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Article

The silicon valley bank collapse, deposit insurance concentration, and stock market returns

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Abstract: In this study, we explore the impact of contemporary bank run incidents on stock market performance, taking into consideration insured deposit concentration. Specifically, we use data from the recent downfall of the Silicon Valley Bank (SVB). By employing event study methods with the mean-adjusted return model and market models, we evaluate the cumulative abnormal returns (CARs). Our findings reveal a substantial negative CAR for all the listed companies in our sample, suggesting that the SVB crisis adversely affected stock returns. Further analysis shows an even more pronounced effect on the banking sector and that banks with a high concentration of insured deposits experienced economically and statistically less negative CARs. We also find that the response by the Treasury Department, the Federal Reserve, the Federal Deposit Insurance Corporation, and other agencies—aimed at fully safeguard all depositors—led a rebound in CARs. Our results highlight the importance of deposit insurance policy and regulatory responses in protecting the financial system during panic events.

Keywords: stock returns; event study; insured deposits; bank runs; financial risk
JEL Classification: G10; G14; G18; G20; G21; G28

1. Introduction

Banking crises and runs exert significant influence on financial and economic landscapes (Johnson and Mamun, 2014; Peavy and Hempel, 1988; Yorulmazer, 2009). Bank run events are crucial economic triggers, typically having significant effects on stock market returns. Consequently, these negative events are often linked to negative abnormal returns in the post-event period (Dangol, 2008; He et al., 2017). More recently, several studies have examined the effect of the Silicon Valley Bank (SVB) collapse on stock market performance (Ali et al., 2024; Choi et al., 2023; Martins, 2023; Martins, 2024; Yadav et al., 2023 ;Yousaf and Goodell, 2023).

Deposit insurance mitigates the risk of bank runs by providing a safety net for depositors, thus reducing the incentive for them to withdraw their funds during times of uncertainty or crisis and by relieving depositors' concerns about the safety of their funds and, consequently, their inclination to withdraw their deposits (Diamond and Dybvig, 1983; Demirgüç-Kunt and Detragiache, 2002). A higher percentage of uninsured deposits may increase the likelihood of bank runs as these depositors face greater uncertainty and are more likely to withdraw their funds when they perceive the bank to be in distress (Iyer and Puri, 2012). Conversely, a higher proportion of uninsured deposits may also serve as a market discipline mechanism, forcing banks to maintain higher capital levels and adopt more prudent risk management practices to retain the confidence of their uninsured depositors (Calomiris and Kahn, 1991; Flannery, 1998). What is not so well understood is the relationship between insured deposit concentration during bank run events and stock market reaction.

Without getting into the specifics of SVB's downfall, it is evident that certain issues played a major role in the swift and dramatic sequence of events culminating in the bank's collapse. Regulatory factors include a prolonged period of exceptionally low interest rates due to lenient monetary policy, as well as heightened levels of quantitative easing. On the bank's end, inadequate risk management practices at SVB, such as insufficient modeling of interest rate and liquidity risks, likely played a part in its failure, particularly in light of the bank's significant mismatch in its assets—liabilities maturity ladder. It is also probable that online banking technology facilitating swift electronic fund withdrawals and the rapid, widespread dissemination of information via social media intensified the panic and concern surrounding SVB's viability, ultimately resulting in an unprecedented run on bank deposits. The sudden collapse of SVB, the second largest in U.S. history and the largest since 2008, evoked memories of the global financial crisis of 2008 for many.

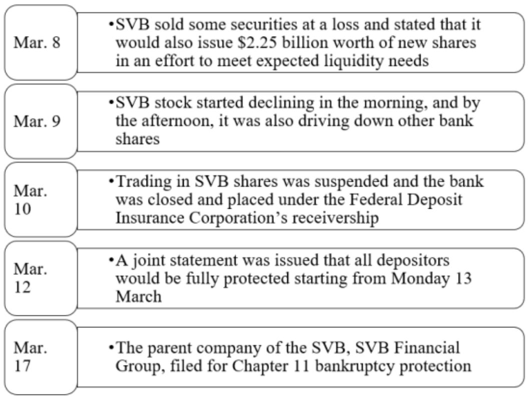

Figure 1. Main events relating to the SVB collapse.

