarypolicy/bst\\_lendingother.htm](https://www.federalreserve.gov/monetarypolicy/bst_lendingother.htm).

additional \$20 billion in senior preferred stock to the Treasury.<sup>73</sup> A similar package of support, albeit with the portfolio of supported assets limited to only \$118 billion in assets, was provided to Bank of America on January 15, 2009.<sup>74</sup>

The TARP funds allocated to banks were also used to backstop the Federal Reserve's 2009 stress test of the largest banks. The Fed conducted test in which banks were required to estimate their expected losses given a continuing downturn. If the resulting estimated capital position was less than regulatory minimums, the bank would be required to raise capital sufficient to meet regulatory minimums. Before the banks and their supervisors had completed work on the tests, the Federal Reserve chair Ben Bernanke declared that no bank would fail the test. Any bank that could not raise sufficient capital to satisfy the stress test requirements from private sources could obtain capital through the TARP program.<sup>75</sup> This commitment was seen by many as indicating that none of the banks undergoing the stress test would be allowed to fail for at least the next year.

The GFC was an extreme event that drew a series of extraordinary responses from the Federal Reserve, the FDIC, and the US Treasury, both in terms of their actions and the dollar amounts of support provided. The Federal Reserve's 13(3) lending was unusual, and its no-recourse loans in support of Bear Stearns and AIG were unprecedented. The central bank liquidity swaps used by the Fed had earlier precedents for foreign exchange rate management, but their use to indirectly provide dollar loans to foreign banks was unprecedented. The FDIC invoked the so-called systemic risk exception to its least-cost resolution mandate to provide guarantees of bank deposits and securities. Finally, the US Treasury provided capital to the housing enterprises and to the banks, and it took a first-loss position in many of the Fed's lending facilities and implicitly guaranteed that the banks subject to the stress test would not fail.

### **3.16. European Sovereign Debt Crisis**

The European sovereign debt that started in 2010 showed the Federal Reserve would provide US dollar liquidity assistance to foreign banks even absent notable strains to financial institutions headquartered in the United States. The GFC had imposed strains on national economies and banking systems around the world, including the countries in the eurozone. Nevertheless, eurozone countries initially appeared to come out of the GFC in reasonably good shape.<sup>76</sup> However, these appearances proved deceiving for several countries. The first shock

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<sup>73</sup> The term sheet for the Citigroup deal is available at <https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20081123a1.pdf>.

<sup>74</sup> The term sheet for the Bank of America deal is available at <https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20090115a1.pdf>.

<sup>75</sup> Bozzo (2009).

<sup>76</sup> See Lane (2012) for an overview of the European sovereign debt crisis.

was Greece’s announcement in late 2009 that its deficit forecast for that year had more than doubled and its fiscal accounts had substantially understated the deficit in prior years. This announcement led to Greece being shut out of the bond market in 2010, followed by Ireland and Portugal. Concerns also arose about Spain, which had boomed in the early 2000s, and Italy, which had long had a high ratio of government debt to GDP.

Concerns about the increasing risk of sovereign defaults and enhanced regulatory disclosure requirements led US money funds to substantially decrease their holding of US dollar–denominated commercial paper issued by some US branches of euro area banks.<sup>77</sup> The parents of these branches tried to offset the loss in dollar funding by transferring funds to the branches. However, the parents obtained most of their funding in euros with the result that to obtain dollars they used eurodollar swaps. The pricing of the swaps soon reflected the sudden jump in demand by European banks. US bank branches responded to the liquidity shock by reducing their lending to US firms.

The Federal Reserve reestablished the central bank liquidity swap lines with the Bank of Canada, the Bank of England, the Bank of Japan, and the European Central Bank on May 10, 2010 to “improve liquidity in global money markets and minimize the risk that strains abroad could spread to US markets.”<sup>78</sup> The dollar amount of the loans outstanding peaked at \$109 billion in February 2012 and dropped as tensions eased.<sup>79</sup> The amount outstanding dropped below \$1 billion in August 2013.

In a sense the reopening of the central bank liquidity swap lines was merely a reopening of a liquidity facility that became well established during the GFC. Moreover, the loan amounts were well below GFC levels, and many of the banks benefiting from the swap lines very likely had US operations. In another sense, however, this is arguably a significant expansion of the Fed’s role as a liquidity provider as it is probably the first case where the Fed opened a facility that was designed exclusively to support the liquidity of banks headquartered in foreign countries.

