

OCTOBER 2023

# FEDERAL RESERVE: CONFLICTS BETWEEN MONETARY POLICY AND BANK REGULATION IN TACKLING INFLATION

**Aaron D. Klein**, Miriam K. Carliner Chair and senior fellow, Economic Studies at the  
Brookings Institution

The Brookings Institution is financed through the support of a diverse array of foundations, corporations, governments, individuals, as well as an endowment. A list of donors can be found in our annual reports published online. The findings, interpretations, and conclusions in this report are solely those of its author(s) and are not influenced by any donation.

Abstract: Covid was a worldwide economic shock, creating a global recession later followed by widespread inflation. Central banks responded to the Covid recession by slashing interest rates. Fiscal authorities across the world flooded their countries with direct stimulus. Combinations of central banks in their lender of last resort authority, and fiscal authorities provided substantial support to credit, equity, and debt markets, largely protecting (bailing out) investors from the unexpected and uncertain impact of Covid. As Covid's economic shock wore off, inflation surged.

America's response to Covid was particularly aggressive across all three dimensions: monetary, fiscal, and markets. America's economy, as measured by traditional factors such as GDP and employment, generally outperformed other nations similarly impacted by Covid. Inflation in America was similar to those of other nations subject to Covid shocks and disruptions in the price of energy and other goods caused by Russia's invasion of Ukraine. However, America experienced substantial instability in its banking sector. Multiple banks failed, resulting in the Federal Reserve and other government agencies invoking emergency authority designed to protect financial stability.

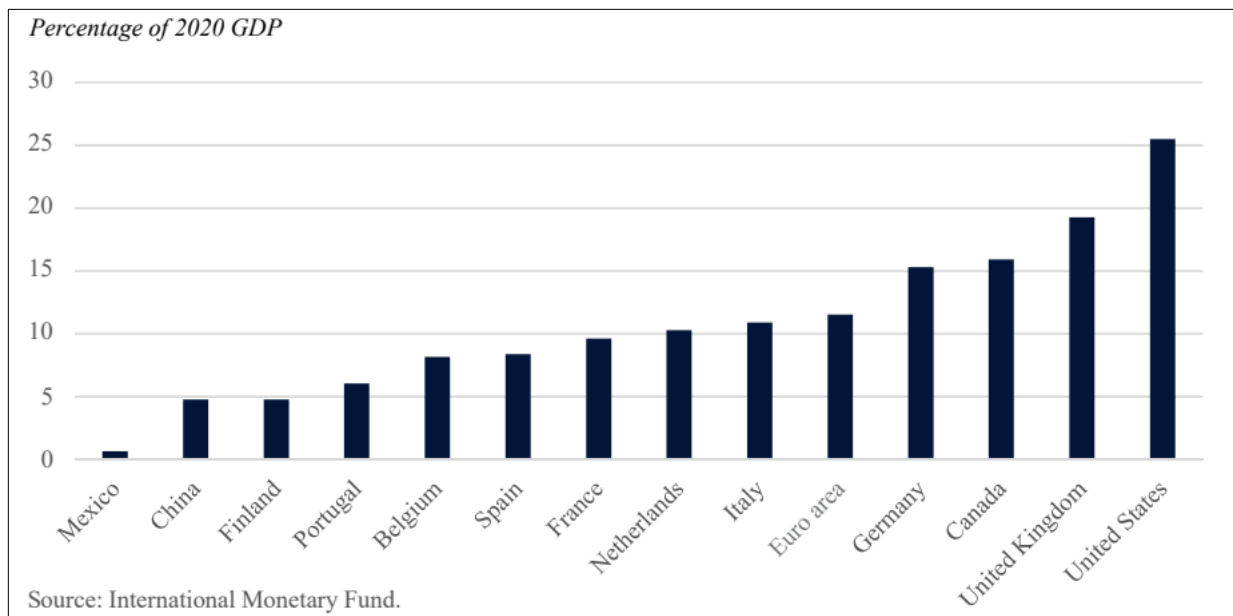
This paper argues that the Federal Reserve has unique responsibility for this banking crisis from its multiple roles of 1) monetary policy; 2) financial stability regulator; 3) lender of last resort; 4) bank supervisor; and 5) payment system regulator and operator. These roles should in theory produce economies of scope allowing the Fed to more effectively perform each function. America's spring 2023 banking crisis instead shows that the Fed's current implementation of these roles causes substantial contradictions and problems resulting in unnecessary financial instability and bailouts of creditors. The promise of the financial reforms undertaken after the 2008 global financial crisis, which resulted in increased regulatory power for the Federal Reserve was greater financial stability and the end to financial bailouts. Yet 15 years later the Federal Reserve invoked systemic risk authority citing a threat to financial stability emanating from the failure of institutions it supervised. These mistakes will result in slower economic growth and greater income inequality. Policymakers should question whether these roles should be separated resulting in lower authority and a smaller mandate for the Federal Reserve.

## The 2020s Economy: Covid shock, Inflation Rebound

The Covid pandemic generated similar economic shocks around the world, with lockdowns, supply-chain disruptions, and breakdowns in domestic economic activity and global trade. Central banks globally responded with sharp decreases in interest rates (Vallence and Wallis 2020). Fiscal stimulus was broadly enacted, with different mechanisms attempting to achieve similar results: targeting assistance to those most directly impacted and vulnerable to the recession while stabilizing the macroeconomy until the pandemic could recede (Soyres, Santacreu, and Young 2022). Lenders of last resort authorities were activated, with support provided to a broad array of participants including banks, broker-dealers, and in many cases owners of debt and other investors (Vallence and Wallis 2020).

America's size and distribution of US fiscal stimulus was among the largest (Council of Economic Advisors [CEA] 2022). While the United States historically has a smaller social safety net than most other developed economies (Gould and Wething 2012), the US fiscal response was significantly larger. Figure 1 shows the US fiscal response amounting to over 25% of GDP, no other country listed broke 20 percent and the Euro average was just over 10 percent (CEA 2022, 102)

*Figure 1 Discretionary fiscal response, 2020: Q1-2021: Q3*



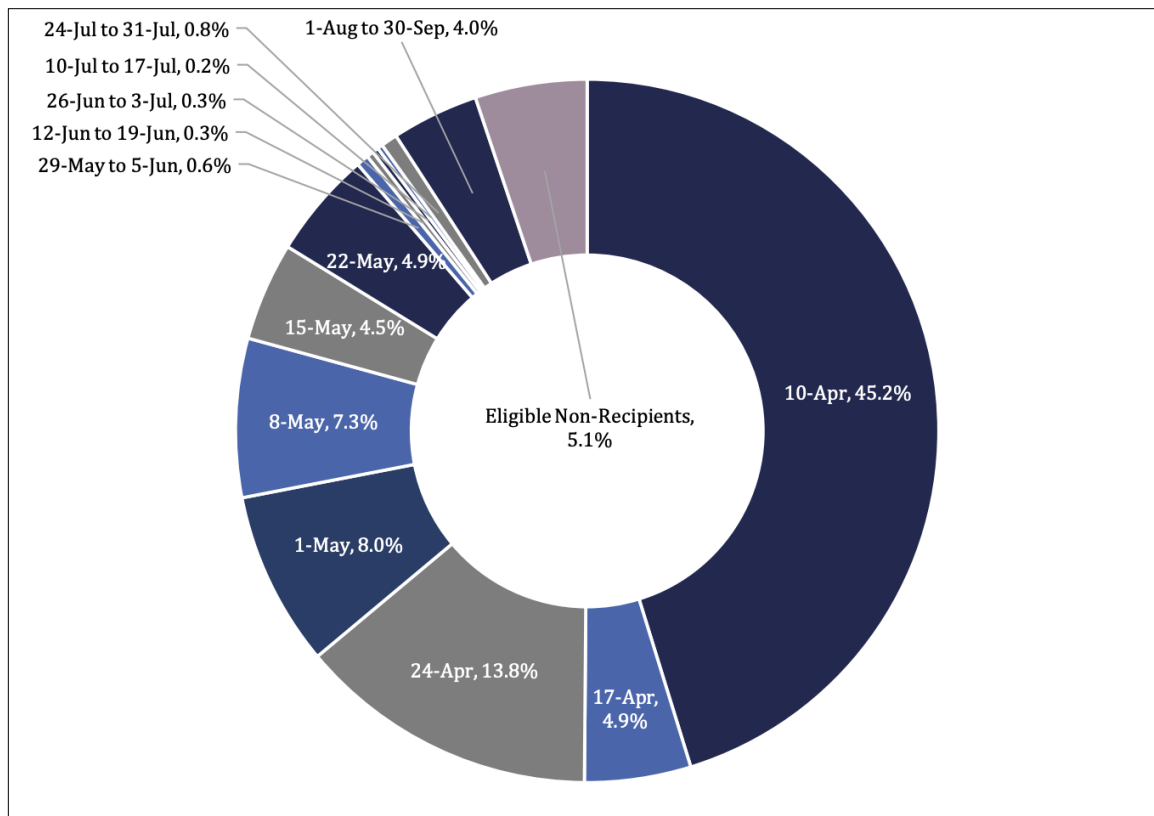
Source: (CEA 2022, 102)

Original Data Source:(International Monetary Fund 2021)

The fiscal response consisted of large direct payments to individuals and businesses (CBPP Staff 2023). Direct individual and family support was provided to a large proportion of the public – 228 million individuals (about 70%) of Americans were eligible for the first Covid payments of \$1,200 for individuals, \$2,400 for married couples, and an additional \$500 for each child, with these amounts being reduced for individuals making more than \$75,000 (U.S. Department of the Treasury n.d.; Clark et al. 2023, 5).

Enactment of these payments was swift; delivery lagged. Despite a divided government with a Democratically controlled Congress clashing with President Trump, Congress enacted the CARES Act in March 2020, before economic indicators such as unemployment and GDP had been reported. However, actual payment was substantially slower. Payments were not sent out until two weeks after the law was passed and then only to a minority of Americans for whom the government had accurate bank data. By May 1<sup>st</sup> 34% of eligible families still did not have access to their initial payments which continued to trickle out for months as shown in figure 2.

*Figure 2 Percent of eligible recipients whose Economic Impact Payments were disbursed in each period as of September 20, 2020.*



Source: (Murphy 2021, 10).

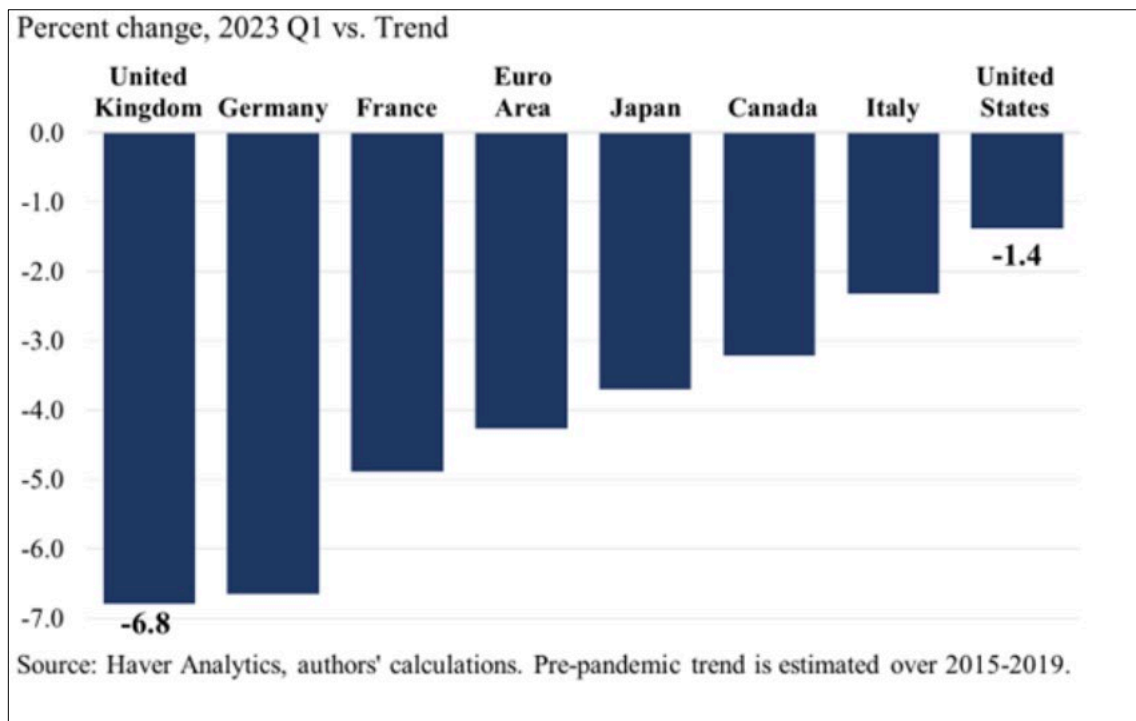
Original Data Source: Financial Health Network analysis of GAO reports from 9/21/2020 and 11/30/2020.

Business payments labeled as attempts to provide support to workers, such as the “paycheck protection program (PPP),” were often transfers to owners with relatively little requirement that funds go to workers (Klein 2020). America uniquely used the banking system as a conduit to reach business owners (Baker, Judge, and Klein 2022). As a result, aid was skewed toward companies that had stronger relationships with banks (Li and Strahan 2021; Glancy 2023). Given America’s history of racial discrimination and existing differences in banking relationships, the result was disproportionate provision of aid toward white-owned businesses and away from those owned by women and minorities, particularly in the first round of PPP funding (Chernenko et al. 2023; Chernenko and Scharfstein 2021; Fairlie 2022).

Other countries, such as Germany, structured payments directly to workers through fiscal authorities such as taxation agencies rather than through banks (Gotbaum, 2020). This resulted in more equitable distribution of assistance and improved targeting to workers. It may account for the order of magnitude less fraud experienced in Germany compared to the US. In the US \$67 billion (about 8%) of funds from PPP loans and \$136 billion of Economic Injury Disaster Loans (about 33%) were distributed to fraudulent actors, while a news report estimated German fraud in only the hundreds of millions (Office of Inspector General 2023; Deutsche Welle 2021).

Analysis studying the efficacy of the responses (OECD 2020), including economist Jason Furman, have argued that “the US will come out of this economically better than any country that was similarly affected by the virus” (Matthews 2021). America’s GDP gap was the smallest relative to other advanced economies as seen in figure 3 (Harris and Sinclair 2023).