Examining the precise sequence of events, on Wednesday, 8 March 2023, multiple venture capital firms reportedly advised businesses to withdraw their funds from the bank after SVB announced the sale of certain securities at a loss and its intention to issue $2.25 billion in new shares to maintain liquidity and accommodate anticipated withdrawals (CNN Com Wire Service, 2023). The following day, Thursday, March 9, SVB's stock began to plummet in the morning, and by the afternoon, it had dragged down other bank shares as investor fears of a 2007–2008 financial crisis resurgence grew (CNN Com Wire Service, 2023). By the morning of Friday, March 10, trading in SVB shares had been halted, and the company had abandoned attempts to quickly raise funds or secure a buyer (Reuters, 2023). On Sunday, March 12, a joint statement was released by Treasury Secretary Janet L. Yellen, Federal Reserve Board Chair Jerome H. Powell, and FDIC Chairman Martin J. Gruenberg, asserting their commitment to protecting the American economy by bolstering public trust in the banking system. They endorsed measures that would enable the FDIC to resolve SVB in a manner that fully safeguards all depositors. Starting on Monday, March 13, all depositors would be completely protected (FDIC, 2023). On Friday, March 17, SVB Financial Group, SVB's parent company, filed for Chapter 11 bankruptcy protection (Valinsky, 2023). **Figure 1** summarizes the events related to SVB's collapse.

Earlier research has underscored the considerable impact of banking crises and bank runs on the economy. Peavy and Hempel (1988) emphasize the adverse effects of the Penn Square Bank failure on market returns, while Yorulmazer (2009) demonstrates how the Northern Rock bank run and subsequent rescue announcement significantly impacted the United Kingdom banking sector. Johnson and Mamun (2014) assess the consequences of Lehman Brothers' collapse on other financial institutions and their stock returns.

The failure of SVB in March 2023 is known to be one of the most significant catastrophes in the history of the banking sector and a recent real-life example of a bank run. The collapse of SVB, which was among the top 20 institutions in the United States of America, is regarded as the second-largest bank run in the history of the United States (Liu et al., 2024). According to Yousaf and Goodell (2023), bank runs caused SVB, Signature Bank, and Silvergate Bank to fail before the end of the first quarter of 2023.

There were multiple factors that led to SVB's failure. The most notable, though, was their risk exposure given their concentration on the technology sector, as well as their lack of investment diversification. This has considerably raised the amount of risk the bank is facing (Van Vo and Lee, 2023). Similar to the classical bank run model presented by Diamond and Dybvig (1983), SVB also experienced interest rate risk, which led to a liquidity mismatch between long-term loans and short-term deposits. In addition, Bales and Burghof (2024) provide evidence that the SVB crash was accelerated and exacerbated by media attention and sentiment on social media platforms. This is because social media platforms assist in sending strong signals to the public, which may encourage people to act quickly and attempt to liquidate as soon as possible.

The SVB case attracted scholarly attention due to its effect and has been extensively investigated. Yousaf and Goodell (2023) evidence that the SVB collapse negatively affected the returns of some sectors in the US market, such as the real estate, materials, and financial sectors. The effect of the SVB failure on the European banking industry and US banking industry is also examined by (Martins, 2023; Martins, 2024). In addition, numerous studies emphasized the significance of diversification and strong risk management systems in preventing bank runs and similar catastrophes (Al-Sowaidi and Faour, 2023).

A number of studies in the literature concentrated more on SVB's collapse's contagion effects. The study conducted by Choi et al. (2023) aimed to illustrate the factors that could have contributed to the SVB collapse contagion effect. The authors identified several key factors, such as asset quality, uninsured deposits, bank size, and other factors, that significantly affect collapses and their subsequent contagion effects. Additionally, Van Vo and Lee (2023) provide evidence that SVB's ineffective risk management strategy had a significant role in the collapse.

The findings of Akhtaruzzaman et al. (2023) further demonstrate the global nature of the SVB failure's contagion effect, as they extend to other international banks. The contagion effect on the top 10 banks in the MSCI Bank Index is likewise confirmed by Erer E. and Erer D. (2024). The paper also notes that the Federal Reserve's attempts to curb inflation were largely successful in generating the contagion effect, as seen by the Fed's hike in the federal funds rate. Evidence that the contagion effects extended to the cryptocurrency markets is presented in another paper (Ali, 2024; Galati and Capalbo, 2024). Pandey et al. (2023) examine the effect of the SVB collapse on both developed and emerging markets, they find that the effect is more negative and significant in developed markets. This result is attributed to the complexity of integration and correlation with global markets. In addition, Aharon et al. (2023) examine the impact of SVB collapse on global equity markets. They find that Europe, Latin America, and MENA regions experienced a negative and significant effect on the event day, whereas the Asian market experienced a delay in response. The extent of SVB's collapse is reflected in all of these studies.