### **3.17. COVID-19 Pandemic “Dash for Cash”**

The COVID-19 induced “dash for cash” and subsequent concerns about the pandemic’s effect brought responses from the Federal Reserve and from the Treasury that drew in part from their response to past crises but also involved new measures that extended support to markets that

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<sup>77</sup> See Correa, Sapriza, and Zlate (2016) for analysis of the effect of the European sovereign debt crisis on European banks US dollar funding and the resulting cutback in US lending.

<sup>78</sup> See Allen and Moessner (2013) and the Federal Reserve’s press release at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20100511a.htm>.

<sup>79</sup> The Federal Reserve Bank of New York provides a weekly historical summary of the operations of the liquidity swap lines at <https://apps.newyorkfed.org/markets/autorates/fxswaps-search-result-page?SHOWMORE=TRUE>.



had previously not received such direct support. The news of a serious COVID-19 infection in China reached financial markets in January 2020, but initially the response was muted. However, the situation changed in mid-March after the World Health Organization declared a pandemic, and many countries announced they were imposing a variety of stringent containment measures.<sup>80</sup> These containment measures—and the threat that they would extend to other jurisdictions—raised concerns among a variety of domestic and foreign institutions about whether their cash inflows would be sufficient to meet their commitments. The response of many firms and governments was to seek to bolster their liquidity positions by converting financial claims into liquid cash (especially US dollars) and borrowing additional funds to bolster their cash reserves.

Among the assets liquidated to obtain cash were Treasury securities. Fleming (2020) documents developments in this market, starting with the fall of the 10-year bond yield. This yield began falling in early March but experienced a sharp rise between March 9 and March 18. The risk was accompanied by increased volatility and higher bid-ask spreads. In response, the Fed cut its funds rate target on March 3 and again on March 15 in what Fleming (2020) describes as a “a rare Sunday announcement.” The Fed also increased the size of its repo operations, announced increased purchases of Treasury securities (along with agency MBS), and on March 18 restarted the PDCF. Additionally, to support both Treasury market functioning and to help address international financial stresses, the Federal Reserve announced the Temporary Foreign and International Monetary Authorities (FIMA) Repo Facility on March 31, a new facility that allowed foreign central banks and international monetary authorities to repo their Treasury securities with the Fed to obtain cash.<sup>81</sup>

Also coming under stress in the early days of the pandemic were the corporate bond markets.<sup>82</sup> In response to this stress, the Federal Reserve created the Secondary Market Corporate Credit Facility (SMCCF), supported by an equity investment from the US Treasury. The facility bought seasoned corporate bonds directly in the bond market and indirectly through purchases of exchange traded funds (ETF) that specialized in broad holdings of US bonds.. Gilchrist, Wei, Yue, and Zakrajšek (2020) show that Fed announcements related to this program produced economically large declines in the credit spreads of eligible bonds while the actual implementation of the facility had a relatively smaller impact on spreads.

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<sup>80</sup> See Financial Stability Board (2020) for a review of the impact of COVID-19 on international financial markets.

<sup>81</sup> See the announcement of the facility at <https://www.federalreserve.gov/monetarypolicy/fima-repo-facility.htm>.

<sup>82</sup> This stress arose in part because of a run on corporate bond mutual funds and exchange traded funds (ETFs). See Falato, Goldstein, and Hortaçsu (2020) for an analysis of the outflows and Jiang, Li, Sun, and Wang (2020) for an analysis of the impact of the outflows on corporate bond prices.

Money market funds specializing in prime and municipal debt obligations also came under stress. Cipriani, La Spada, Orchinik, and Plesset (2020) report that the assets under management by prime money funds decreased by \$120 billion (15 percent) and municipal funds dropped by \$9 billion (7 percent). To support the money funds, the Federal Reserve established the Money Market Mutual Fund Liquidity Facility (MMLF), which the Treasury supported with credit protection. Cipriani, La Spada, Orchinik, and Plesset (2020) report that the flow of funds into prime and municipal funds improved after the creation of the money fund facility. Li et al. (2020) provide more rigorous evidence that this facility helped to stabilize the flow of funds into prime funds.