*Figure 3 Real GDP shortfall relative to pre-pandemic trends.*



*Note: Pre-pandemic trend is estimated over 2015-2019. Source: (Harris and Sinclair 2023)*

### **America’s Mini Bank Panic of March 2023**

America suffered a bout of financial instability when four banks failed in a short time span starting in early March 2023. Bank failures alone are not a mark of financial instability in America. On the contrary, banks routinely fail, with almost every year having at least one bank failure (Klein 2018b). In response to the bank failures in March 2023, the Federal Reserve and FDIC with the support of the Biden Administration, invoked exceptional authority designed only to address financial instability. This included the FDIC’s invocation of its systemic risk authority and the Federal Reserve’s creation of the Bank Term Funding Program capitalized by funds from the U.S. Treasury (Board of Governors of the Federal Reserve System (US) [FRB] 2023d).

Most of the rest of the advanced economies globally did not experience banking instability (with the important exception of Switzerland who experienced financial instability resulting in the merger of Credit Suisse and UBS). To understand the root causes, it is important to begin with an overview of some of the unique aspects of the United States banking system. We will then incorporate the consequences of America's pandemic response for the banking system. Finally, we will turn to the Federal Reserve's role as bank regulator in this crisis and connect the dots to its conduct as monetary policy authority. This portion will include an analysis of the Fed's unique structure as a central bank comprised of both a government institution (Board) and private entities (Regional Banks).

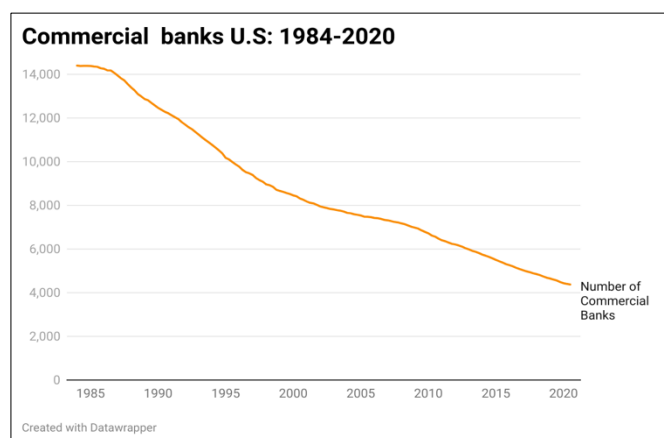
### *America's large and diverse banking system*

America's banking system is globally unique on many dimensions. One of which is the sheer number of banks. America has over 4,000 banks, the largest number of any country (Smith 2023). America also has more than 4,600 credit unions, bringing the total number of insured depository institutions to almost 9,000 as of the second half of 2023 (National Credit Union Administration 2023).

America has so many banks today because it had even more in the past. America had over 14,000 banks in 1986 (Emmons 2021). America's fractured banking system was the result of legal structures that for much of its first century precluded national chartering and for more than the next century functionally made multi-state branching extremely difficult. Consolidation nonetheless took off during the late 1980s with a combination of technological changes benefiting scale combined with significant structural problems through the savings and loan system, which resulted in large public bailouts, depositor losses, and a massive wave of bank failures (Emmons 2021). Subsequent legislation (FDICIA and FIRREA) reformed regulation and deposit insurance while the Riegel-Neal Act functionally removed prohibitions on inter-state branching.

As figure 4 shows, bank consolidation has been a hallmark of the American banking system since the mid-1980s. This long-term trend presents evidence counter to the argument that new legislation and regulation following the 2008 global financial crisis caused bank consolidation, as some, such as Lux and Greene (2016), have claimed.

*Figure 4 Commercial banks U.S*



*Adapted from: (Federal Financial Institutions Examination Council (US) and Federal Reserve Bank of St. Louis 2023).*

### *Fractured Regulatory System and Fractured Federal Reserve System*

America’s regulatory regime remains fractured along historical lines. Most American banks are state-chartered, free to choose their federal regulator between the Federal Reserve (so-called member banks) and the FDIC (non-member banks). Nationally chartered banks are regulated by the Office of the Comptroller of the Currency (OCC). All banks are required to have federal deposit insurance which gives the FDIC secondary back-up regulatory authority and primary responsibility for resolutions. Finally, America separates banking and commerce. That separation is

enforced through a requirement that banks owned by an entity that owns multiple enterprises, must be a bank or financial holding company. All bank and financial holding companies are regulated by the Federal Reserve.

The Fed’s regulatory authority is both deep and broad. As holding company regulator, the Fed has substantial authority over the largest, most complex financial institutions even when they operate nationally chartered banks. As a primary bank regulator and supervisor, the Fed has direct responsibility for many of the nation’s state-chartered banks most of which are small. Broadly speaking, regulation is the writing of rules and policies, while supervision is their enforcement. As Conti-Brown and Vanatta (2021) eloquently put it: “If regulation sets the rules of the road, supervision is the process that ensures obedience to these rules.”

The Federal Reserve System is headed by a Board of Governors (Board). The Fed Board has seven appointed Governors, with three secondary appointments as Chair, Vice Chair, and Vice Chair for Supervision. The Chair serves as the agency’s head and as discussed later the leader of the Federal Open Markets Committee that conducts monetary policy. The Vice Chair is the second in command of the Board. The Supervision Vice Chair is essentially the head of the Board’s bank regulation and was created as part of the Dodd-Frank Act in response to Congress’s conclusion that the Fed had failed in its role as bank regulator in what caused the financial crisis (Conti-Brown 2021). The Board is based in Washington DC as part of the federal government. Board Governors are appointed by the President and confirmed by the Senate.

The Federal Reserve has 12 Regional Banks. Fed Regional Banks are not part of the government. Chartered by Congress in the Federal Reserve Act, the Regional Banks are owned by their member banks and run by a President selected by the Regional Bank Boards of Directors with approval by the Fed Board. The hybrid public-private nature of the Fed was designed to maximize political independence and allow for regional and banker input into the conduct of monetary policy (Conti-Brown 2021). While the system has been altered over time, the Regional Bank/Board structure has remained largely intact.

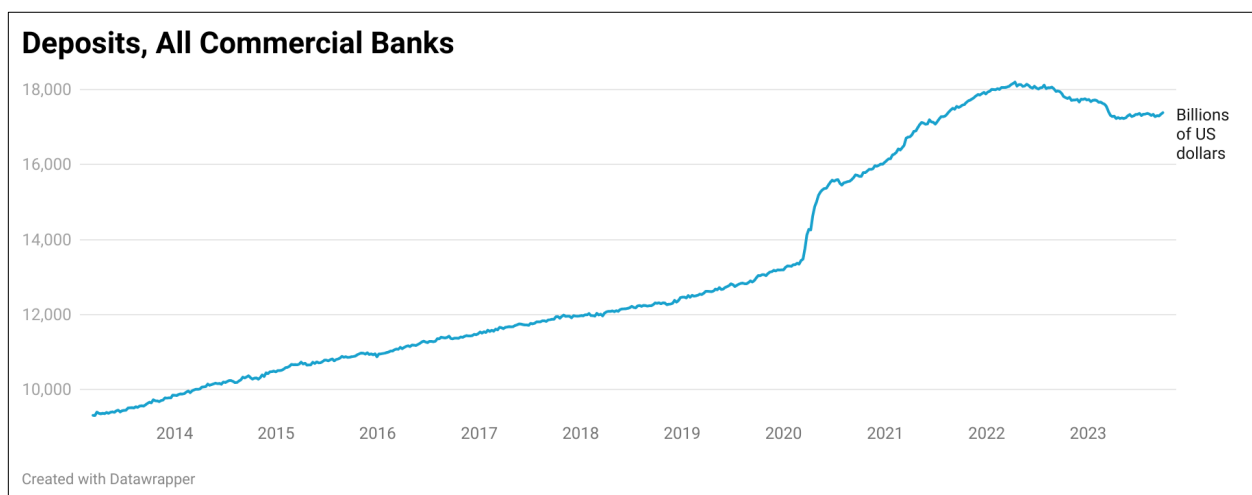
The Federal Reserve carries out its bank regulatory and supervisory responsibilities in a fractured manner. The Board of Governors is responsible for all regulation. Supervision is primarily a responsibility of the Reserve Banks. However, when banks or financial institutions become large enough, portions of that supervisory authority are transferred back to the Board. Thus, the Fed's internal supervisory structure relies on both the Board and the Regional Banks to work collectively with coordination and similar judgment.

The hybrid regulatory and supervisory system of bank regulation and supervision mirrors the hybrid conduct of monetary policy. Monetary policy is established not by the Board but by the Federal Open Markets Committee (FOMC). The FOMC consists of all Board Governors and Regional Bank Presidents, however voting membership on the FOMC consists of just the Governors, the President of the New York Federal Reserve, and four of the remaining eleven Regional Bank Presidents on a rotating basis. Thus, when fully constituted, the Governors have seven votes to the Regional Bank Presidents' five. As a matter of custom, but not law, the Chair of the Board is voted by the FOMC members as chair and the President of the New York Fed as vice-chair.

### Sharp Rise in Deposits

America's banking system experienced a sharp rise in deposits as a result of response measures taken during the Covid pandemic. As figure 5 illustrates, the trend line of commercial bank deposits was stable for years leading up to the pandemic but then jumped sharply and remained elevated for several years. Deposits rose by \$2.25 trillion between March 11 and September 16, 2020, as fiscal policy flooded consumers, businesses, and state and local governments with stimulus funds. Calculating from the data in figure 5, this was a 17 percent increase in the existing deposit base. To put that in perspective, it took three years, from January 1, 2014, to January 4, 2017, to achieve a 17 percent deposit increase over the 2014 level.

*Figure 5 Deposits, all commercial banks.*



*Adapted from: (FRB 2023a).*

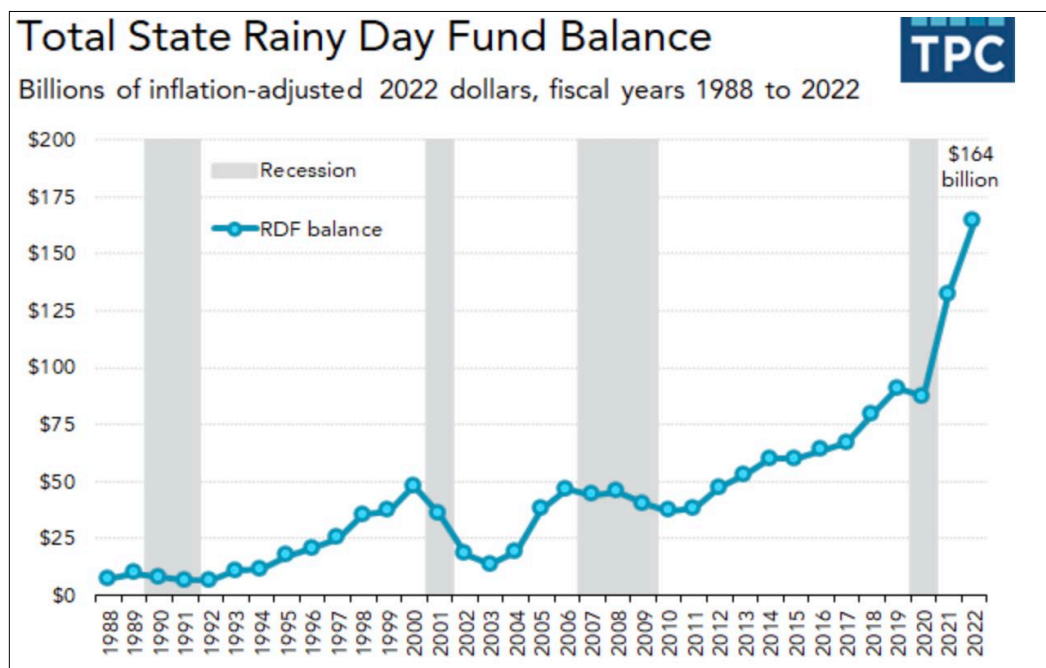
The rapid growth in bank deposits in the US is plausibly explained in large part by America's larger fiscal response than other nations (Castro, Cavallo, and Zarutskie 2022). The federal



government flooded households, businesses, states and local governments with cash. While some was directly spent to replace lost income, much was saved. Savings were likely particularly high given uncertainty regarding the length of Covid shutdowns and the recession.

State and municipal governments received larger surpluses of federal assistance than they could spend. State governments are required to run annual balanced operating budgets and use “rainy day” reserve funds to handle excess revenue and prepare for recessions.<sup>1</sup> 41 states increased their rainy-day funds in 2022, due in part to historical federal aid (Theal 2022). Figure 6 shows the sharp increase of state rainy day funds, nearly \$100 billion.

*Figure 6 Total state rainy day fund balance*



Source: (Boddupalli 2023).

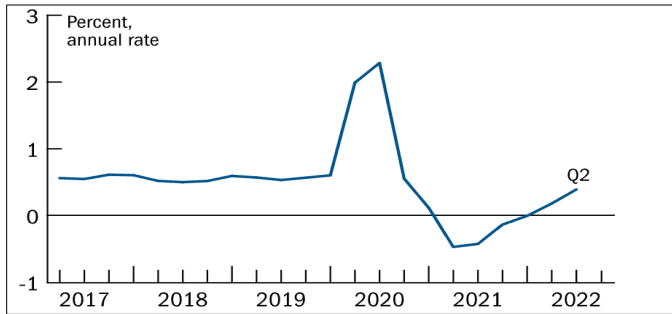
Original Data Sources: National Association of State Budget Officers. State Rainy Day Fund Balances Historical Data Set, 1988-2024. June 2023; Bureau of Labor Statistics. Consumer Price Index. “R-CPI-U-RS Homepage: Updated R-CPI-URS, All items, 1977-2022.” 2023.

As seen in figure 5, covid policy responses resulted in the deposit base achieving 3 years of growth in a six-month time span. This left banks with a simple but important question: what to do with the excess deposits?

Banks’ traditional role is to take deposits and make loans (Gobat 2012). Thus, as deposits rise so too should lending. However, the pandemic changed both demand and supply for lending in multiple ways most of which pointed toward reduced lending. First, there was a sharp recession. Economic contractions reduce the supply of bank credit as banks tighten lending standards and have reductions to capital in the form of increased loan loss reserves (Chen, Hanson, and Stein

<sup>1</sup> Technically only 49 states have balanced operating budget requirements (Vermont is the outlier which is a tiny state) for more see Boddupalli, “State Rainy Day Fund Balances Reached All-Time Highs Last Year.” <https://www.taxpolicycenter.org/taxvox/state-rainy-day-fund-balances-reached-all-time-highs-last-year>

**Figure 7** Provisions for loan and lease losses as a share of average loan and leases



Source: (FRB 2022).

Original Data Source: Call Report and FR-Y-9C.