The financial and banking systems are not new in terms of their interconnection (Al-Thaqeb and Algharabali, 2019; Al-Thaqeb et al., 2022; Raddant and Kenett, 2021). When Lehman Brothers failed during the 2008 financial crisis, the financial market experienced a similar pattern that had a substantial impact on several financial institutions (Johnson and Mamun, 2012). The Great Depression, the Asian financial crisis, and the majority of other economic disasters have all shown signs of the same pattern (Bianchi, 2020; Radelet and Sachs, 1999). In the past, the Federal Deposit Insurance Corporation was founded in response to bank runs and the devastating consequences they had on the economy (McKay and Seale, 2000). In addition, governments have been forced to review their regulatory policies and procedures. Moreover, financial institutions have been required to re-evaluate their risk management strategiea and procedures as a result of the continued financial institution collapses and the economic damage they have caused.

Our study investigates the different dimensions of the impact of SVB-induced bank runs on stock market returns by examining the role of insured deposit concentration on stock market outcomes, taking into consideration the effectiveness of the subsequent response by the Treasury Department, the Federal Reserve, the Federal Deposit Insurance Corporation (FDIC), and other regulatory agencies in protecting all depositors, beginning on Monday, 13 March 2023.

In line with the theoretical framework related to financial contagion developed by Allen and Gale (2000), we first hypothesize that Financial crises can spread across institutions and markets due to their interconnectedness. Allen and Gale (2000) show how distress in one part of the financial system, such as an individual bank, can spread throughout the financial network, resulting in a systemic crisis. Specifically, they demonstrate how a liquidity shock in one bank could impact other banks due to their interconnection, resulting in a widespread financial crisis. This theoretical framework has been supported by several empirical works (Akhtaruzzaman et al., 2023; Erer and Erer, 2024; Iyer and Peydro, 2011). Conversely, having a well-established financial infrastructure that includes independent agencies may maintain stability and public confidence in the financial system by providing deposit insurance schemes. Deposit insurance policies may minimize the risk for banks with a high concentration of insured deposits. Therefore, we hypothesize next that Stocks of banks with a high concentration of insured deposits are more stable during bank run crises.

Utilizing an event study approach, our empirical analysis reveals a decreasing trend in Cumulative Abnormal Returns (CARs) across S&P 500 stocks during the event, ranging from 455 to 678 basis points, indicating a negative effect of the SVB run on stock returns. Additional tests expose more pronounced effects on the banking sector, with a decline of 1624 to 2191 basis points in the same event window, signifying that the SVB collapse had a more substantial negative impact on banking sector stock returns. Controlling for size and risk-weighted capital adequacy ratio, we also find that banks with a higher percentage of insured deposits experienced less negative CARs. Following the third business day after the onset of SVB's turmoil, the response by the Treasury Department, the Federal Reserve, the FDIC, and other agencies—aiming to fully safeguard all depositors—demonstrated a rebound in CARs and a reversion to a less negative market reaction compared to the days immediately surrounding the event, both in the overall market and the banking sector.

This work contributes to the body of knowledge regarding bank failures and the effects they have on markets and systems. Through the examination of CARs along with bank-specific indicators, such as the proportion of insured deposits, we have illustrated how the market interprets the potential effects of SVB's failure and how it reacts to subsequent government initiatives.