Along with supporting money funds, the Federal Reserve—with the financial backing of the US Treasury—also opened a facility to provide support to the issuers of commercial paper. The Commercial Paper Funding Facility purchased commercial paper and asset-backed commercial paper from highly rated US issuers, including municipalities and US issuers with a foreign parent company.<sup>83</sup> Boyarchenko, Crump, and Kovner (2020) find that the spreads on commercial paper and asset-backed commercial paper fell after the announcement of the facility.

The asset-backed securities (ABS) market also saw a spike in required yields at the start of the pandemic. Asset-based securities are securities backed by a variety of types of loans including student loans, credit card loans, and loans guaranteed by the Small Business Administration. To support the flow of credit to the markets served by ABS, the Federal Reserve opened the Term Asset-Backed Securities Loan Facility (TALF), which was supported by an equity contribution from the US Treasury. Caviness and Sarkar (2020) show that the spreads on highly rated ABS securities fell after the announcement of the TALF.

The stresses created by the dash for cash were not limited to the US domestic market but also included considerable stress in foreign exchange markets, especially the foreign exchange (FX) swap market. In part, this stress arose from withdrawals from US prime money market funds, which in turn reduced the availability of US dollar funding to foreign banks, like what happened in the European sovereign debt crisis. The Federal Reserve responded by reopening the central bank liquidity swap lines with select foreign central banks, according to Cetorelli, Goldberg, and Ravazzolo (2020). Eren, Schrimpf, and Sushko (2020) provide evidence that the swap lines were effective in reducing strains in international markets and providing funding to stressed banks.

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<sup>83</sup> An FAQ on the structure of the commercial paper funding facility may be found at <https://www.newyorkfed.org/markets/commercial-paper-funding-facility/commercial-paper-funding-facility-faq>.

On March 27, President Donald Trump signed the Coronavirus Aid, Relief and Economic Security Act (CARES Act) into law. The wide-ranging law provided funding for a variety of programs, including providing \$454 billion to back programs and facilities established by the Federal Reserve. This funding was used to provide an equity (first loss) stake in the Fed's lending facilities.<sup>84</sup> The CARES Act also provided funds for various other programs that directly and indirectly supported the financial system.<sup>85</sup>

Although the Fed facilities reduced stress in financial markets, the ability of some borrowers to obtain adequate funding remained in doubt. At the same time the Fed announced the SMCCF, it also announced the Primary Market Corporate Credit Facility (PMCCF) to buy bonds directly from eligible corporations. The PMCCF was also supported by an equity investment by the Treasury. The Fed's postpandemic facilities, like its GFC facilities, are priced to be attractive during a crisis but also to provide incentives to borrowers to return to financial markets as conditions normalize. For the PMCCF, the bond market stabilized before the facility became operational, hence no investments were made under this program as of September 2021.

The start of the pandemic stressed the financial condition of state and local governments, both reducing revenue and generating increased demand for services. To support the flow of funds to these municipalities, the Federal Reserve created the Municipal Liquidity Facility (MLF) with an equity stake being taken by the Treasury.<sup>86</sup> Li and Lu (2020) found that the announcement of the MLF reduced the spread on municipal notes and bonds.

The previously discussed facilities provided by the Fed targeted large institutions, and the CARES Act provided financial support programs for small businesses (see below). That left a gap made up of businesses and nonprofits that were too small to access financial markets but too big to use the CARES Act small business programs. The Federal Reserve, with the financial support of the Treasury, sought to fill this gap with the Main Street Lending Program, which represented a major innovation in Fed lending facilities and programs as it potentially involved the Fed lending directly to a large number businesses without the benefit of market

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<sup>84</sup> See the Government Accountability Office (2020) for a review of the CARES Act support of Federal Reserve lending programs.

<sup>85</sup> Along with supporting Fed facilities and the funding the PPP, the CARES Act also provided direct support to various industries adversely affected by the pandemic as well as to individuals. For example, the act provided a tax credit to most individuals, expanded unemployment benefits, and made certain changes to the tax code for businesses. The act also provided forbearance in federally backed mortgages. These provisions greatly reduced the financial strain on those suffering reduced income due to the pandemic. As a result, although the rate of delinquency and forbearance on consumer loans was elevated, it has remained below the levels that would have been predicted solely on the deep recession that occurred at the start of the pandemic (see Dettling and Lambie-Hanson 2021). Thus, the programs targeting individuals and businesses have indirectly had the effect of benefiting lenders.