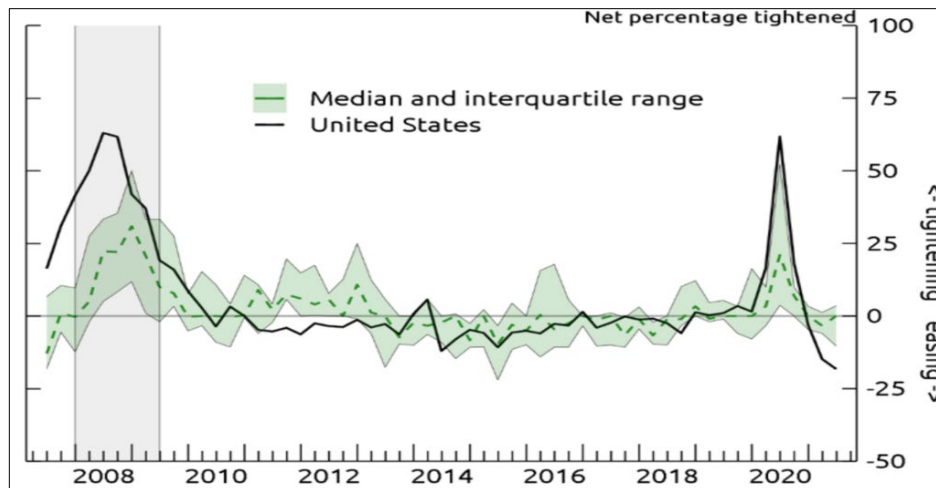
(Raunig, Scharler, and Sindermann 2017; Buch, Buchholz, and Tonzer 2015). Banks should therefore tighten lending criteria and reduce total lending.

2017). This happened in the United States as illustrated in figure 7 from the Federal Reserve’s banking systems condition report which shows the large increase in loan loss reserves in 2020 (FRB 2022, 5). While this trend was reversed in 2021, the initial experience in 2020 resulted in lower availability of credit.

Additionally, high levels of uncertainty impact lending. Increased uncertainty in the future of individuals’ financial status and businesses’ ability to execute their plans, generally leads to less lending

Banks reduced lending standards in the United States. Figures 8,9, and 10 show changes in lending standards in the US against changes in loan demand. All show lending standards rising sharply in the US, even more so than in other countries. Figure 8 shows lending for households, figure 9 for all firms, and figure 10 for a subsection of loans, commercial and industrial, that are closely followed (Bodovski et al. 2021).

**Figure 8** Changes in Lending Standard for Households

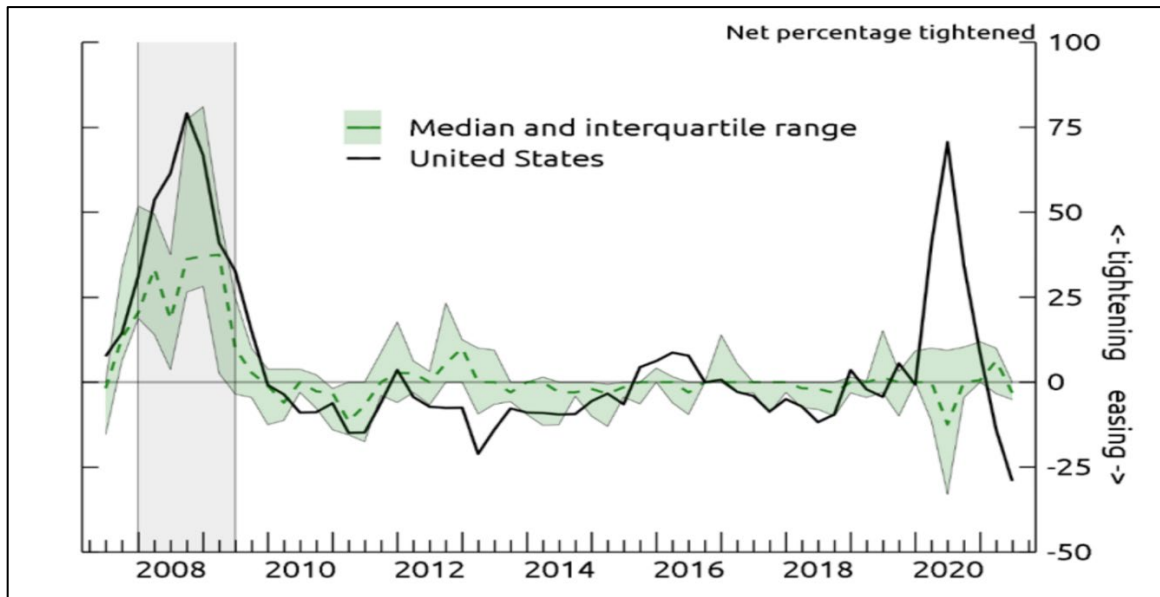


Note: The sample range is the interquartile range of lending standards for France, Germany, Italy, Japan, Netherlands, Poland, South Korea, Spain, United States, and United Kingdom. The shaded area denotes the GFC.

Source: (Bodovski et al. 2021)

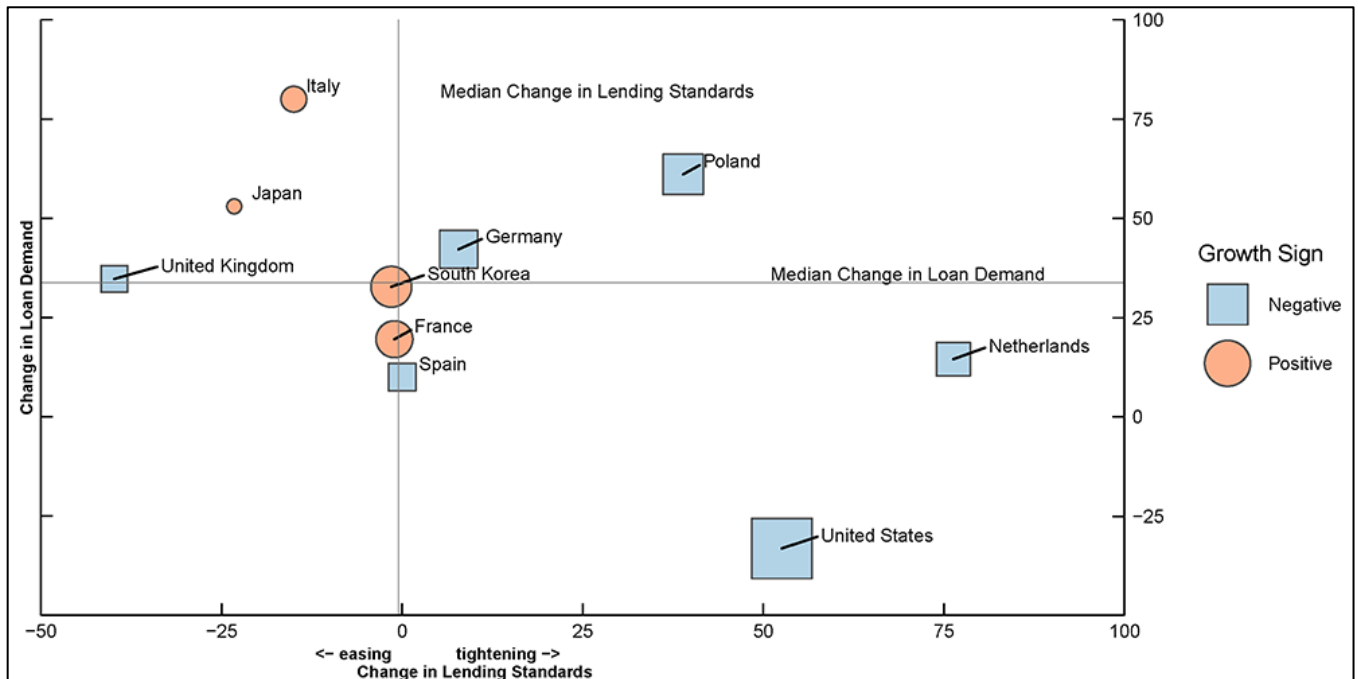
Original Data Sources: Bank of England, Bank of Japan, Bank of Korea, European Central Bank, Federal Reserve Board, and National Bank of Poland.

**Figure 9** Changes in Lending Standards for Firms



Source: *Ibid*

**Figure 10** Changes in Commercial and Industrial Loans, Credit Standards, and Loan Demand.



Notes: Tightening Credit Standards refers to the net percentage of banks reporting a tightening of credit standards. Increase in Loan Demand refers to the net percentage of banks reporting an increase in the demand for loans over 2020:Q2-Q3. C&I loans.  
Source: *Ibid*.

America’s economy recovered faster and at a greater level than other countries (Milesi-Ferretti 2021). All else equal, faster macroeconomic growth would be likely to correlate to faster

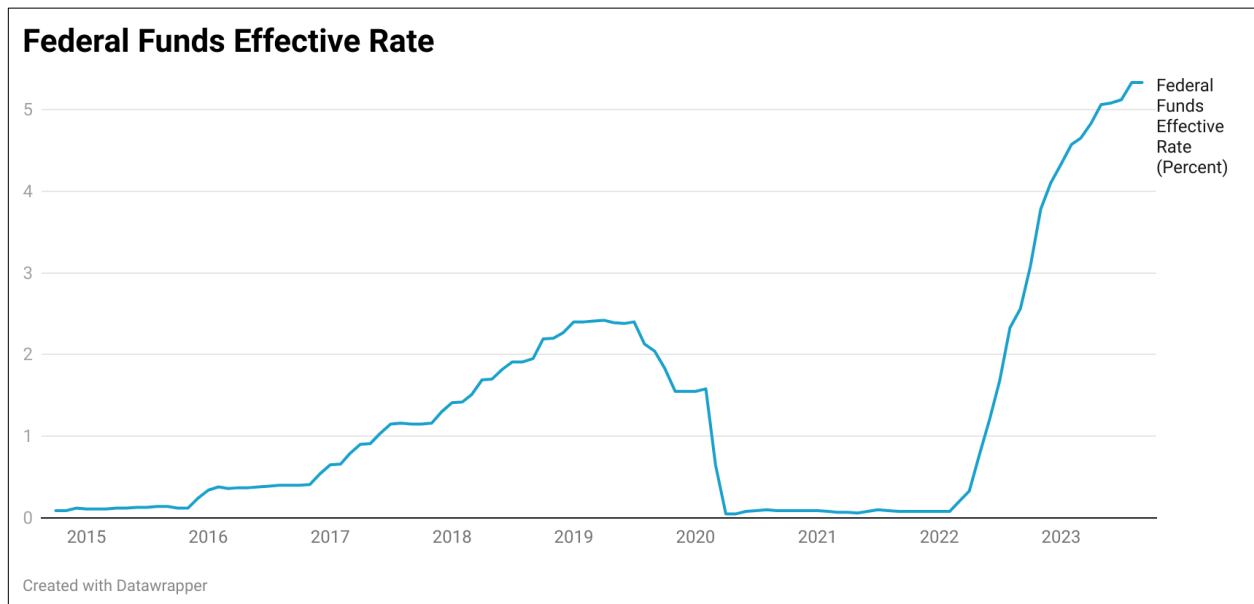
lending. However, American banks tightened lending standards at a greater rate than observed in other countries. This created even greater excess deposits than observed internationally. The investing of these excess deposits created an important seed that led to the financial instability in America's banking system in the spring of 2023.

### **Monetary Policy and Bank Regulation: Increasingly Conflicting**

America's banks were awash in deposits during Covid, substantially driven by Covid-related fiscal policy. Lending opportunity declined during the pandemic, an expected outcome given the recession and rising uncertainty (Buch, Buchholz, and Tonzer 2015; Raunig, Scharler, and Sindermann 2017). The result was that banks needed to put their deposits in something. The Federal Reserve had cut rates to near zero, so parking excess reserves at the Fed would not be profitable. Investing excess deposits into securities became the option.

At the time in 2020, interest rates were low. They remained low through the end of 2021 when inflation began to accelerate in the United States and globally. The Federal Reserve began a historically fast cycle of interest rate tightening in 2022. As seen in figure 11, beginning March 2022 the Fed raised interest rates by over 500 basis points as figure 11 shows. By September 2023 interest rates were the highest they had been in over 20 years.

*Figure 11 Federal funds effective rate*

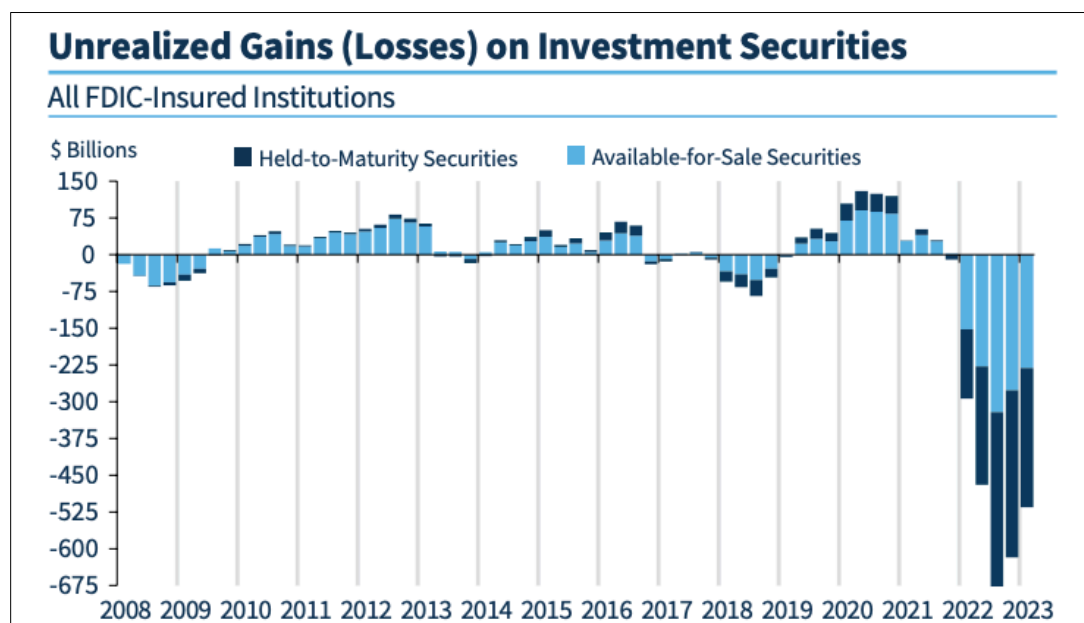


*Adapted from: (FRB 2023b).*

Banks purchased a substantial amount of assets during the immediate Covid era. These assets were purchased during periods of very low interest rates, given the sharp reduction in interest rates by central banks globally during the crisis. Further, the flight to safety pushed down interest rates on US Treasuries and agency debt that is perceived by the market to have varying levels of government support, aka agency debt issued by the US government-sponsored mortgage market.