The academic implications of this paper oppose the efficient markets hypothesis. In efficient markets, stock prices are expected to adjust rapidly and accurately, with the influence of recurring instances of specific events diminishing over time (Kolaric and Schiereck, 2016). Some studies have found that repeated events exert minimal impact on financial markets (Barros and Gil-Alana, 2009; Gul et al., 2010). However, other research argues that financial markets efficiently absorb such shocks, rendering their statistical significance negligible (Johnston and Nedelescu, 2006). The practical implications of our paper are important for regulatorS&Policy makers to understand the deposit insurance policy. While the FDIC insures up to $250,000 for each depositor for FDIC-insured banks, some banks are not insured. Regulators may consider protecting the financial system by making it obligatory for all banks to be insured by the FDIC. Also, it is important for regulators to impose new regulatory policies that minimize the risk of banks with a high concentration of uninsured deposits. Finally, it is important for regulators from least developed markets to understand the importance of having a well-established financial infrastructure that includes independent agencies to maintain stability and public confidence in the financial system by providing deposits insurance schemes.

The rest of the paper is organized as follows: methods in section 2, the results and discussion in section 3, and in section 4 we conclude the paper.

2. Methods

2.1. Data

We source our market data from Bloomberg, using stocks that comprise the S&P 500 index. Daily returns are calculated based on the closing stock prices. For each day within the event window, including the event day (8 March 2023), we determine daily abnormal returns ($AR_{i,t}$) and ($CAR_{i,t}$) for every stock using two distinct methodologies: the mean-adjusted returns model and the market model. Financial data pertaining to banks, including balance sheet information and other bank-specific metrics, is obtained from quarterly Y-9C call reports sourced from the Federal Reserve Bank of Chicago. Specifically, we employ items BHCBHK29 and BHODHK29 (Time Deposits of $250,000 or less), as well as BHCK2948 (Total Liabilities) for the construction of the insured deposit concentration ratio. We also employ item BHCA7205, which is an indicator representing the total risk-based capital ratio.

2.2. Mean-adjusted returns

To test our first hypothesis: Financial crises can spread across institutions and markets due to their interconnectedness, we compute the abnormal return, we use Brown and Warner's (1985) conventional mean-adjusted returns event study approach ($AR_{i,t}$) for stock i during day t:

$$AR_{i,t} = R_{i,t} - \bar{R}_i \tag{1}$$

$$\bar{R}_i = \frac{1}{239}\sum_{t=-250}^{-11} R_{i,t} \tag{2}$$

where $R_{i,t}$ denotes the return of stock i on day t, and $\bar{R}_i$ is the average return of stock i's daily returns during the estimate period (−250, −11).

2.3. Market model

We also use Dodd and Warner's (1983) and Brown and Warner's (1985) market model event study approach to compute abnormal returns and test our first hypothesis: Financial crises can spread across institutions and markets due to their interconnectedness, as follows:

$$AR_{i,t} = R_{i,t} - \left(\alpha_i + \beta_i R_{m,t}\right) \tag{3}$$

where $R_{i,t}$ is the return of stock i on day t, $R_{m,t}$ is the return of the S&P 500 index, and α_i and β_i are the regression estimates from an ordinary least squares (OLS) regression performed throughout the estimate period (−250, −11).

2.4. Cumulative abnormal return OLS regressions

To test our second hypothesi: Stocks of banks with a high concentration of insured deposits are more stable during bank run crises, we analyze how the market responds to banks that have a high concentration of insured depositors by running the following regression on a cross-sectional sample of 72 listed banks for which all data are available:

$$CAR_{[-t,t]} = \beta_1 InsuredDepositRatio + \beta_2 Log(Total\ Assets) + \beta_3 Risk\ Weighted\ Capital\ Adequacy\ Ratio + \varepsilon_i \tag{4}$$

where $InsuredDepositRatio$ is the ratio of total time deposits of $250,000 or less (items BHCBHK29 and BHODHK29 in Y-9C form) to total bank liabilities (item BHCK2948), and $Risk\ Weighted\ Capital\ Adequacy\ Ratio$ refers to item BHCA7205.

The regression presented in Equation (4) above is a pooled ordinary least squares (OLS) regression, with heteroscedasticity-robust standard errors, applied to cross-sectional data of the banks in our sample. Hence, each observation represents a unique bank with no time dimension or repeated measurements. This is done to measure the differential effects of our independent variables on CARs, and in this sense appropriate as it treats all observations independently without needing to account for unobserved individual-specific effects that would typically be addressed in panel data models. Further, given that all banks in our dataset are large public banks, they are not clustered in any meaningful way, making clustering of standard errors unnecessary in this context.