<sup>86</sup> See Haughwout, Hyman, and Lieber (2020) for a discussion of the MLF.

measure of credit risks (the other programs typically relied on credit ratings from one of the major credit rating agencies).<sup>87</sup> The program went through a series of reforms as the Fed sought to reach a larger set of borrowers and has since been split into five different facilities.<sup>88</sup> Brauning and Paligorova (2021) find that the program had a diverse set of borrowers through December 2020 with “a disproportionate uptake by firms that faced pandemic-related disruptions.”

The primary small business support program in the CARES Act was the Paycheck Protection Program (PPP). The PPP was structured as a loan guaranteed by the Small Business Administration (SBA). The loans’ special features included a low interest rate and the potential for the loan to be forgiven if the funds were used for certain purposes—most notably for the businesses’ payroll. The loans for the PPP program were made by SBA-qualified lenders, with the SBA approving each loan. This process has generated many controversies about who did and did not receive loans, the timeliness of the loans, and the process for forgiving the loans. The Federal Reserve’s contribution to the PPP was to facilitate lending by offering to accept PPP loans from SBA-qualified lenders as collateral for loans from the Fed as a part of the Paycheck Protection Program Liquidity Facility.

The pandemic had an extraordinarily negative effect on the real economy, weakness that could have been aggravated by financial sector weakness. In contrast to the GFC, the banking system was able to provide support to the real economy rather than needing support from the government. However, in many other areas the Federal Reserve’s intervention followed the playbook developed during the GFC and likely strengthened expectations that the Fed would take similar action in future crises. Additionally, the Federal Reserve and the Treasury provided direct support to nonfinancial businesses in ways not previously seen in the last 50 years—if ever.

### **3.18. Summing Up the Last 50 Years**

The 16 extraordinary interventions are summarized in table 1, which shows for each event which of the agencies provided support and the intended direct beneficiaries. There are several important takeaways from the summary in table 1 and the details provided in the preceding sections. First, the record shows that large domestic banks have been the repeated beneficiaries of the extraordinary support. Substantial substance exists behind the concern about too big to fail banks. Second, the extension of implicit and explicit guarantees extends well beyond the domestic banking sector to include domestic financial and nonfinancial private

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<sup>87</sup> See English and Liang (2020) for a discussion of some of the issues in designing the Main Street Lending Program.

<sup>88</sup> See the Federal Reserve Board’s summary of the program at <https://www.federalreserve.gov/monetarypolicy/mainstreetlending.htm>.

firms.<sup>89</sup> Third, the safety net does not completely stop at the water's edge but rather extends to the global market for US dollar-denominated obligations. Fourth, the scope and the size of the interventions has increased dramatically in the 2000s. Table 1 in particular highlights the increase in scope during the GFC and pandemic dash for cash. The problems in the 1970s and '80s could largely be addressed by working with and through the banking system (except for the GSEs). However, the problems of the 2000s were not only larger in size but also required direct intervention with a wider variety of counterparties to stabilize the financial system.

## **4. The Future of Government Support**

The above portion of this article has shown widespread and increasing government action to reduce the risk of economic damage from a tail event in the financial system, but it has not discussed whether and how that support results in significant social costs. Nor has it discussed alternative responses. This section will partially address those limitations in two ways. First, it will provide several reasons for believing that such intervention can have large social costs. Second, it will provide a very high-level discussion of possible responses.

### **4.1. Costs of Providing Support**

Although the provision of support may provide significant benefits, it also comes with some potential costs. A frequently expressed concern is that the “bailouts” provided to the financial sector have the effect of transferring wealth from the rest of society to a small number of highly compensated financial executives. One possible response to this concern is that it ignores the benefits obtained by the rest of society from preventing or limiting financial instability. However, even if one accepted that all the financial sector bailouts did in fact prevent worse macroeconomic outcomes, it is still the case that many of the biggest beneficiaries are far wealthier than the typical taxpayer.