Bank regulation, largely re-written post-financial crisis, places differing capital weights on different types of assets banks hold on their balance sheet. Risk-weighted capital requirements influence which assets banks hold (BPI Staff 2023). In addition, banks may choose to maximize safer assets for their own purposes to reduce risk. The main sources of risk in debt purchase are credit and interest rate. Banks devote substantial resources to analyzing credit risk in their lending business. That should provide an economy of scope in terms of risk analysis on holding debt originated by others. It may also incentivize a bank to hold lower risk third party originated assets so that it can concentrate credit risk on loans it originates, which again should be a bank's comparative advantage. As seen in figure 12, the result was massive purchases by banks of US Treasuries and agency debt. This debt was purchased yielding historically low interest rates. Thus, while the credit risk of this debt was minimal, the interest rate risk was substantial. As soon as the Federal Reserve raised interest rates, the value of these assets would begin to fall. The quicker interest rates rose, the sharper the decline in asset value.

*Figure 12 Unrealized Gains (Losses) on Investment Securities.*



*Note: Insured Call Report filers only. Unrealized losses on securities reflects the difference between the market value as of quarter end and the book value of non-equity securities. This calculation does not account for any unrealized gains or losses in "accumulated other comprehensive income" because they cannot be derived from Call Reports for the industry.*

*Source: (Federal Deposit Insurance Corporation 2023b).*

The predictable result of the Fed's interest rate tightening was massive losses by banks on assets they had purchased with their excess deposits. Figure 12 shows losses of over \$600 billion on these assets. Note that these losses occurred at rates not seen since the great financial crisis, precisely because of the magnitude and speed of the Federal Reserve's movement of interest rates.

The FDIC chart above is color-coded between the two accounting types of security assets a bank holds: held to maturity and available for sale. The sale of any asset that has been elected as held-

to-maturity triggers an immediate re-accounting for the value of all assets in that category. This re-accounting would require the bank to mark to market the value of the entire held-to-maturity portfolio, bringing forward any embedded losses and draining earnings and regulatory capital. As consequence, banks are further incentivized to hold assets they initially elected as held-to-maturity, even as their value falls, lest the entire pool be re-accounted for.

Banks disclose the value of both of these aspects of their balance sheet. While the bank does not necessarily directly disclose the change in mark to market valuation of the assets, it can be easy to deduce the timing of the purchase of these assets and impute their value. For example, figures 13 and 14 below are Silicon Valley Bank’s regulatory filing on their agency debt (mortgage-backed securities by FNMA, FHLC, and GNMA) in its December 31 filing from 2019 (figure 13) and 2022 (figure 14). At the end of 2019, the bank had just over \$11 million in these assets (row 13a) split roughly \$7 million to \$4 million between held to maturity and available to sale. After the pandemic, by December 2022 that amount had risen by more than 600% to over \$64 million with over 95% of the increase having been designated as held-to-maturity. <sup>2</sup>

*Figure 11 Selected balance sheet items of Silicon Valley Bank as reported to regulators in 2019*

Dollar amounts in thousands		(Column A) Amortized Cost of Held-to-Maturity Securities		(Column B) Fair Value of Available-for-Sale Securities	
10. U.S. Treasury securities.....		RCON0211	0	RCON1287	6,778,868
11. U.S. Government agency obligations (exclude mortgage-backed securities).....		RCON8492	518,728	RCON8495	99,547
12. Securities issued by states and political subdivisions in the U.S.....		RCON8496	1,785,951	RCON8499	0
13. Mortgage-backed securities (MBS):					
a. Mortgage pass-through securities:					
1. Issued or guaranteed by FNMA, FHLMC, or GNMA.....		RCONG389	6,992,008	RCONG390	4,148,791
2. Other mortgage pass-through securities.....		RCON1709	0	RCON1713	0
b. Other mortgage-backed securities (include CMOs, REMICs, and stripped MBS):					
1. Issued or guaranteed by U.S. Government agencies or sponsored agencies <sup>1</sup> .....		RCONG393	4,546,259	RCONG394	2,863,532
2. All other mortgage-backed securities.....		RCON1733	0	RCON1736	0
14. Other domestic debt securities (include domestic structured financial products and domestic asset-backed securities).....		RCONG397	0	RCONG398	0
15. Other foreign debt securities (include foreign structured financial products and foreign asset-backed securities).....		RCONG399	0	RCONG400	0
16. Investments in mutual funds and other equity securities with readily determinable fair values <sup>2</sup> .....				RCONA511	NR
17. Total held-to-maturity and available-for-sale securities (sum of items 10 through 16).....		RCON1754	13,842,946	RCON1773	13,890,738

Source: (Silicon Valley Bank 2019)

<sup>2</sup> A careful reader of the charts will see a similar increase in over 6x in held to maturity securities issues by states and local governments (row 12) and a rough doubling of holdings of US Treasuries. Treasuries are held as available to sale column for SVB, an important distinction as that changed their accounting treatment. It also fights against the narrative that it was purchase of US Treasuries that sank SVB put rather the facts are a much higher concentration in mortgage-backed securities issued by the GSEs.

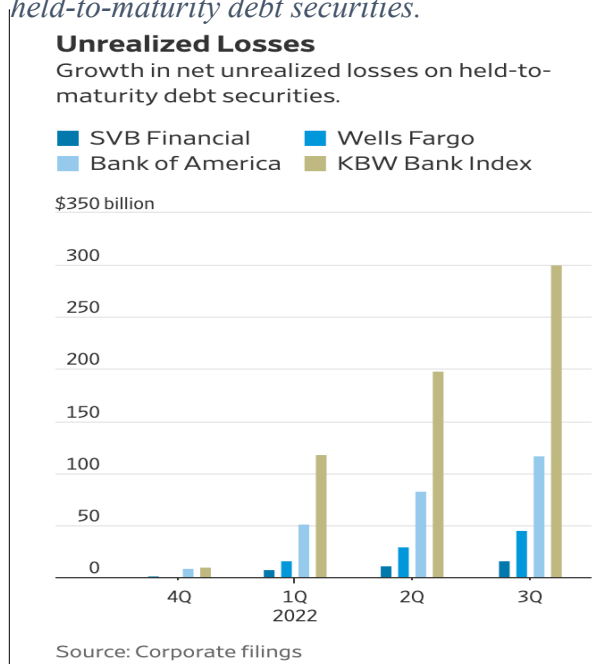
Figure 12. Selected balance sheet items of Silicon Valley Bank as reported to regulators in 2022

Dollar amounts in thousands	(Column A) Amortized Cost of Held-to-Maturity Securities		(Column B) Fair Value of Available-for-Sale Securities		
10. U.S. Treasury securities.....	RCON0211	0	RCON1287	13,130,000	10.
11. U.S. Government agency obligations (exclude mortgage-backed securities).....	RCON8492	486,000	RCON8495	101,000	11.
12. Securities issued by states and political subdivisions in the U.S.....	RCON8496	7,417,000	RCON8499	0	12.
13. Mortgage-backed securities (MBS):					13.
a. Mortgage pass-through securities:					13.a.
1. Issued or guaranteed by FNMA, FHLMC, or GNMA.....	RCONG389	57,705,000	RCONG390	6,603,000	13.a.1.
2. Other mortgage pass-through securities.....	RCON1709	0	RCON1713	0	13.a.2.
b. Other mortgage-backed securities (include CMOs, REMICs, and stripped MBS):					13.b.
1. Issued or guaranteed by U.S. Government agencies or sponsored agencies <sup>1</sup> .....	RCONG393	25,011,000	RCONG394	2,141,000	13.b.1.
2. All other mortgage-backed securities.....	RCON1733	0	RCON1736	0	13.b.2.
14. Other domestic debt securities (include domestic structured financial products and domestic asset-backed securities).....	RCONG397	708,000	RCONG398	0	14.
15. Other foreign debt securities (include foreign structured financial products and foreign asset-backed securities).....	RCONG399	0	RCONG400	0	15.
16. Not applicable.					16.
17. Total held-to-maturity and available-for-sale debt securities (sum of items 10 through 15).....	RCON1754	91,327,000	RCON1773	21,975,000	17.

Source: (Silicon Valley Bank 2022)

At this point, assets purchased over that time span had lost significant value on a mark to market basis. The chart below from a *Wall Street Journal* in November 2022 article captures the losses accumulating in real-time. Note that SVB was highlighted, along with two much larger globally significant banks, well before SVB bank entered the market crisis (Weil 2022).

Figure 13 Growth in net unrealized losses on held-to-maturity debt securities.



Source: (Weil 2022)

Bank regulation meant to reduce risk in the banking sector, in combination with monetary policy meant to fight inflation, led banks to purchase huge amounts of interest-rate-exposed assets which plummeted in value once the Fed raised rates. This illustrates the potential incompatibility of two of the Fed’s responsibilities: regulating banks and conducting monetary

In a separate article that reads almost prophetic, the WSJ highlighted the disconnect between equity markets’ view of SVB’s health and the underlying financial health of the bank: “The stock market’s failure to anticipate SVB’s results highlights the enduring confusion about how banks and their clients will react to the Fed’s supsize rate moves.... The turbulence in SVB’s stock may be a harbinger of what is to come for banks when those increases cause unexpected twists” (Benoit 2022). The article’s subheader accurately focused on the two largest banks that would fail less than six months later: “Lending profits are under pressure at niche firms like Silicon Valley Bank and First Republic.”

policy. A closer look at the Federal Reserve's role as the primary regulator of SVB further demonstrates this contradiction.

### **Federal Reserve's Failure of Oversight and SVB's Failure of Management**

The Federal Reserve was SVB's primary federal regulator due to SVB's status as a state-chartered member bank. The Federal Reserve Bank of San Francisco carried out that regulatory role for much of this period. The Federal Reserve had multiple points of regulatory failure through this period. Problems include classic examples of regulatory neglect, misunderstanding of risk, and the failure of the regulator to take more forceful action quickly. Another set of problems relates to the structural relationship between SVB and the Federal Reserve.

Before examining the Federal Reserve's role in SVB's failure, it is important to start with the entity most responsible: SVB itself. The main reason for this bank's failure, like most bank failures is poor management. The purpose of regulation is not to prevent bank failure; America's economic system is designed to allow banks to fail. The opposite would be the creation of thousands of perpetuities of banks guaranteed to survive regardless of the consequences of their economic actions. That is hardly capitalism.

The regulator's goal then is not to prevent failure. The regulator's goal is to make failure unlikely through prudent rules, regulation, and timely supervision to highlight problems at the bank before they metastasize and threaten the viability of the bank. If the bank's management makes bad judgements, violates the rules, and/or ignores the supervisory actions to the point that it fails, then the regulator must ensure that the failure of that institution does not jeopardize the stability of the broader financial system.

Thus, it is entirely consistent to acknowledge that the fault lies with SVB's management while also admitting that the Federal Reserve made significant errors. These errors failed to prevent SVB's collapse and the systemic consequences that caused the regulators to invoke financial stability exceptions and bail out creditors. The Fed's first paragraph of its SVB report does just this: "Silicon Valley Bank (SVB) failed because of a textbook case of mismanagement by the bank. Its senior leadership failed to manage basic interest rate and liquidity risk. Its board of directors failed to oversee senior leadership and hold them accountable. And Federal Reserve supervisors failed to take forceful enough action, as detailed in the report" (Barr 2023, 1).

#### *Regulatory neglect and misunderstanding of risk: Stress Tests Fail*

Banks across the board and SVB acutely accumulated large interest rate risks as a result of purchasing low interest rate, low credit risk assets. Banks pursued this strategy in a manner that was approved by the Federal Reserve and other regulators. The Fed has developed a series of stress tests designed to ensure that banks were not individually or in a correlated fashion developing vulnerability to a shock. The Fed states its stress tests "are intended to capture how firms' net income and other components of regulatory capital would be affected by the macroeconomic and financial conditions" under different scenarios (FRB 2023e, 3). These scenarios are designed by Federal Reserve staff, and while specifics are confidential, broader trends can be understood.



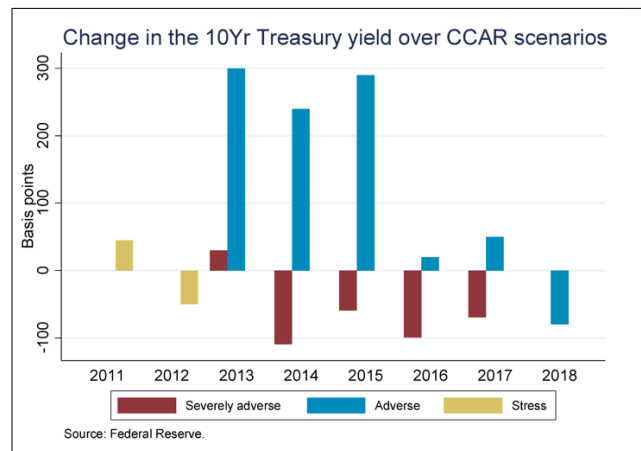
Two types of stresses can occur: those that can be reasonably foreseen and those that cannot. The Covid pandemic is one that would be difficult to have foreseen. As former Fed Governor Tarullo, who was deeply involved with the creation of stress testing, put it: “Precisely because a severely adverse scenario arising from the COVID shock was so different from the 2008-2009 shock, neither the Fed nor the banks had systematically worked through the implications for bank balance sheets” (Tarullo 2023). Having been unable to reasonably predict the macroeconomic consequences of the Covid pandemic, stress tests were unlikely to model such a scenario. Tarullo, in his June 2020 paper, drew the conclusion that stress tests were declining in value, stating, “the annual stress test had already shown signs of ossification... the world of stress testing has been turned upside down. Instead of a dynamic annual stress test, we have increasingly predictable compliance exercises. Instead of building on the 2009 SCAP and using stress testing to estimate the losses that could ensue from an extended COVID crisis, a stale scenario is used to allow banks to continue paying dividends. Instead of transparency around meaningful stress test results, the public has only aggregate numbers from a sensitivity analysis whose influence on bank capital policies remains unclear.”

Some drew the opposite conclusion, that the short-lived success of banks during the Covid pandemic serves as an example of the success of stress testing. A March 2021 paper from researchers at the Federal Reserve entitled *COVID-19 as a Stress Test: Assessing the Bank Regulatory Framework* concluded: “The overall robust capital and liquidity levels resulted in a resilient banking system, which maintained lending through the early stages of the pandemic” (Wix et al. 2021, 2). Almost exactly two years later, this optimism proved deeply misplaced and Tarullo’s concern proved correct.

The second type of scenario, that which can be foreseen should be simpler. Interest rate risk is foreseeable. The Federal Reserve devotes considerable resources to understanding the impact of interest rates on the broader economy and the banking system. To some extent, the Fed controls market interest rates through its conduct of monetary policy. The Fed also controls, to some extent, the incentive for banks, particularly larger systemically important banks, to hold assets that have credit or interest rate risk. Changes to bank capital models alter economic incentives to hold assets of different risk nature. The Fed’s Stress Test is one of the most important such models (Baer 2018).