3. Results

3.1. Overall market results

Table 1 presents descriptive statistics for $AR_{i,t}$ using both the mean-adjusted returns and market model methods during the period of SVB's collapse. **Table 1** reveals that the distribution of $AR_{i,t}$ exhibits negative skewness for several days following the event, implying the presence of significant negative outliers. Moreover, the $AR_{i,t}$ distribution demonstrates leptokurtosis for many days after the event, further indicating extreme outlier values.

Table 1. Descriptive statistics of abnormal returns ($AR_{i,t}$) using mean-adjusted returns and market model before and after the SVB collapse.

		Mean-adjusted Returns $AR_{i,t}$				**Market Model $AR_{i,t}$**			
t	Date	Mean	Median	Skewness	Kurtosis	Mean	Median	Skewness	Kurtosis
−10	22-Feb-23	−0.0010	−0.0013	−2.1221	23.2439	−0.0003	−0.0006	−2.1475	23.2581
−9	23-Feb-23	0.0042	0.0033	1.0405	20.0524	0.0017	0.0006	1.1136	19.7928
−8	24-Feb-23	−0.0083	−0.0071	−1.3078	12.2830	−0.0034	−0.0021	−1.3559	11.3610
−7	27-Feb-23	0.0013	0.0007	0.7319	11.7438	−0.0001	−0.0008	0.7855	11.4506
−6	28-Feb-23	−0.0028	−0.0018	−0.3588	13.3842	−0.0014	−0.0002	−0.4219	13.3939
−5	1-Mar-23	−0.0021	−0.0042	2.2927	19.9716	0.0001	−0.0020	2.2555	19.9907
−4	2-Mar-23	0.0084	0.0082	0.6363	8.0422	0.0048	0.0044	0.6985	8.0987
−3	3-Mar-23	0.0138	0.0131	1.0290	3.7839	0.0062	0.0050	1.1136	3.6775
−2	6-Mar-23	−0.0043	−0.0028	−0.9538	4.3733	−0.0046	−0.0031	−0.9487	4.3859
−1	7-Mar-23	−0.0156	−0.0150	−0.2867	2.1792	−0.0085	−0.0076	−0.4229	1.9478
0	8-Mar-23	0.0024	0.0026	0.0310	1.4513	0.0018	0.0020	0.0534	1.4681
+1	9-Mar-23	−0.0202	−0.0172	−2.0803	12.3040	−0.0116	−0.0081	−1.9777	10.8709
+2	10-Mar-23	−0.0202	−0.0185	−1.6076	8.0547	−0.0134	−0.0116	−1.5899	7.6650
+3	13-Mar-23	−0.0099	−0.0034	−6.6202	78.0888	−0.0092	−0.0028	−6.6200	78.0766
+4	14-Mar-23	0.0141	0.0129	4.6034	52.4263	0.0064	0.0050	4.7148	52.7652
+5	15-Mar-23	−0.0150	−0.0118	−1.5323	7.9061	−0.0117	−0.0084	−1.5494	7.8279
+6	16-Mar-23	0.0137	0.0126	0.2917	2.8063	0.0055	0.0042	0.4012	2.4463

Table 2 displays descriptive statistics of $CAR_{i,t}$ using both mean-adjusted returns and the market model in the aftermath of the SVB collapse, leading to a similar conclusion.

Table 2. Descriptive statistics of $CAR_{i,t}$ using mean-adjusted returns and market model before and after the SVB collapse.