A second response is that many of the support programs were not costly; indeed, some even produced a profit for the Treasury. Although it is true that many programs have been turned out to be profitable ex post in accounting terms, that does not mean they were a good deal for the taxpayers. For these programs to earn economic profits, it is not sufficient that their accounting revenue exceeds their accounting cost. Rather, the programs would need to earn a rate of return that compensated the taxpayers for the risk they were bearing. One easy test of whether the programs earned such a rate of return the ex ante risk from the support is whether the programs were on terms equal to or better than the firm could have done in private markets. When applying this test, virtually all the lending programs involved an ex ante transfer of wealth from taxpayers to the firms' investors. If the firms could have accessed

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<sup>89</sup> The fact that the safety net extends beyond the banking system has been noted by Walter and Weinberg (2002) and Malysheva and Walter (2013), both of which provide estimates of the share of financially intermediated funds that have an implicit or explicit guarantee.

market financing on equal or better terms than that available from the government, they would have gone to the market rather than turning to the government.<sup>90</sup>

Yet if the problem were merely wealth transfers, then one could argue that government support of the financial sector was one of a set of Pareto efficient outcomes.<sup>91</sup> However, the potential costs of the support also include moral hazard, which is sometimes referred to as bank executives taking excessive risk with the attitude that “heads I win, tails the government loses.” However, one does not need to attribute any malign intent to bankers to be worried about moral hazard. Investors will only price those risks to the extent they perceive they are at risk of loss. If investors anticipate *ex ante* that the government will absorb a large fraction of the losses in some states, then investors will only price in their share of the losses in those states. This underpricing of risk by investors then distorts management’s incentives. Managers will observe that they can invest in higher return assets without having to pay a correspondingly higher credit risk premium on their debt. Many managers will respond to these incentives by purchasing the higher-return asset, with many of them thinking their higher returns (net of funding costs) were due to the management’s superior skill. In fact, in most cases the reason that an asset has a higher return is because it also is riskier. The only reason the higher return/higher risk asset portfolio can produce higher profits (under most but not all conditions) is that the government is bearing part of the higher risk associated with the portfolio. Moreover, the set of counterparties included in the operations has expanded significantly over time, expanding the set of institutions potentially subject to moral hazard. Further, this expansion of the set of parties subject to increased moral hazard has not been accompanied by a commensurate increase in scope and rigor of prudential regulation of these counterparties that might mitigate some of the increased risk-taking incentive.

To the extent that the support increases moral hazard and financial risk taking, there are real social costs. First, the additional funding for higher risk assets may distort the allocation of real resources toward riskier projects than would be socially optimal. Second, the risk of future financial crises increases to the extent that firms are taking greater financial risk.

Measuring the exact extent of moral hazard is difficult, in part because it requires the researcher to spell out how investors and firms would act in the unobservable counterfactual case where firms do not expect government support. What we can observe are a few specific

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<sup>90</sup> For example, Lucas (2019) estimates that the economic cost of the support provided during the GFC was approximately \$500 billion.

<sup>91</sup> A Pareto efficient policy is one in which it is not possible to improve anyone’s welfare without reducing another person’s welfare. It is widely accepted that any policy would ideally be Pareto efficient. However, Pareto efficiency is a rather weak criterion for social welfare as often a wide variety of policies would meet this standard. Thus, many (likely most) economists would go beyond Pareto efficiency and agree that social welfare can be improved by some policies that transfer resources from some individuals to others—especially if the transfer is from higher-income to lower-income individuals.

cases where government action contributed to greater risk taking. One such example is that of the weakening of S&L regulatory standards rather than the prompt resolution of insolvent thrifts, which resulted in increased risk taking and, in some cases, outright fraud. Additionally, there are several cases where key decision makers expected to receive a bailout, presumably based on that expectation, and they were disappointed when it was not forthcoming. One example of this type of case comes from the decision to not bail out Drexel Burnham Lambert, where the CEO did accept that bankruptcy was inevitable until after talking with officials at the Fed and Treasury. Another example comes from the decision not to bail out Lehman Brothers. The chief investment officer at Prime Reserve Fund, the money fund that collapsed after Lehman's failure and helped spark a run on other prime money market funds. Prior to Lehman's bankruptcy, a ratings agency asked him if he was comfortable with his fund's large holdings of Lehman's commercial paper. He replied that he was, and that the worst possible outcome was that the federal government would assist Lehman.<sup>92,93</sup>

Another potential way that firm incentives may be distorted would be if deeply undercapitalized or insolvent firms are allowed to remain in operation.<sup>94</sup> These firms are often referred to as "zombies."<sup>95</sup> At best, zombie firms have excessive debt but a viable business model and good management. The problem created by excessive debt is that these firms tend to underinvest in low-risk projects where most or all the benefits would flow to creditors in the form of a reduced risk of bankruptcy. At worst, these firms have obsolete business models or inefficient management and are tying up valuable productive assets that could be better used in other ways.<sup>96</sup>

Arguably the biggest concern that is potentially measurable is the extent to which the costs of a bailout can impair the financial condition of the government and possibly even exceed the government's ability to absorb risks. One way of thinking about the problem draws on some recent papers on risk sharing in financial networks.<sup>97</sup> This literature has shown that more interconnected networks that share risks widely will suffer less damage from small

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<sup>92</sup> See Securities and Exchange Commission (2009, pp. 14-15).