The Federal Reserve’s stress tests left banks vulnerable to a rising interest rate environment according to a 2018 article written by former Federal Reserve then Bank Policy Institute economists Nelson and Covas (2018). They found that: “For the past four years, with the exception of CCAR 2018, the Fed’s annual stress tests have been based on the assumption that long-term interest rates will fall, not rise. While banks are currently extraordinarily safe, with capital and liquidity levels at record highs, it is hard to see how banks could not have responded to the incentives created by the Fed’s stress tests by protecting themselves from rising rates by less than they would have otherwise.” Figure 16 shows the interest rate assumptions in the CCAR tests which stop examining the possibility of a sharp rise in rates in 2015 (note even before then they did not contemplate the magnitude of rate hikes the Fed itself undertook in 2022-2023).

**Figure 14** Change in 10-Yr treasury yield over CCAR scenarios.



Source: (Nelson and Covas 2018)

The Fed’s stress tests thus drove banks to a certain type of asset. As Nelson and Covas state, “the more the Fed cranks up the severity of the scenario to make it produce acceptable levels of stress even as banks adjust to pass the previous year’s test, the stronger are the incentives driving the banks to choose portfolios correlated to do well in that specific set of conditions, portfolios without loans to small businesses or loans to middle class households, but with an abundance of longer-term fixed-rate securities.”

Long-term fixed-rate securities were exactly what banks invested in. These securities then lost value as interest rates rose. This decline

hollowed out bank capital, creating the conditions by which banks were vulnerable to runs. As former FDIC Chair Bair pointed out in 2023, “Unfortunately, the Federal Reserve’s recently completed “stress tests” gave high grades to banks for passing exams that fail to prepare them for the biggest risk that likely awaits them: a prolonged period of high and rising interest rates... The assumptions within the Fed’s stress tests do not assess banks’ ability to withstand these very real challenges. Instead, the tests make those challenges magically go away by assuming that interest rates will return to zero fairly quickly if there is an economic downturn” (Bair 2023).

The inefficacy of these stress tests and capital allocation can cause bank failures regardless of the liquid nature of these assets. Much has been written on liquidity as a cause of bank runs (e.g., Diamond and Rajan 2005; Williamson 1998). However, when highly liquid assets lose value, this can lead to rapid loss of capital and also cause a bank to fail. The Federal Reserve correctly determined that “While the proximate cause of SVB’s failure was a liquidity run, the underlying issue was concern about its solvency” (Barr 2023, 2).

One recent paper analyzing the 2023 banking crisis created a model that “illustrates that interest rate increases can lead to self-fulfilling solvency bank runs even when banks’ assets are fully liquid. The model identifies banks with asset losses, low capital, and critically, high uninsured leverage as being most fragile” (Jiang et al. 2023, 1). This model presented troubling broader results: “Even if only half of uninsured depositors had decided to withdraw, almost 190 banks with assets of \$300 billion are at a potential risk of insolvency, meaning that the mark to market value of their remaining assets after these withdrawals would be insufficient to repay all insured deposits” (4). More recent concerns have risen after Bank of America acknowledged over \$100 billion of losses on its asset portfolio in October 2023 (Gandel 2023). This begs the question: Were the March 2023 problems a precursor to a bigger quake to follow?

## *Regulatory neglect and delay*

A second issue has to do with the Fed's failure to act in a quick or forceful manner when problems were recognized. This criticism falls under bank supervision more than regulation. The Fed acknowledges it failed as a supervisor of SVB stating, "supervisors did not fully appreciate the extent of the bank's vulnerabilities, or take sufficient steps to ensure that the bank fixed its problems quickly enough" (Barr 2023, 2). The Fed argues that part of its failure as supervisor was due to a different approach put in place as a result of a combination of legal and personnel changes enacted during the Trump Administration. This includes both legal changes enacted in 2018 and regulatory rollbacks instituted by Vice Chairman Randall Quarles, who was appointed by President Trump. It is worth noting this critique came from a report authored by Fed Vice Chairman for Bank Supervision Michael Barr, who helped lead the drafting of the Dodd-Frank Act under President Obama and was then appointed to the Fed under President Biden.

One aspect this critique of supervision highlights is that supervisory standards change over time and those changes are correlated and caused by differences in politically appointed personnel. Elections have consequences, and while the Fed as an institution has independence from the executive branch, the Fed is not immune from politics or political change. Presidents and Congresses that pursue increased levels of regulation will lead to greater regulation and tighter supervision. Presidents and Congresses that pursue deregulation will result in the opposite effect. Some have described this as a pendulum, although that somewhat assumes both a fixed and "correct" center that policy wobbles around (Peretie 2011).

The Fed's supervisory weakness had another element: its structure. Supervision of banks at the Fed is split between Washington and the Regional Banks as described earlier. The Fed uses a size threshold of \$100 billion after which a bank changes categorization from Regional Bank (RBO) to Large or Foreign Bank (LFBO). Although both are supervised by the Regional Federal Reserve: "LFBO supervision is also delegated to the Reserve Banks but with greater Board staff involvement on substantive topics than in RBO supervision" (FRB 2023c, 30). According to the Fed, SVB crossed that threshold in February 2021, and that transition between groups created problems: "Staff describe a sharp shift and "cliff effect" as SVB Financial Group rapidly went from RBO supervision to LFBO supervision, requiring building of a new supervisory team, implementation of horizontal examination processes, establishment of more intense continuous monitoring routines, and phasing in of EPS [(Earnings per Share)]" (35).

The Fed acknowledges its internal processes were too slow to recognize problems from SVB, too bifurcated between San Francisco and Washington, and dominated by a supervisory culture that was too timid. The Fed's own report does not discuss the conflict of interest between SVB's CEO and the SF Federal Reserve, but its inspector general does which is the subject of the next section of this paper.

## *Structural*

Federal Reserve regional banks have nine member boards of directors, which include three bankers who are members of that regional bank. Those bankers serve multi-year terms. Having bankers on the board of their regulators is a legal requirement and a clear conflict (Government

Accountability Office [GAO] 2011). Congress has failed to remedy this problem, taking only a minor step in the Dodd-Frank Act of removing the banker board members from a voting role in selecting the President of the bank (GAO 2011, 10). This conflict of interest was apparent in SVB's regulatory treatment.

SVB's CEO was a member of the SF Fed's Board of Directors. The Federal Reserve's inspector general in its material review of SVB's failure noted this "created an appearance of a conflict of interest for the [Federal Reserve] System" (Office of Inspector General 2023b, 46). At one point during SVB's problems, the SF Fed considered removing the CEO from this position but was concerned that doing so would "reveal confidential supervisory information and potentially signaling to the market the bank's declining condition" (46).

The SF Fed concluded internally that it could not remove a bank's CEO from its board during a period of stress at that bank because doing so would signal to the market the bank's problematic health. This logic means that once a banker is appointed to a Fed bank board, the Fed is unable to remove the banker when the bank has problems. This exacerbates the appearance of a conflict, as a bank CEO's board role signals sound management of the bank to markets.

The Federal Reserve has supported the status quo with Federal Reserve officials arguing to keep bankers on their boards. Former Kansas City Federal Reserve President George argues that these bankers provide value in setting monetary policy: "Bankers provide valuable banking expertise regarding credit conditions, the payments system and the local economy, and I strongly defend the role of bankers as Reserve Bank directors" (George 2023).

Federal Reserve Bank Presidents who vote on monetary policy rely on anecdotal insights from their board members, particularly their bank board members. This belief is also held by the bank CEOs who serve on these boards as St. Louis Federal Reserve Board Member and Planters Bank CEO McCoy states, "we are in a position to influence how the Federal Reserve feels about local economies and especially about rural America, and I think it's invaluable to the Fed as they try to develop monetary policy" (Smith 2021).

Bank CEOs serving on Fed Regional Bank Boards also create conflicts of interest in regulation. This is in both appearance to the market and in terms of the inability to remove such a director even when the bank is troubled. The Fed's preference for bankers to stay relates to the banker's input through the Regional Bank Presidents for their conduct of monetary policy. This is an example of the conflict between the monetary policy function and the bank regulatory function of the Federal Reserve.

A policy recommendation from this conflict is simple: remove bank CEOs from Federal Reserve Regional Bank Boards. This requires an act of Congress, which has been proposed by Sen. Sanders (I-VT) (Sanders 2023). However, according to the Fed's defense of the status quo, this would result in lower quality conduct of monetary policy. If this is correct, then the banker CEOs selected must be adding value to the FOMC which results in a different course of action than it would have taken without their position as Regional Bank board members. That means that monetary policy is influenced by the bankers selected as Class A directors, giving those bankers

an outsized voice in the conduct of monetary policy. If the bankers do not meaningfully impact monetary policy, then the Fed's prior argument is logically false.

### **Additional Factors that Contributed (or not) to Bank Instability**

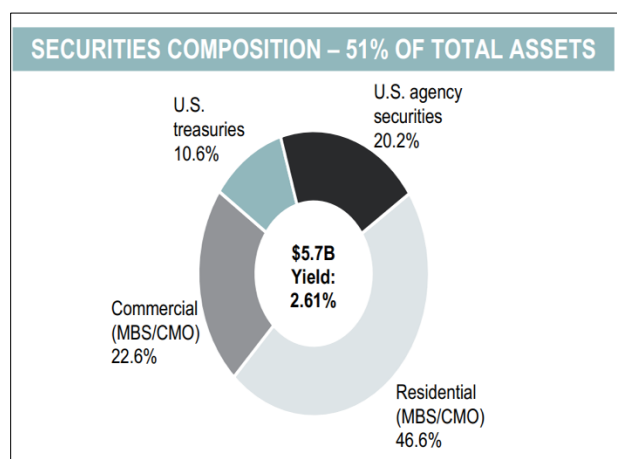
This paper's hypothesis is centered around the role the Federal Reserve played in its capacity as a central bank that contributed to the banking failures America experienced in the spring of 2023. However, activities beyond the Fed's role played a meaningful role and deserve exploration. This paper considers three possible additional factors: crypto, changes in payment technology, and social media. It finds that crypto played a meaningful role in several of the bank failures, while payment technology and social media did not.

#### *Crypto: Unique But Important Role*

Many of the banks that failed in the United States in spring 2022 were exposed to crypto-currency and that exposure played a meaningful role in their failure. Four banks failed during this time period, the first of which was Silvergate Bank. Silvergate's failure did not result in the invocation of special systemic risk exemptions nor were significant portions of the bank sold to other banks as was the case with the other three. Silvergate self-liquidated, a relatively rare method of failure resolution (Silvergate Capital Corporation 2023a). Silvergate was heavily exposed to crypto-currency, particularly FTX: as FDIC Chairman Gruenberg stated, Silvergate's "business model focused almost exclusively on providing services to digital asset firms" (Gruenberg 2023a, 5). Focusing on crypto clients is a theme common between both Silvergate and Signature Bank (Gruenberg 2023a, 9). While both banks shared significant crypto business models, Signature Bank was much larger and crypto was a significantly smaller proportion of Signature's customer base (Tierno 2023, 1).

Silvergate experienced a sharp outflow in deposits as crypto crashed in the wake of FTX's collapse toward the end of 2022. This caused the bank to have to sell securities that had lost value as a result of rising interest rates (Silvergate Capital Corporation 2023b). The securities were 70 percent residential and commercial mortgage-backed securities that were either directly issued by the US government or were issued by government-sponsored enterprises (GSEs) Silvergate Capital Corporation 2023b, 6). As of the end of 2022, these assets were earning a combined 2.6% as shown in Figure 17 from Silvergate's 4<sup>th</sup> quarter 2022 earnings. By that point, the Federal Reserve's Fed funds effective rate was already 4.33% with expectations in the market (supported by Federal Reserve statements) that it would continue to rise (FRB 2023b).

Figure 15 Silvergate's assets end of 2022.



Source: (Silvergate Bank 2023b)

Silvergate's announcement on March 8, played a meaningful role in sparking the contagion that resulted in Silicon Valley Bank's failure two days later (Gruenberg 2023a). Signature Bank in New York had substantial exposure to crypto. Signature Bank's failure, the same weekend as SVB's, played a substantial role in financial regulators invoking systemic risk authority to conduct broad based bailouts of uninsured depositors at both institutions (Gruenberg 2023b).

In examining the cause of the failure of Signature Bank, the FDIC concluded that it

“failed to understand the risk of its association with and reliance on crypto industry deposits or its vulnerability to contagion from crypto industry turmoil that occurred in late 2022 and into 2023” (Federal Deposit Insurance Corporation 2023a, 2). Signature developed a digital payment platform, Signet, which it “touted as the first to market for an FDIC-insured bank [to enable its] clients to settle US dollar payments globally 24 hours a day/7 days a week/365 days a year within the bank” (13). The FDIC's report found Signature had significant exposure to FTX, Alameda, and Silvergate Bank whose own crypto problems caused its demise. These connections were broadly known in the market with media, as one CNBC article described Signature and Silvergate as “the two main banks for crypto companies” (Sigalos 2023). As Allen finds “while most banks have eschewed crypto business, Signature Bank and Silvergate... had aggressively pursued business models based on providing banking services to crypto businesses” (Allen 2023). As banking turmoil mounted with SVB's and Silvergate's earlier failure and Signature's known exposure, depositors fled, and Signature quickly failed.

Exposure to crypto played a direct and meaningful role in the failures of Signature and Silvergate banks. Signature being the first failure and Silvergate's failure creating something of a tipping point for extraordinary government intervention, including bailing out uninsured depositors, lay a strong predicate for crypto playing a meaningful role in creating the turmoil in the American banking sector experienced this spring. Further, the only bank to fail since the spring, a small bank in Kansas, appears to have failed due to ownership falling for a cryptocurrency scam (Bloomberg 2023; American Banker 2023).

Cryptocurrency regulation is not part of the Federal Reserve's mandate and is contradictory evidence to the core thesis of this paper. One could view cryptocurrency as a more traditional source of financial instability, that of a new asset whose value is not well understood. Despite substantial appreciation since its launch in 2008, crypto valuations have fluctuated widely, with long periods of bear markets, and some well-known failures of specific cryptocurrencies (FTT, Terra Luna, etc.). Financial crises require both asset valuation uncertainty and leverage (Klein 2022). That the banking system would have some level of exposure to crypto is predictable despite attempts by regulators to safeguard the system. As the Financial Stability Oversight Council concluded: “The Council finds that crypto-asset activities could pose risks to the

stability of the U.S. financial system if their interconnections with the traditional financial system or their overall scale were to grow without being paired with appropriate regulation, including enforcement of the existing regulatory structure.” (FSOC 2022, 11).