		Mean-adjusted Returns $CAR_{i,t}$				**Market Model $CAR_{i,t}$**			
t	Date	Mean	Median	Skewness	Kurtosis	Mean	Median	Skewness	Kurtosis
−10	22-Feb-23	−0.0010	−0.0013	−2.1221	23.2439	−0.0003	−0.0006	−2.1475	23.2581
−9	23-Feb-23	0.0032	0.0017	0.3115	10.3302	0.0014	−0.0001	0.3492	10.2848
−8	24-Feb-23	−0.0051	−0.0055	−0.1235	8.4274	−0.0019	−0.0024	−0.1838	8.2863
−7	27-Feb-23	−0.0038	−0.0051	0.1877	5.8222	−0.0021	−0.0030	0.1583	5.8056
−6	28-Feb-23	−0.0066	−0.0069	−0.0354	3.9294	−0.0034	−0.0038	−0.0817	3.9456
−5	1-Mar-23	−0.0087	−0.0102	0.4152	3.6365	−0.0033	−0.0048	0.3471	3.5695
−4	2-Mar-23	−0.0003	−0.0027	0.5671	3.9598	0.0015	−0.0006	0.5448	3.9474
−3	3-Mar-23	0.0135	0.0100	0.7250	4.5986	0.0078	0.0039	0.7853	4.6327
−2	6-Mar-23	0.0092	0.0059	0.7094	5.5596	0.0032	−0.0007	0.7841	5.6604
−1	7-Mar-23	−0.0064	−0.0096	0.7934	4.8572	−0.0053	−0.0084	0.7823	4.8319
0	8-Mar-23	−0.0040	−0.0073	0.6694	4.1823	−0.0035	−0.0067	0.6650	4.1735
+1	9-Mar-23	−0.0242	−0.0230	0.1387	3.2877	−0.0151	−0.0134	0.0680	3.1275
+2	10-Mar-23	−0.0444	−0.0404	−0.4689	4.4947	−0.0285	−0.0242	−0.5543	4.2688
+3	13-Mar-23	−0.0543	−0.0394	−3.4824	30.0106	−0.0377	−0.0231	−3.4883	29.7352
+4	14-Mar-23	−0.0402	−0.0293	−1.9361	11.4869	−0.0314	−0.0202	−1.9498	11.3897
+5	15-Mar-23	−0.0552	−0.0436	−2.3894	18.4775	−0.0431	−0.0318	−2.3938	18.2257
+6	16-Mar-23	−0.0416	−0.0318	−1.7505	12.9098	−0.0376	−0.0280	−1.7569	12.8614

Table 3 shows the mean and median equality tests for $CAR_{i,t}$ using the mean-adjusted returns and market models for the entire event study sample. Panel A of **Table 3** highlights the results of mean and median equality tests employing the mean-adjusted returns method. Panel A of **Table 3** reveals that the mean equality tests show a highly significant negative market reaction on the event date (8 March 2023) and throughout the [−1, +1], [−2, +2], [−3, +3], [−4, +4], [−5, +5], and [−6, +6] event day windows. Panel B of **Table 3** displays the results of mean and median equality tests, utilizing the market model. Panel B of **Table 3** indicates a highly significant negative market response on the event day (8 March 2023) and throughout the [−1, +1], [−2, +2], [−3, +3], [−4, +4], [−5, +5], and [−6, +6] event day windows. The median equality test results support a similar conclusion. These statistics clearly suggest that the U.S. stock market returns reacted adversely to the SVB collapse and consistent with the findings of Yousaf and Goodell (2023), who found negative returns across all equity sectors on the event day.

Table 3. Mean and median equality tests for $CAR_{i,t}$ using mean-adjusted returns and market model.

Panel A: Mean-adjusted Returns			
Event Window	Mean	t-test	Median
[−1, 1]	−0.0334	−26.3443	−0.0297***
[−2, 2]	−0.0579	−31.3076	−0.0517***
[−3, 3]	−0.0540	−15.8593	−0.0432***
[−4, 4]	−0.0316	−9.0667	−0.0207***
[−5, 5]	−0.0486	−12.1840	−0.0378***
[−6, 6]	−0.0377	−9.5643	−0.0287***
Panel B: Market Model			
Event Window	Mean	t-test	Median
[−1, 1]	−0.0183	−14.0197	−0.0137***
[−2, 2]	−0.0363	−18.9087	−0.0295***
[−3, 3]	−0.0393	−11.4632	−0.0270***
[−4, 4]	−0.0281	−8.0554	−0.0164***
[−5, 5]	−0.0397	−9.9169	−0.0276***
[−6, 6]	−0.0356	−9.0094	−0.0262***

Note. The-test refers to a standard test for equality of the Satterthwaite—Welch; *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively of Wilcoxon–Mann–the Whitney signed-rank test.

We validate our results by repeating our analysis by employing data from the S&P 1000 firms, a composite of the S&P 400 MidCap and the S&P 600 SmallCap indices. Our results demonstrate consistency with our earlier findings, revealing a substantial and statistically significant CAR decline in this market classification, ranging between 667 and 1033 basis points. Notably, we observed more negative skewness and greater kurtosis in abnormal returns during the post-event period. This observation is likely reflecting the nature of these firms in terms of size compared to S&P 500 firms. Additionally, since our sample focuses on the U.S. equity market, our findings align with those of Pradey et al. (2023), who found that developed markets, compared to emerging markets, experienced a significantly greater negative impact from the SVB collapse, likely due to their higher level of integration. Furthermore, our results are consistent with those of Aharon et al. (2023) and Ali et al. (2023). Overall, our results support our hypothesis that financial crises can spread across institutions and markets due to their interconnectedness.