<sup>93</sup> Some assert that the failure of Lehman was itself due in part to expectations by the firm's head Richard Fuld that the government would not allow the firm to fail (see, for example, Pozen 2009). Although Treasury Secretary Hank Paulson had told Fuld that there would be no federal assistance for Lehman, Fuld's view that the government would help if needed was also held by others in the financial services sector and government, see Valukas (2010, vol. 2, pp. 617-619).

<sup>94</sup> See Caballero, Hoshi, and Kashyap (2008) for an analysis of the adverse effect of Japanese zombie firms in the 1990s.

<sup>95</sup> Kane (1987) first used the term "zombies" in his analysis of insolvent savings and loans that relied on deposit insurance to remain in operation.

<sup>96</sup> See Banerjee and Hofman (2020) for a recent discussion of corporate zombies from an international perspective.

<sup>97</sup> For example, see Acemoglu, Ozdaglar, and Tahbaz-Salehi (2015).

shocks than less interconnected networks in which risks are not shared. Firms that would have failed absent risk sharing are able to survive because other firms were absorbing part of the risk. However, this research also finds that for sufficiently large shocks, the relationship flips: firms are more likely to survive in less interconnected networks. If a less interconnected network is hit with a large shock, some random firms will take large losses and fail, but other firms will take relatively small losses and survive. However, if there is extensive loss sharing in the network, then the large losses at some firms will be shared with firms suffering smaller losses, causing many of the firms suffering small losses to fail along with those taking large losses.

The way to apply this network intuition to government bailouts is to think of the government as another node in the network that is absorbing losses. Even though some of the recent shocks have seemed large, they have not exceeded the US government's fiscal slack. In part, this is because the US government has had, at least to this point, incredible fiscal capacity. Unfortunately, that fiscal capacity is not what it once was, as Reinhart (2018) observes. Another part of the reason is that we have so far been lucky in that the adverse shocks could have been worse. For example, one could easily imagine the COVID-19 pandemic having a far worse impact on the economy and financial system if the virus had been more virulent and/or deadly, or if it had taken years rather than months to develop a vaccine. Moreover, recent cases show that a country's financial system can simply become "too big to save".<sup>98</sup> Ireland needed a large EU loan that was ultimately repaid via much higher taxes on Ireland's taxpayers and accompanied by a sharp economic downturn.<sup>99</sup> The banking crisis in Iceland during the GFC was so severe that the country's deposit insurance system refused to cover the losses borne by one its banks' UK and Dutch depositors. Nevertheless, the crisis was so severe the country suffered a 7 percent drop in GDP in 2009 despite large loans from the International Monetary Fund and the other Nordic countries.<sup>100</sup>

#### **4.2. Alternatives for Reducing the Need to Intervene**

Given the costs and risks associated with the government absorbing the tail risk, an important policy problem is that of how to reduce that risk. The two possibilities are, first, to allow more financial firms to fail and, second, to reduce the risk that the financial sector will need support by strengthening the prudential supervision and regulation of the financial system.

A policy of allowing more firms to fail could reduce the amount of aid provided by the FDIC, the Federal Reserve, and the Treasury. Such a policy could also reduce moral hazard in

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<sup>98</sup> See Demirgüç-Kunt and Huizinga (2013) for an analysis of the whether some banks are too big to fail or too big to save given their home country's fiscal capacity.

<sup>99</sup> See papers presented at an International Monetary Fund conference by Eichengreen (2015), Fatás (2015), and Schoenmaker (2015).