However, an alternative analysis attempts to link crypto speculation not to the emergence of a new asset such as internet presence or social media followers, but rather as an attempt by capital to chase yield in a structurally low interest rate environment. Allen, a well-known crypto skeptic, goes further than simply blaming exposure to crypto as the cause for these bank failures (Allen 2022). She argues crypto exposure was a symptom of a larger phenomenon driven by low interest rates. Her central argument is that “when policy makers respond to financial crises with prolonged periods of low interest rates, that can sow the seeds for the next round of financial instability – and those seeds may sprout in unexpected ways” (Allen, 33). In this context, crypto is an example of the unexpected sprout of venture capital firms and other investors searching for higher yields as a result of prolonged periods of low interest rates stemming from the 2007/2008 global financial crisis. Thus, the magnitude of the crypto frenzy (she would argue bubble that will burst) is not completely an endogenous event, but rather related to the conduct of monetary policy by the central bank.

### *The False Narratives: Payment Speed and Social Media*

The speed at which the spring banking failures occurred has been ascribed by some to changes in payment speed and by others to social media (Lopatto 2023; FRB 2023c, 4, 15, 24). Attributing these changes to these external factors obviates the central bank from fault of poor judgement of poor supervision or the consequences of monetary or other regulatory policy. Incorrectly identifying the cause leads to policy solutions that are likely to fail to correct the problem.

Both of these arguments, faster movement of money and faster spread of information on social media, start with the argument that banks failed faster in 2023 than in the past. Figure 18 shows the share of outflow from the recent bank failures was similar to those in the past, while the share of deposits that were covered by insurance was also similar to Continental Illinois<sup>3</sup>. However, what was different was the speed of outflows, with depositors withdrawing their money more quickly. This speed of outflow change is made to argue that bank failures are faster because of technology (Cookson et al. 2023; Sweet and Chloe 2023; Neuman 2023; Welburn 2023).

---

<sup>3</sup> Continental Illinois failure in 1984 gave rise to the term ‘too big to fail’ and is considered a benchmark in American bank failures for multiple reasons (Nurisso and Prescott 2017). One reason is that Continental was an early adopter of electronic banking and in fact did network its depositors and funds using the newly available computing power (see Rose 2023 for more). Given that it is nearly 40 years since Continental’s failure and the widespread adoption of computing did change the way money moved, the analysis uses that as a benchmark.

*Figure 16 Selected Deposit Runs from 1984 to 2023*

Selected Deposit Runs from 1984 to 2023				
Bank	Date run started	Deposit insurance coverage (%)	Total outflow (%)	Duration of outflow
Continental Illinois	May 7, 1984	15	30	10 days (7 bus. days)
Washington Mutual	Sep. 8, 2008	74	10.1	16 days (12 bus. days)
Wachovia	Sep. 15, 2008	61	4.4	19 days (15 bus. days)
Silvergate	2022 Q4	11	52	Possibly 7 days or less
Silicon Valley Bank	Mar. 9, 2023	6	25 + 62*	1 day + expected next day
Signature Bank	Mar. 10, 2023	10	20 + 9*	1 day + expected next day
First Republic	Mar. 10, 2023	32	57	About 7-14 days (5-10 bus. days)

Note: \*Figures with asterisks are the expected amount of outflows that were scheduled to go out the next business day, but did not actually occur because the banks were closed.

Source: (Rose 2023)

However, careful analysis shows that the speed at which money actually moves out of banks is not faster today than it was in 2007/8 or even for Continental Illinois. Bank outflows are typically handled by bank payment networks (e.g. ACH, FedWire, etc...) which have remained batch systems operating only on working days. While technology has allowed retail depositors the ability to initiate deposit movements from their homes or phones, retail depositors were not the ones moving funds. Furthermore, the United States, unlike much of the rest of the world has not adopted faster or real-time payments for consumers (Klein 2023a). The Federal Reserve's faster FedNow payment system was not operational in March 2023 (it came online later in July). Nor had the Fed used its regulatory authority to force banks to move customer funds quickly, despite the legal authority to do so (Klein 2018a). Simply put money did not move out faster because the speed at which money moves between banks in the United States has remained largely constant.

The real question is whose money is moving: the answer is predominantly large depositors. As the chart shows, 94 percent of SVB's depositors had accounts greater than \$250,000. The top 10 depositors at SVB had over \$13 billion in depositors (Gruenber 2023a, 13). Silvergate and Signature similarly were focused on institutional, corporate, and in many cases crypto-related clients. These banks did not have retail footprints the way that true regional banks that failed in the 2008 crisis such as Washington Mutual or Wachovia had. Only First Republic had a somewhat larger retail deposit core, although their business model was more skewed toward wealthier individuals. However, First Republic limped along in terms of its depositors sticking. The chart shows a similar time horizon for First Republic to prior bank failures.

As the Federal Reserve Bank of Chicago's Jonathan Rose concluded: "There is little indication that depositors waited several days in 1984 or 2008 to make withdrawals because of technological limitations... technological changes since the 1970s appear capable of speeding up withdrawals for smaller uninsured depositors by a matter of hours or a day or two. But it is difficult to view depositors in 1984 or 2008 as delayed by several days by the technology of the time" (Rose 2023, 3).

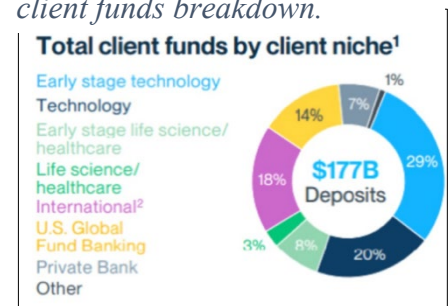
The bank failures were the first systemic tremor to the banking system during the age of social media. Social media did light up around bank failures. One paper quickly produced after the



bank failures in April 2023 went so far as to try to ascribe a more causal relationship arguing that: “negative sentiment tweets in the run period translate into immediate stock market losses” for these banks, speculating that social media played a meaningful role in these bank failures (Cookson et al. 2023). This analysis is flawed for several reasons.

The logic behind social media playing a role is “that greater exposure to social media increases communication during the run, which amplifies bank run risk by increasing” depositor’s willingness to pull their money, aka depositor run (Cookson 2023). This stated model logic is that depositors’ expectations of bank health influence their behavior, which is a logical starting part. However, in the case of SVB, we are not dealing with a random sample of depositors. SVB’s depositors were 94 percent uninsured and heavily corporate. The 10 largest controlled \$13 billion in deposits, with the largest identified as Circle, a stablecoin currency. Figure 19 is a look at how SVB identified its depositors in 2022 Q3 (SVB 2022).

**Figure 17** Silicon Valley Bank client funds breakdown.



Source: (SVB 2022)

Analysis of SVB’s depositor bases show it to be heavily corporate, with a skew toward technology and start-up companies, which makes sense given its location and business model. Around 50 percent of US venture-backed tech and life science companies were depositors at SVB (Baker 2023). Specific companies BILL Holdings (financial services technology) at \$670 million, Roku at \$487 million, ZoomInfo at \$284million, Roblox at \$149 million, Vit Biotechnology at \$220 million, Oak Street Health at \$106 million, and many more corporations (Gilbert 2023).

The logic behind the model states that corporate treasurers make decisions on the basis of changing their company’s bank account on the basis of tweets. This social media argument is not based on specific Tweets by leading authorities, but rather on total Twitter traffic. They claim that “The severity of bank runs increases markedly when banks are in a Twitter conversation” without regard to who is engaged in the conversation. Estimates are that five to 15 percent of Twitter accounts are not people but rather bots (Dang, Paul, and Chmielewski 2022). Further, since Musk’s takeover of Twitter, the verification process for factual information has fallen. The logic behind this paper is not that retail investors get nervous because of what they see on social media and pull their money. The logic is that sophisticated corporate treasurers of large, often multi-billion businesses, change their bank on the basis of the quantity of tweets and the conversation occurring between people on Twitter, regardless of their validation or reputation.

Who were corporate treasurers listening to? Venture capitalists who often had equity stakes in their companies. Gary Tan, president of Y combinator, the large Silicon Valley VC firm posted this message to companies they invested in: “We have no specific knowledge of what’s happening at SVB. But anytime you hear problems of solvency in any bank, and it can be deemed credible, you should take it seriously and prioritize the interests of your startup by not exposing yourself to more than \$250K of exposure there. As always, your startup dies when you run out of money for whatever reason” (Weil and Eisen 2023).

Tan was hardly alone and SVB management took the threat of VC calls for companies to pull deposits so seriously that SVB CEO Becker held a video call on March 9 with VCs and SVB

depositors urging them to keep their money (Baker 2023). That call did not work as depositors pulled over \$40 billion and the bank failed the next day.

The question then is what is more likely: that corporate treasurers listened to their VC investors and were not assured by personal interaction with the banks' CEO; or that they were monitoring unverified Twitter accounts and moved by Twitter sentiment from strangers?

This flaw ought to be enough to question the paper's claims of causality. However, the paper goes further to try to relate bank equity price as an indication of bank health and then equity price to Twitter traffic. As Figure 20 shows, SVB's equity price was trading stably for weeks before its failure. The week of its failure it started in that same range, only falling sharply two days before its failure.

*Figure 18 SVB Financial Group stock price: February-March, 2023.*

The equity price was not a meaningful signal of SVB's solvency. SVB's assets did not change materially over this week. Using SVB's equity price as an indication of the underlying health of the bank would lead an observer to argue the bank was healthy. Instead of falling equity prices causing depositor runs, it is the other way around. Depositor runs caused equity prices to react. Contemporaneous reports argued that "the panic surrounding SVB kicked off Wednesday [March 8], when the company said it would book a \$1.8 billion after-tax loss on the sales of investments and see to raise \$2.245 billion by selling a mix of common and preferred stock" (McCabe 2023). Equity reacting to plans of dilution is a more logical explanation than Twitter traffic.



Source: Google Finance

The equity pattern of SVB is not unique in bank failures. Signature Bank's equity price hovered around \$110 per share from March 1 through 6, falling below 100 only on March 9, two days before its failure (Yahoo! Finance. 2023). Lehman and Bear Sterns equity prices were substantially higher the weeks of their failure. Bank equity price is not a reliable indicator of a bank's potential for sudden failure.

## **Conclusion**

The Federal Reserve was at the epicenter of America's episode of financial instability in March 2023. Banks were awash in deposits as a result of a combination of fiscal and monetary policy during the pandemic. Given troubled lending environments and regulatory rules focused on credit risk, banks invested in low credit risk, long duration, assets, and heavily mortgage-backed agency securities. The Fed's shift to raising interest rates to combat inflation had the predictable impact of devaluing these securities. Losses grew on bank balance sheets, hidden in plain sight to regulators and investors.

The Federal Reserve was in the pole position as bank regulator. Silicon Valley Bank was so closely linked to Fed supervision that its CEO was on the Board of the Regional Federal Reserve which regulated it. SVB's business model screamed a series of risks that should have been caught by basic supervision and regulation: rapid asset growth, overreliance on Federal Home Loan Bank borrowing, declining asset valuation, heavy reliance on uninsured deposits that were highly correlated to venture capital, and poor management. Yet the Fed missed these obvious warning signs and allowed SVB to continue until it was far too late. SVB's demise was rapid, also catching the Fed off guard.

The most immediate, proximate cause of SVB's failure was the failure of Silvergate, another bank under the Federal Reserve's regulatory purview. Silvergate was much smaller than SVB but shared similar bad business practices of over-reliance on uninsured deposits and concentration in depositors in the tech sector. Federal Reserve supervision and regulation was problematic and insufficient in both cases (Jarsulic and Thornton 2023).

In America's fractured regulatory system, it is ironic that the banks whose failure started a crisis so severe regulators judged it a systemic threat to the financial system, the central bank's monetary policy choices would be the mechanism by which the bank's asset quality would degrade. That the Federal Reserve would be unable to detect this vulnerability brings into question the Fed's competence as a bank regulator.

Other countries have split the role of monetary policy and bank regulation. This model is often referred to as "twin peaks" and has been tried in many countries often with successful results (Schmulow 2017). Regardless of the structural model pursued, regulators and supervisors must act with independence and quality judgment. Both were lacking in the oversight of the banks that failed.

The Federal Reserve, like many central banks globally, gained greater authority after the global financial crisis (Calvo et al. 2018). This authority included macro-prudential and micro-prudential tools. As it relates to the March 2023 crisis, the Fed's failure as a micro-prudential regulator and supervisor resulted in its use of macroprudential systemic risk tools designed to bail out and stabilize the broader American financial system.

The modest reforms to the Federal Reserve Regional Bank structure under Dodd-Frank appear to have been insufficient. As the BIS found in its review of regulators across the G-20: "enhanced supervisory effectiveness may require some institutional changes" (Calvo et al. 2018, 3). The conflict of interest in having the SVB CEO on the Board of the SF Fed limited the Fed's response to problems at the institution and gave the appearance (at the least) of greater supervisory and regulatory approval.

Removing all bankers from the Boards of the Regional Federal Reserve Banks is one recommendation that addresses some of the structural problems inherent at the Federal Reserve. It is perhaps the least aggressive change. A more aggressive change would be to move bank regulation out of the Fed to one of the two other main bank regulators (OCC or FDIC). This move is justified based on the Fed's track record as supervisor. Further, such a move could enhance the freedom and flexibility of the Fed to conduct monetary policy.

Monetary policy is the Federal Reserve's top priority, as it should be (Klein 2023b). Every organization can only have one number-one priority. Ancient Greek philosophy called this top priority *telos*, the one north star guiding goal. Adding additional responsibilities and goals to the Federal Reserve requires them to be secondary objectives to the organization's *telos*. This may be OK. Organizations can achieve multiple objectives. Objectives can be complementary, benefit from economies of scope, and even improve each other's understanding.

Bank regulation and monetary policy have the potential to create many benefits through co-existing in a single institution. They also have the potential to be in conflict. The financial instability episode of March 2023 is a clear example of their conflict. To prevent similar failures in the future, reforms of the Federal Reserve System are needed.