3.2. Banking sector results

To gain further insights into the impact of the SVB collapse on the banking sector, we analyzed the effect on 95 banking stocks included in the S&P Banks Select Industry Index (S&P Banks), and **Figure 2** displays the outcomes of the mean-adjusted returns method for $AR_{i,t}$ and $CAR_{i,t}$ of the stocks in the S&P 500 in comparison to those in the S&P Banks Index during the SVB collapse on 8 March 2023. **Figure 3** illustrates the results of the market model for $AR_{i,t}$ and $CAR_{i,t}$ of the same stocks within the same event timeframe. Both **Figures 2** and **3** reveal that the downtrend in $AR_{i,t}$ and

$CAR_{i,t}$ is more pronounced for the banking industry than for the stocks of the S&P 500, as expected.

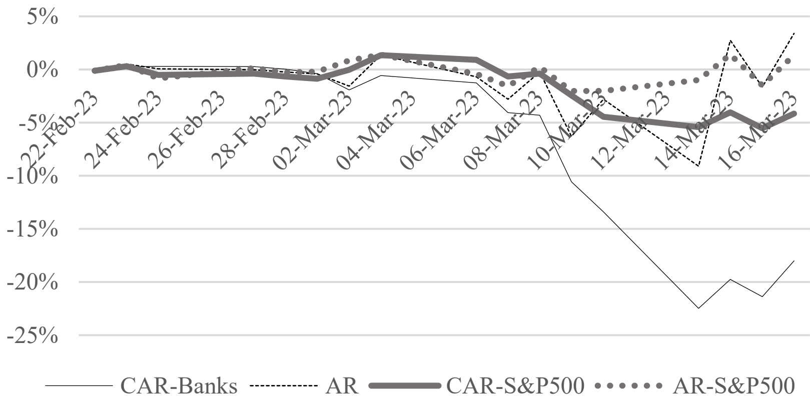

Figure 2. Mean-adjusted returns: $AR_{i,t}$ and $CAR_{i,t}$ surrounding SVB collapse.

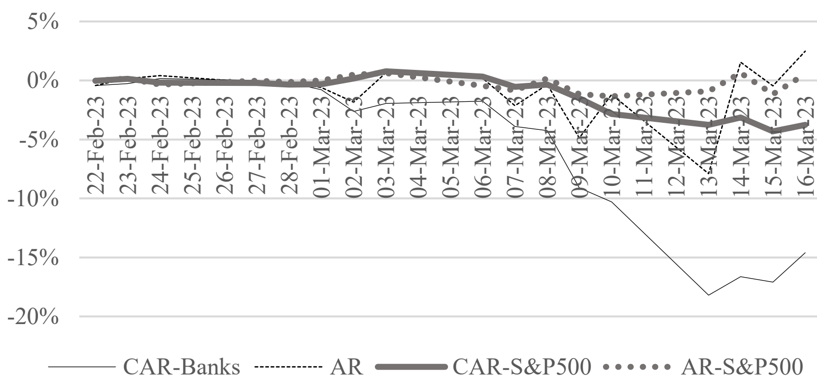

Figure 3. Market model: $AR_{i,t}$ and $CAR_{i,t}$ surrounding SVB collapse.

Table 4 shows the outcomes of the mean and median equality tests for the 95 banking stocks using the mean-adjusted returns and market models. Panels A of **Table 4** indicates that both the mean and median equality tests exhibit a significant negative response after the event across all event day windows. A similar conclusion is drawn for the market model, as demonstrated in Panel B of **Table 4**. These findings strongly suggest a negative reaction for the banking stocks due to the SVB collapse. It is worth noting that Yousaf and Goodell (2023) found the financial sector in the U.S. market to be one of the most severely impacted compared to other sectors, with significant negative abnormal returns. This is further confirmed by Martins (2024), who identified substantial negative abnormal returns for the largest 100 U.S. banks following the announcement of SVB's collapse.