<sup>100</sup> See Jackson (2010).



the financial sector to the extent the policy was ex ante credible. The simplest and most extreme way of implementing such a policy would be to announce that the FDIC, the Fed, and the Treasury will no longer provide assistance to the financial sector. The weakness of a policy of “just say no” is a time consistency problem. Although policymakers may say they will not provide any assistance when times are good, they are very likely to change their minds when confronted with the potential social and political costs of a financial crisis. Moreover, financial market participants are aware that policymakers are likely to provide aid in a crisis, regardless of what they say about policy in good times. Thus, a “just say no” policy is likely to have at best a small effect on moral hazard and on the amount of aid when a crisis occurs.

Although a “just say no” policy will not work, policymakers may be able to reduce the amount of assistance they provide by making failure more credible. This policy may involve changes to bank resolution and nonbank financial firm bankruptcy to reduce the risk that the failure of some firms will result in the failure of other firms. Policymakers may also seek to make changes in the way financial firms and markets operate to reduce the risk that problems in one firm or market will spill over to other firms and markets. The approach of making failure more credible is not a complete solution, as the likelihood remains that assistance will be provided in some states. However, it has the potential for reducing the set of states and the amount of assistance. Also, because it is more credible than “just say no,” a policy of reducing the cost of failure also has the potential for reducing moral hazard.<sup>101</sup>

The United States has been working on making big bank resolution more credible with both the FDIC Improvement Act and the Dodd-Frank Act taking important steps to address large bank resolution issues. However, more could be done with regard to large banks, and the potential also exists for creating new bankruptcy provisions to address problems unique to nonbank financial firms.<sup>102</sup>

Along with making failure more credible, enhanced supervision and regulation may reduce the likelihood that government support is needed and make the financial system more resilient to those failures that do occur. Parts of the financial system are already subject to prudential supervision and regulation, most notably banks and their parent holding companies. Here too, potential exists for strengthening the regulation of firms and markets already subject to prudential regulation and extending that regulation to financial firms and markets not currently subject to prudential regulation.

An important limitation prudential regulation is that it is almost always incomplete in two important ways. First, prudential regulation is applied to firms and markets that were at

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<sup>101</sup> Stern and Feldman (2004) also emphasize the need for the resolution plan to be publicly disclosed for it to be credible.

<sup>102</sup> One example of a proposal for reforming the bankruptcy code is Scott (2012).

some point in the past recognized as posing a risk to retail customers and/or to the financial system. Thus, banks have been subject to prudential regulation for centuries, but, for example, most types of fintech activity are not subject to direct prudential regulation. Second, prudential regulation is also almost always limited in its coverage of regulated firms. That is, prudential regulation almost always has some loopholes that regulated entities will eventually discover and—if they deem it profitable—exploit. Imposing stricter rules on regulated firms could reduce the problem of regulatory avoidance, but doing so creates an incentive for the activity to migrate to places that are either unregulated or subject to less effective regulation.

US regulations also have limited ability to reduce the risk of firms headquartered outside the United States. The US operations of these firms may be subject to prudential supervision, which can extend, to some extent, to the firm’s consolidated financial condition if the firm has US operations. However, the non-US operations are typically outside US jurisdiction, a potentially important limitation that can be partially addressed by working with international standard setting bodies such as the Basel Committee on Banking Supervision to strengthen the prudential requirements imposed on foreign financial firms.

A complement to policies intended to allow more firms to fail and to stricter regulation would be better monitoring and understanding of how the financial system evolves. Kane (2010) proposes that individual financial firms be required to estimate the safety-net subsidies the firm receives.<sup>103</sup> To aid in estimating the subsidies, large and/or complex firms would be required to issue securities that are sensitive to the firm’s risk of distress or failure. These estimates would be reviewed by their supervisors and supplemented by government estimates of the safety net subsidy provided to different financial industry sectors. The information obtained from these reviews could then be used to direct supervisory resources and may also be incorporated into the managerial compensation scheme employed by firms estimated to be benefiting from a large subsidy.

Wall (2015) advocates for a different approach that could be taken independently or in combination with Kane (2010). Wall (2015) begins by observing that financial instability almost always arises from more than one financial firm taking a large position in the same or highly correlated markets. He argues that this suggests that these major markets should be subject to periodic, intensive end-to-end reviews, starting where the risks originate and tracing them through to the ultimate bearer(s) of the risks, allowing the supervisors to identify market practices that could give rise to excessive risk. It would also allow the supervisors to identify firms and markets that are not currently subject to prudential regulation but should be. Finally, when financial stability does arise, it may allow the authorities to target their assistance more narrowly to the most vulnerable parts, reducing the overall support being provided. For

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<sup>103</sup> “Safety net” refers to the combination of explicit and implicit deposit insurance, implicit protection of nondeposit liabilities, and provision of emergency liquidity accorded to financial firms, especially banks.

example, if such reviews had been done, supervisors may have better understood the potential for portfolio insurance to exacerbate the stock market crash of 1987 and for collateralized debt obligations to amplify the shocks from the mortgage markets in 2007–09.