## References

- Abel, Andrew B., and Janice C. Eberly. 1994. "A Unified Model of Investment Under Uncertainty." *The American Economic Review* 84 (5): 1369–84. <https://www.jstor.org/stable/2117777>.
- Albright, Amanda. 2023. "A \$12 Million Request to Cover a Crypto Scam Sank a Bank CEO." Bloomberg. September 27, 2023. <https://www.bloomberg.com/news/articles/2023-09-27/crypto-scam-led-to-demise-of-heartland-tri-state-bank>.
- Allen, Hillary. 2022. *Driverless Finance*. New York, NY: Oxford University Press. <https://driverlessfinancebook.com/>.
- Allen, Hilary J. 2023. "Interest Rates, Venture Capital, and Financial Stability." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network. <https://doi.org/10.2139/ssrn.4513037>.
- Baer, Greg. 2018. "Stress Test Dummies: A Fundamental Problem With CCAR (and How To Fix It)." *Bank Capital and Stress Testing* (blog). Bank Policy Institute. July 16, 2018. <https://bpi.com/stress-test-dummies-a-fundamental-problem-with-ccar-and-how-to-fix-it/>.
- Bair, Sheila. 2023. "The Fed's 'Stress Tests' Overlook the Dangers Facing Banks." *Washington Post*, July 11, 2023. <https://www.washingtonpost.com/opinions/2023/07/11/banks-fed-stress-test-interest-rates/>.
- Baker, Todd, Kathryn Judge, and Aaron Klein. 2022. "Credit, Crises, and Infrastructure: The Differing Fates of Large and Small Businesses." *Boston University Law Review* 102 (4): 1353–96. <https://www.bu.edu/bulawreview/files/2022/05/BAKER-JUDGE-KLEIN.pdf>
- Baker, Todd. 2023. *2023 Banking Crisis and Silicon Valley Bank -- Causes, Effects & Unanswered Questions*. Briefing for California Assembly Committee on Banking & Finance. Richman Center for Business, Law & Public Policy, Columbia University. <https://abnk.assembly.ca.gov/sites/abnk.assembly.ca.gov/files/Presentation%201%20-%20Todd%20Baker.pdf>.
- Barr, Michael. 2023. "Re: Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank," April 28, 2023. <https://www.federalreserve.gov/publications/files/svb-review-20230428.pdf>.
- Benoit, David. 2022. "Rising Rates Help Some Banks More Than Others." *Wall Street Journal*, November 7, 2022, sec. Finance. <https://www.wsj.com/articles/rising-rates-help-some-banks-more-than-others-11667776213>.
- Board of Governors of the Federal Reserve System. 2022. *Supervision and Regulation Report*. Washington, DC: Board of Governors of the Federal Reserve. <https://www.federalreserve.gov/publications/2022-november-supervision-and-regulation-report-banking-system-conditions.htm>.

- Board of Governors of the Federal Reserve System (US). 2023a. “Deposits, All Commercial Banks [DPSACBW027SBOG].” FRED, Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/DPSACBW027SBOG>.
- Board of Governors of the Federal Reserve System (US). 2023b. “Federal Funds Effective Rate [FEDFUNS].” FRED, Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/FEDFUNDS>.
- Board of Governors of the Federal Reserve System (US). 2023c. *Review of the Federal Reserve’s Supervision and Regulation of Silicon Valley Bank*. Washington, DC: Board of Governors of the Federal Reserve System. <https://www.federalreserve.gov/publications/files/svb-review-20230428.pdf>
- Board of Governors of the Federal Reserve System (US). 2023d. “Federal Reserve Board Announces It Will Make Available Additional Funding to Eligible Depository Institutions to Help Assure Banks Have the Ability to Meet the Needs of All Their Depositors.” Board of Governors of the Federal Reserve System.
- Board of Governors of the Federal Reserve System (US). 2023e. *2023 Stress Test Methodology*. Washington, DC: Board of Governors of the Federal Reserve System. <https://www.federalreserve.gov/publications/files/2023-june-supervisory-stress-test-methodology.pdf>.
- Boddupalli, Aravind. 2023. “State Rainy Day Fund Balances Reached All-Time Highs Last Year.” *TaxVox* (blog). *Tax Policy Center: Urban Institute & Brookings Institution*. September 6, 2023. <https://www.taxpolicycenter.org/taxvox/state-rainy-day-fund-balances-reached-all-time-highs-last-year>.
- Bodovski, David, Hannah Firestone, Seung Jung Lee, and Viktors Stebunovs. 2021. “Bank Lending Conditions during the Pandemic.” FEDS Notes, Board of Governors of the Federal Reserve System. <https://www.federalreserve.gov/econres/notes/feds-notes/bank-lending-conditions-during-the-pandemic-20211015.html>.
- BPI Staff. 2023. “Calibrating Bank Capital Requirements.” *BPI One-Pagers* (blog). *Bank Policy Institute*. February 2, 2023. <https://bpi.com/calibrating-bank-capital-requirements/>.
- Buch, Claudia M., Manuel Buchholz, and Lena Tonzer. 2015. “Uncertainty, Bank Lending, and Bank-Level Heterogeneity.” *IMF Economic Review* 63 (4): 919–54. <https://www.jstor.org/stable/24738128>.
- Calvo, Daniel, Juan Carlos Crisanto, Stefan Hohl, and Oscar Pascual Gutiérrez. 2018. *Financial Supervisory Architecture: What Has Changed after the Crisis?* 8. FSI Insights on Policy Implementation. Basel, Switzerland: Financial Stability Institute. <https://www.bis.org/fsi/publ/insights8.pdf>.

- Castro, Andrew, Michele Cavallo, and Rebecca Zarutskie. 2022. “Understanding Bank Deposit Growth during the COVID-19 Pandemic.” *FEDS Notes. Board of Governors of the Federal Reserve System* (blog). June 3, 2022. <https://www.federalreserve.gov/econres/notes/feds-notes/understanding-bank-deposit-growth-during-the-covid-19-pandemic-20220603.html>.
- CBPP Staff. 2023. *Robust COVID Relief Bolstered Economy and Reduced Hardship for Millions*. Washington, DC: Center on Budget and Policy Priorities. <https://www.cbpp.org/research/poverty-and-inequality/robust-covid-relief-bolstered-economy-and-reduced-hardship-for>.
- Chen, Brian S., Samuel G. Hanson, and Jeremy C. Stein. 2017. “The Decline of Big-Bank Lending to Small Business: Dynamic Impacts on Local Credit and Labor Markets.” NEBR Working Paper 23843. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w23843>.
- Chernenko, Sergey, Nathan Kaplan, Asani Sarkar, and David S. Scharfstein. 2023. “Applications or Approvals: What Drives Racial Disparities in the Paycheck Protection Program?” NBER Working Paper 31172. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w31172>.
- Chernenko, Sergey, and David S. Scharfstein. 2022. “Racial Disparities in the Paycheck Protection Program.” NBER Working Paper 29748. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.2139/ssrn.3907575>.
- Clark, Leah, Adam Cole, Amanda Eng, Ben Meiselman, Nikolas Pharris-Ciurej, Kevin Pierce, and John Vooheis. 2023. *The Demographics of the Recipients of the First Economic Impact Payment*. Washington, DC: United States Census Bureau. <https://www2.census.gov/library/working-papers/2023/adrm/ces/CES-WP-23-24.pdf>
- Conti-brown, Peter, and Sean Vanatta. 2021. “Focus on Bank Supervision, Not Just Bank Regulation.” Brookings. November 2, 2021. <https://www.brookings.edu/articles/we-must-focus-on-bank-supervision/>.
- Cont-Brown. 2021. “Where Is the Fed Vice Chair for Supervision?” Brookings. October 26, 2021. <https://www.brookings.edu/articles/where-is-the-fed-vice-chair-for-supervision/>.
- Cookson, J. Anthony, Corbin Fox, Javier Gil-Bazo, Juan Felipe Imbet, and Christoph Schiller. 2023. “Social Media as a Bank Run Catalyst.” SSRN Scholarly Paper. Rochester, NY. <https://doi.org/10.2139/ssrn.4422754>.
- Council of Economic Advisors. 2022. *Economic Report of the President*. Washington, DC: White House. <https://www.whitehouse.gov/wp-content/uploads/2022/04/ERP-2022.pdf>.
- Dang, Sheila, Katie Paul, and Dawn Chmielewski. 2022. “Focus: Do Spam Bots Really Comprise under 5% of Twitter Users? Elon Musk Wants to Know.” Reuters. May 14, 2022.

<https://www.reuters.com/technology/do-spam-bots-really-comprise-under-5-twitter-users-elon-musk-wants-know-2022-05-13/>.

Deutsche Welle. 2021. “COVID Aid: Germany Uncovers over 25,000 Fraud Cases.” February 14, 2021. <https://www.dw.com/en/covid-aid-germany-uncovers-over-25000-cases-of-fraud/a-56565754>

U.S. Department of the Treasury. n.d “Economic Impact Payments.” U.S. Department of the Treasury. Accessed September 21, 2023. <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-american-families-and-workers/economic-impact-payments>.

Diamond, Douglas W., and Raghuram G. Rajan. 2005. “Liquidity Shortages and Banking Crises.” *The Journal of Finance* 60 (2): 615–47. <https://www.jstor.org/stable/3694762>.

Emmons, William. 2021. “Slow, Steady Decline in the Number of U.S. Banks Continues.” *On the Economy Blog, Federal Reserve Bank of St. Louis*. December 9, 2021. <https://www.stlouisfed.org/on-the-economy/2021/december/steady-decline-number-us-banks>.

Federal Deposit Insurance Corporation. 2023a. *FDIC’s Supervision of Signature Bank*. Washington, DC: Federal Deposit Insurance Corporation. <https://www.fdic.gov/news/press-releases/2023/pr23033a.pdf>.

Federal Deposit Insurance Corporation. 2023b. *First Quarter: Quarterly Banking Profile*. Federal Deposit Insurance Corporation Quarterly: Volume 17, Number 2. Washington, DC: Federal Deposit Insurance Corporation. <https://www.fdic.gov/analysis/quarterly-banking-profile/fdic-quarterly/2023-vol17-2/fdic-v17n2-1q2023.pdf>.

Federal Financial Institutions Examination Council (US) and Federal Reserve Bank of St. Louis. 2023. “Commercial Banks in the U.S. (DISCONTINUED) [USNUM].” FRED, Federal Reserve Bank of St. Louis. <https://fred.stlouisfed.org/series/USNUM>.

Fairlie, Robert. 2022. “COVID-19, Small Business Owners, and Racial Inequality.” University of California, Santa Cruz and National Bureau of Economic Research. [https://www.nber.org/sites/default/files/2022-11/Fairlie\\_COVID-19SmallBusinessOwnersandRacialInequality.pdf](https://www.nber.org/sites/default/files/2022-11/Fairlie_COVID-19SmallBusinessOwnersandRacialInequality.pdf).

FSOC. 2022. “Report on Digital Asset Financial Stability Risks and Regulation 2022.” Washington, DC: Financial Stability Oversight Council. <https://home.treasury.gov/system/files/261/FSOC-Digital-Assets-Report-2022.pdf>.

Gandel, Stephen. 2023. “Bank of America Nurses \$100bn Paper Loss after Big Bet in Bond Market.” *Financial Times*, June 29, 2023. <https://www.ft.com/content/df4f343c-5666-43a2-ba01-ef315bfb119a>.



- George, Esther. 2012. “Should Bankers Serve on Federal Reserve Bank Boards of Directors?” Federal Reserve Bank of Kansas City. May 23, 2012. <https://www.kansascityfed.org/newsroom/should-bankers-serve-on-federal-reserve-bank-boards-of-directors/>.
- Gilbert, Caitlin, Alyssa Fowers, Jacob Bogage, and Daniel Wolfe. 2023. “These Companies Had Billions of Dollars at Risk in Silicon Valley Bank.” *Washington Post*, March 15, 2023, sec. Business. <https://www.washingtonpost.com/business/2023/03/15/svb-billions-uninsured-assets-companies/>.
- Glancy, David P. 2023. *Bank Relationships and the Geography of PPP Lending*. Finance and Economics Discussion Series, 2023-014. Washington, DC: Board of Governors of the Federal Reserve System. <https://ideas.repec.org/p/fip/fedgfe/2023-14.html>.
- Gobat, Jeanne. 2012. “What Is a Bank?” *Finance and Development: A Quarterly Publication of the International Monetary Fund*, March 2012. <https://www.imf.org/external/pubs/ft/fandd/2012/03/basics.htm>.
- Gotbaum, Joshua. 2020. “How to Fix the Paycheck Protection Program: Make Sure It Actually Protects Paychecks.” Brookings. May 4, 2020. <https://www.brookings.edu/articles/how-to-fix-the-paycheck-protection-program-make-sure-it-actually-protects-paychecks/>.
- Gould, Elise, and Hilary Wething. 2012. *U.S. Poverty Rates Higher, Safety Net Weaker Than in Peer Countries*. Issue Brief 339. The State of Working America. Washington, DC: Economic Policy Institute. <https://files.epi.org/2012/ib339-us-poverty-higher-safety-net-weaker.pdf>.
- U.S Government Accountability Office. 2011. *Opportunities Exist to Broaden Director Recruitment Efforts and Increase Transparency*. Federal Reserve Bank Governance. Washington, DC: U.S Government Accountability Office. <https://www.sanders.senate.gov/wp-content/uploads/d1218-2-1.pdf>.
- Gruenber, Martin. 2023a. *Recent Bank Failures and the Federal Regulatory Response*. Washington, DC: before the Committee on Banking, Housing, And Urban Affairs United States Senate. <https://www.fdic.gov/news/speeches/2023/spmar2723.pdf>.
- Gruenber, Martin. 2023b. “Remarks by Martin J. Gruenberg, Chairman, FDIC, on The Resolution of Large Regional Banks — Lessons Learned.” FDIC. August 12, 2023. <https://www.fdic.gov/news/speeches/2023/spaug1423.html>.
- Harris, Benjamin, and Tara Sinclair. 2023. “The U.S. Economic Recovery in International Context.” U.S. Department of the Treasury. August 28, 2023. <https://home.treasury.gov/news/featured-stories/the-us-economic-recovery-in-international-context-2023>.
- International Monetary Fund. 2021. “Fiscal Monitor Database of Country Fiscal Measures in Response to the Covid-19 Pandemic.” IMF. October 2021. <https://www.imf.org/en/Topics/imf-and-covid19/Fiscal-Policies-Database-in-Response-to-COVID-19>.

- Jarsulic, Marc, and Alexandra Thornton. 2023. "The Role of Leverage in the Failures of Silvergate, Silicon Valley, and Signature Banks." Center for American Progress. March 16, 2023. <https://www.americanprogress.org/article/the-role-of-leverage-in-the-failures-of-silvergate-silicon-valley-and-signature-banks/>.
- Jiang, Erica Xuwei, Gregor Matvos, Tomasz Piskorski, and Amit Seru. 2023. "Monetary Tightening and U.S. Bank Fragility in 2023: Mark-to-Market Losses and Uninsured Depositor Runs?" SSRN Scholarly Paper. Rochester, NY. <https://doi.org/10.2139/ssrn.4387676>.
- Klein, Aaron. Public Comment. 2018a. "Re: Potential Federal Reserve Actions to Support Interbank Settlement of Faster Payments [OP-1625]," December 12, 2018. [https://www.federalreserve.gov/SECRS/2018/December/20181221/OP-1625/OP-1625\\_121418\\_133277\\_428769914666\\_1.pdf](https://www.federalreserve.gov/SECRS/2018/December/20181221/OP-1625/OP-1625_121418_133277_428769914666_1.pdf).
- Klein, Aaron. 2018b. "When No Banks Are Failing, You've Got a Silent Canary in a Coal Mine." Brookings. September 11, 2018. <https://www.brookings.edu/articles/when-no-banks-are-failing-youve-got-a-silent-canary-in-a-coal-mine/>.
- Klein, Aaron. 2020. "Losing Sight of Workers in Protecting Paychecks." Brookings. June 2020. <https://www.brookings.edu/articles/losing-sight-of-workers-in-protecting-paychecks/>.
- Klein, Aaron. 2022. "The Financialization of Recession Response." *Journal of Financial Crises* 4 (4): 47–76. <https://elischolar.library.yale.edu/journal-of-financial-crises/vol4/iss4/2/>
- Klein, Aaron. 2023a. *Structural Conflicts in Central Banking: Regulator or Operator of a Payment System?* Initiative on Financial Policy & Regulation White Papers. Philadelphia, PA: Wharton University of Pennsylvania. <https://wifpr.wharton.upenn.edu/wp-content/uploads/2023/09/Structural-Conflicts-in-Central-Banking.pdf>.
- Klein, Aaron. 2023b. "The Fed Shouldn't Be Regulating Banks." Brookings. May 8, 2023. <https://www.brookings.edu/articles/the-fed-shouldnt-be-regulating-banks/>.
- Kline, Allissa. 2023. "Small Kansas Bank Failed Because Its CEO Fell for a Crypto Scam: Report." *American Banker*, September 28, 2023. <https://www.americanbanker.com/news/small-kansas-bank-failed-because-its-ceo-fell-for-a-crypto-scam-report>.
- Li, Lei, and Philip E. Strahan. 2021. "Who Supplies PPP Loans (and Does It Matter)? Banks, Relationships, and the COVID Crisis." *Journal of Financial and Quantitative Analysis* 56 (7): 2411–38. <https://doi.org/10.1017/S0022109021000405>.
- Lopatto, Elizabeth. 2023. "The Tech Industry Moved Fast and Broke Its Most Prestigious Bank." *The Verge*. March 12, 2023. <https://www.theverge.com/23635692/silicon-valley-bank-svb-collapse-explainer-startups-venture-capital>.

- Lux, Marshall, and Robert Greene. 2016. "Dodd-Frank Is Hurting Community Banks." *New York Times*. April 14, 2016. <https://www.nytimes.com/roomfordebate/2016/04/14/has-dodd-frank-eliminated-the-dangers-in-the-banking-system/dodd-frank-is-hurting-community-banks>.
- Matthews, Dylan. 2021. "How the US Won the Economic Recovery." Vox. April 30, 2021. <https://www.vox.com/22348364/united-states-stimulus-covid-coronavirus>.
- McCabe, Caitlin. 2023. "SVB Stock Halted After Sharp Selloff; Bank Exploring Possible Sale." *Wall Street Journal*, March 11, 2023. <https://www.wsj.com/livecoverage/stock-market-news-today-03-10-2023/card/svb-stock-price-slides-another-29-premarket-gdGa9ANN0vNESUUorGqm>.
- Milesi-Ferretti, Gian Maria. 2021. "A Most Unusual Recovery: How the US Rebound from COVID Differs from Rest of G7." Brookings. December 8, 2021. <https://www.brookings.edu/articles/a-most-unusual-recovery-how-the-us-rebound-from-covid-differs-from-rest-of-g7/>.
- Murphy, Dan. 2021. *Economic Impact Payments: Uses, Payment Methods, and Costs to Recipients*. Washington, DC: The Brookings Institution. [https://www.brookings.edu/wp-content/uploads/2021/02/20210216\\_Murphy\\_ImpactPayments\\_Final-4.pdf](https://www.brookings.edu/wp-content/uploads/2021/02/20210216_Murphy_ImpactPayments_Final-4.pdf).
- National Credit Union Administration. 2023. *Quarterly Credit Union Data Summary 2023 Q2*. Washington, DC: National Credit Union Administration. <https://ncua.gov/files/publications/analysis/quarterly-data-summary-2023-Q2.pdf>.
- Nelson, Bill and Francisco Covas. 2018. "The Fed's Stress Tests May Have Left Banks More Exposed to Rising Interest Rates" *Bank Capital and Stress Testing* (blog). *Bank Policy Institute*. July 16, 2018. <https://bpi.com/the-feds-stress-tests-may-have-left-banks-more-exposed-to-rising-interest-rates/>
- Neuman, Scott. 2023. "Silicon Valley Bank's Fall Shows How Tech Can Push a Financial Panic into Hyperdrive." NPR. March 13, 2023. <https://www.npr.org/2023/03/13/1163085072/silicon-valley-bank-tech-finance>.
- Nurisso, George C., and Edward S. Prescott. 2017. "The 1970s Origins of Too Big to Fail." Federal Reserve Bank of Cleveland, Economic Commentary 2017-17. <https://doi.org/10.26509/frbc-ec-201717>.
- OECD. 2020. *The Territorial Impact of COVID-19: Managing the Crisis across Levels of Government*. OECD Policy Responses to Coronavirus (COVID-19). Paris, France: OECD. <https://www.oecd.org/coronavirus/policy-responses/the-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government-d3e314e1/>.
- Office of Inspector General. 2023a. *COVID-19 Pandemic EIDL and PPP Loan Fraud Landscape*. Washington, DC: US Small Business Administration Office of Inspector General. <https://www.sba.gov/document/report-23-09-covid-19-pandemic-eidl-ppp-loan-fraud-landscape>.

- Office of Inspector General. 2023b. “Material Loss Review of Silicon Valley Bank.” Evaluation Report 2023-SR-B-013. Washington, DC: Office of Inspector General Board of Governors of the Federal Reserve System and Consumer Financial Protection Bureau. <https://oig.federalreserve.gov/reports/board-material-loss-review-silicon-valley-bank-sep2023.pdf>.
- Peretie, Michael. 2011. “Regulation: Avoiding the Pendulum Effect.” *The Banker*. September 1, 2011. <https://www.thebanker.com/Regulation-avoiding-the-pendulum-effect-1314864171>.
- Raunig, Burkhard, Johann Scharler, and Friedrich Sindermann. 2017. “Do Banks Lend Less in Uncertain Times?” *Economica* 84 (336): 682–711. <https://www.jstor.org/stable/26746558>.
- Rose, Jonathan. 2023. *Understanding the Speed and Size of Bank Runs in Historical Comparison*. Economic Synopses. St. Louis, MO: Federal Reserve Bank of St. Louis. <https://doi.org/10.20955/es.2023.12>.
- Sanders, Bernie. 2023. “NEWS: After Silicon Valley Bank Collapse, Sanders Introduces Legislation to Prevent Big Bank Executives from Serving on Federal Reserve Boards.” Senator Bernie Sanders: U.S Senator for Vermont. March 23, 2023. <https://www.sanders.senate.gov/press-releases/news-after-silicon-valley-bank-collapse-sanders-introduces-legislation-to-prevent-big-bank-executives-from-serving-on-federal-reserve-boards/>.
- Schmulow, Andrew. 2017. “The Four Methods of Financial System Regulation: An International Comparative Survey.” Craley, Australia: UWA Law School Legal Studies Research Paper Series. <https://papers.ssrn.com/abstract=3082092>.
- Serio, Anna. 2020. “PPP Loan Statistics: Top Lenders, Who Received Loans & More.” Finder. July 30, 2020. <https://www.finder.com/ppp-loan-stats>.
- Silvergate Capital Corporation. 2023a. “Silvergate Capital Corporation Announces Intent to Wind Down Operations and Voluntarily Liquidate Silvergate Bank.” March 8, 2023. <https://ir.silvergate.com/news/news-details/2023/Silvergate-Capital-Corporation-Announces-Intent-to-Wind-Down-Operations-and-Voluntarily-Liquidate-Silvergate-Bank/default.aspx>.
- Silvergate Capital Corporation. 2023b. *4Q22 Earnings Presentation*. La Jolla, CA: Silvergate Capital Corporation. [https://s23.q4cdn.com/615058218/files/doc\\_financials/2022/q4/Ex.-99.2-SI-4Q22-Earnings-Presentation-FINAL.pdf](https://s23.q4cdn.com/615058218/files/doc_financials/2022/q4/Ex.-99.2-SI-4Q22-Earnings-Presentation-FINAL.pdf).
- Semega, Jessica, Melissa Kollar, Emily A. Shrider, John F. Creamer. 2020. *Income and Poverty in the United States: 2019*. Current Population Reports. Washington, DC: United States Census Bureau. <https://www.census.gov/content/dam/Census/library/publications/2020/demo/p60-270.pdf>
- Smith, Christine. 2021. “Explained: A Federal Reserve Bank’s Board of Directors.”, *Open Vault* (blog) *Federal Reserve Bank of St. Louis*. January 13, 2021. <https://www.stlouisfed.org/open-vault/2021/january/explained-federal-reserve-bank-board-directors>.

- Smith, Stacey Vanek. 2023. "The U.S. Has More Banks than Anywhere on Earth. That Shapes the Economy in Many Ways." NPR. May 9, 2023. <https://www.npr.org/2023/05/04/1173488958/silicon-valley-bank-signature-first-republic-bank-failures>.
- Sigalos, MacKenzie. 2023. "What the Failures of Signature, SVB and Silvergate Mean for the Crypto Sector." CNBC. March 13, 2023. <https://www.cnbc.com/2023/03/12/signature-svb-silvergate-failures-effects-on-crypto-sector.html>.
- Soyres, François de, Ana Maria Santacreu, and Henry Young. 2022. "Fiscal Policy and Excess Inflation during Covid-19: A Cross-Country View." FEDS Notes, Board of Governors of the Federal Reserve System. <https://doi.org/10.17016/2380-7172.3083>.
- Silicon Valley Bank. 2019. "Schedule RC-H - Selected Balance Sheet Items for Domestic Offices (Form Type -031)." Federal Financial Institutions Examination Council Central data Repository's Public Data Distribution. Report Date: December 31, 2019. <https://cdr.ffiec.gov/public/ManageFacsimiles.aspx>.
- Silicon Valley Bank. 2022. "Schedule RC-H - Selected Balance Sheet Items for Domestic Offices (Form Type -031)." Federal Financial Institutions Examination Council Central data Repository's Public Data Distribution. Report Date: December 31, 2019. <https://cdr.ffiec.gov/public/ManageFacsimiles.aspx>.
- SVB. 2022. "Q3 2022 Financial Highlights." Silicon Valley Bank. [https://s201.q4cdn.com/589201576/files/doc\\_financials/2022/q3/Q3\\_2022\\_IR\\_Presentation\\_vF.pdf](https://s201.q4cdn.com/589201576/files/doc_financials/2022/q3/Q3_2022_IR_Presentation_vF.pdf).
- Sweet, Ken, and Stan Chloe. 2023. "How the Digital Era Helped Speed up Bank Runs." PBS NewsHour. March 15, 2023. <https://www.pbs.org/newshour/economy/bank-runs-used-to-be-slow-the-digital-era-has-spiced-things-up>.
- Theal, Justin. 2022. "States Build Their Reserves Amid Growing Uncertainties." The Pew Charitable Trusts. October 18, 2022. <https://pew.org/3D3JmJG>.
- Tierno, Paul. 2023. *The Role of Cryptocurrency in the Failures of Silvergate, Silicon Valley, and Signature Banks*. CRS Report No. IN12148. Washington, DC: Congressional Research Service. [https://crsreports.congress.gov/product/pdf/IN/IN12148#:~:text=Silicon%20Valley%20Bank%20\(SVB\)%2C,involvement%20with%20crypt%20firms%20varied](https://crsreports.congress.gov/product/pdf/IN/IN12148#:~:text=Silicon%20Valley%20Bank%20(SVB)%2C,involvement%20with%20crypt%20firms%20varied).
- Tarullo, Daniel. 2020. "Are We Seeing the Demise of Stress Testing?" Brookings. June 25, 2020. <https://www.brookings.edu/articles/stress-testing/>.
- Vallence, Christian, and Peter Wallis. 2020. *The Response by Central Banks in Advanced Economies to COVID-19*. Sydney, Australia: Reserve Bank of Australia. <https://www.rba.gov.au/publications/bulletin/2020/dec/pdf/the-response-by-central-banks-in-advanced-economies-to-covid-19.pdf>

- Wagner, Wolf. 2007. "The Liquidity of Bank Assets and Banking Stability." *Journal of Banking & Finance* 31 (1): 121–39. <https://doi.org/10.1016/j.jbankfin.2005.07.019>.
- Weil, Jonathan. 2022. "Rising Interest Rates Hit Banks' Bond Holdings - WSJ." *Wall Street Journal*, November 11, 2022. <https://www.wsj.com/articles/rising-interest-rates-hit-banks-bond-holdings-11668123473?page=1https://www.wsj.com/articles/rising-rates-help-some-banks-more-than-others-11667776213?page=1>.
- Weil, Jonathan, and Ben Eisen. 2023. "Silicon Valley Bank: Tech Lender Stumbles, Causing Banks to Lose Billions in Stock Value." *Wall Street Journal*, March 9, 2023. [https://www.wsj.com/articles/bond-losses-push-silicon-valley-bank-parent-to-raise-capital-125e89d4?mod=hp\\_lead\\_pos2](https://www.wsj.com/articles/bond-losses-push-silicon-valley-bank-parent-to-raise-capital-125e89d4?mod=hp_lead_pos2).
- Welburn, Jonathan. 2023. "Financial Panic in the Age of Digital Banking and Social Media." *The Rand Blog*. *Rand Corporation*. March 14, 2023. <https://www.rand.org/blog/2023/03/financial-panic-in-the-age-of-digital-banking-social.html>.
- Williamson, Stephen D. 1988. "Liquidity, Banking, and Bank Failures." *International Economic Review* 29 (1): 25–43. <https://doi.org/10.2307/2526805>.
- Wix, Carlo, Alice Abboud, Elizabeth Duncan, Akos Horvath, Diana Iercosan, Bert Loudis, Francis Martinez, et al. 2021. *COVID-19 as a Stress Test: Assessing the Bank Regulatory Framework*. Washington, DC: Board of Governors of the Federal Reserve System. <https://doi.org/10.17016/FEDS.2021.024>.
- Yahoo! Finance. 2023. "Signature Bank (SBNY) Stock Historical Prices & Data." <https://finance.yahoo.com/quote/SBNY/history/>.