## **5. Conclusion**

The US financial sector is important to the operation of the economy, but it is also vulnerable to both solvency and liquidity shocks. The ordinary operations of the FDIC, the Federal Reserve, and the Treasury serve to reduce the effect of solvency and liquidity shocks on banks, and they also mitigate the effect of adverse shocks on regional economic conditions and the national economy. However, in addition to their normal operations, the FDIC, the Fed, and the Treasury have undertaken 16 extraordinary operations with the intent of preventing instability and/or mitigating instability arising from the financial sector. Banks are among the beneficiaries of this extraordinary support, but that support has also extended to domestic nonbank financial firms, domestic nonfinancial firms, and to the global market for US dollars.

So far, these actions appear to have helped in the sense that each of them individually may have reduced the short-run real costs of financial instability. However, financial market participants can reasonably interpret these actions as indicating that they can expect extraordinary government intervention whenever a large adverse shock hits the financial system—that is, the federal government is insuring a large fraction of the risk of tail events that would otherwise be borne by these market participants. The result is likely to be increased risk taking by investors and the financial sector, which in turn may amplify the potential adverse impact of future shocks. Moreover, these shocks are also stressing the fiscal capacity of a federal government that already has rather high debt levels. Thus, far the government has had the financial flexibility to absorb the shocks, in part because of the government’s enormous fiscal slack and in part because we have been lucky that the shocks were not worse. However, at some point our luck may run out.

Finally, we are unlikely to be able to solve the problem of government assumption of risk exposures, but we may be able to better manage that risk. Risk cannot be eliminated from the financial system, as one of the primary functions of the financial system is the allocation of resources to risky assets, and sometimes adverse tail outcomes will occur. When tail outcomes are realized, the government will have an incentive to intervene to reduce the social and political costs of financial instability. However, regulators might take measures to make the financial system more resilient by devising systems that reduce excessive risk taking in the financial sector and that create conditions that allow insolvent firms to fail without the risk of significant adverse spillover to the real economy. It would be a mistake, however, to think that a one-time policy adjustment will resolve the problem. As Wall (2014) observes, two major

drivers of financial innovation are changes in technology and regulation itself.<sup>104</sup> Both drivers are likely to play an important role in the future evolution of the financial system, resulting in the need for the continuing evolution of policy to respond to the changing conditions. One way of identifying such changes would be end-to-end reviews of major financial markets that pose a threat to financial stability.

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<sup>104</sup> As an example of how the banking and nonbanking sectors evolve in response to changing conditions, see Herman, Igan, and Solé (2017) for a discussion of how the evolution of the structural relationship of the bank and nonbank credit from the 1980s to 2007.

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**Table 1: Providers and Beneficiaries of Extraordinary Support in Past Interventions**

Event	Intervenor			Direct beneficiaries of the intervention			
	FDIC	Federal Reserve	US Treasury	Domestic depository organizations	Domestic nonbank financial firms	Domestic nonfinancial firms	Foreign firms in global USD markets
Penn Central		X				X	
Franklin National Bank	X	X		X			X
Hunt Brothers and the silver market		X		X	X		
First Pennsylvania Bank	X	X		X			
Drysdale Government Securities		X		X	X		
Less developed country debt crisis		X	X	X			?
Penn Square, Seafirst, and Continental Illinois	X	X		X			
Housing finance and the Volcker disinflation	X		X	X	X		
Agricultural finance in the 1980s			X		X		
Southwestern banks in the 1980s	X	X	X	X			
1987 stock market crash		X			X		
Northeastern banks in the early 1990s	X	X		X			
Long-Term Capital Management		X		X	X		
Global financial crisis	X	X	X	X	X	X	X
European sovereign debt crisis		X					X
COVID-19 pandemic “dash for cash”	X	X	X	X	X	X	X

Source: Author’s research