The subsequent response of regulatory agencies is apparent in the [−4, +4] and throughout the [−6, +6] event day windows across all tables. Specifically, these windows display a slight rebound and dampening effect in CARs, as well as a reversion toward a less negative market reaction compared to the days immediately surrounding the event. This effect is observable in both the overall market returns and the banking sector. This effect is consistent with the findings of Yadav et al. (2023), who observed mixed results across the markets they studied. In the long run, they found positive and significant abnormal returns for the T+7 and T+8 periods, with the exception of NASDAQ.

Table 4. Banking sector: mean and median equality tests for $CAR_{i,t}$ using mean-adjusted returns and market model.

Panel A: Mean-adjusted Returns			
Event Window	Mean	t-test	Median
[−1, 1]	−0.0932	−24.7973	−0.0907***
[−2, 2]	−0.1281	−15.9246	−0.1098***
[−3, 3]	−0.2055	−13.1548	−0.1627***
[−4, 4]	−0.1936	−14.9744	−0.1688***
[−5, 5]	−0.2142	−15.2355	−0.1825***
[−6, 6]	−0.1827	−13.739	−0.1627***
Panel B: Market Model			
Event Window	Mean	t-test	Median
[−1, 1]	−0.0736	−19.0031	−0.0724***
[−2, 2]	−0.0834	−9.9789	−0.0671***
[−3, 3]	−0.1558	−9.8326	−0.1193***
[−4, 4]	−0.1585	−12.1104	−0.1322***
[−5, 5]	−0.1689	−11.8757	−0.1360***
[−6, 6]	−0.1460	−10.8756	−0.1257***

Note. The-test refers to a standard test for equality of the Satterthwaite–Welch; *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively of the Wilcoxon–Mann–Whitney signed-rank test.

To assess the impact on the banking sector, we compared the abnormal returns of stocks in the S&P Banks index with those in the S&P 500. **Table 5** compares the difference in $CAR_{i,t}$ using mean-adjusted returns and the market model between the stocks in the S&P 500 and those in the S&P Banks. The results imply that the stocks in the S&P Banks experienced a more pronounced negative reaction to the event than those in the S&P 500. Moreover, the ensuing response of the Treasury Department and other agencies to safeguard all depositors led to a stronger positive reaction in the $CAR_{i,t}$ of the banking sector compared to the broader market. These results are similar to the findings of Choi et al. (2023), who reported that the banking industry's relative performance diverged significantly from the overall market, with a 20% decline. Overall, our results support our hypothesis that financial crises can spread across institutions and markets due to their interconnectedness.

Table 5. Difference in $CAR_{i,t}$ using mean-adjusted returns and market model between the stocks included in the S&P 500 and the stocks included in the S&P banks.

		Mean-adjusted Returns		Market Model	
t	Date	Diff. (S&P Banks ($CAR_{i,t}$)– S&P 500 ($CAR_{i,t}$))	t-test	Diff. (S&P Banks ($CAR_{i,t}$)– S&P 500 ($CAR_{i,t}$))	t-test
−10	22-Feb-23	−0.0019	−2.0391	−0.0041	−4.4535
−9	23-Feb-23	−0.0008	−1.7127	−0.0040	−0.2868
−8	24-Feb-23	0.0081	3.8268	0.0035	4.0435
−7	27-Feb-23	0.0066	2.5308	0.0020	0.2854
−6	28-Feb-23	0.0069	2.6696	0.0015	0.9550
−5	1-Mar-23	0.0049	1.9938	−0.0046	−1.1415
−4	2-Mar-23	-0.0190	−7.1703	−0.0277	−9.3696
−3	3-Mar-23	−0.0192	−0.0726	−0.0274	−0.5483
−2	6-Mar-23	−0.0218	−6.6142	−0.0207	−0.4550
−1	7-Mar-23	−0.0341	−8.9825	−0.0337	−6.7232
0	8-Mar-23	−0.0390	−0.6461	−0.0389	−0.0297
+1	9-Mar-23	−0.0816	−10.2301	−0.0760	−8.7305
+2	10-Mar-23	−0.0894	−2.8812	−0.0745	−2.9040
+3	13-Mar-23	−0.1705	−3.5494	−0.1443	−3.9764
+4	14-Mar-23	−0.1571	−9.4640	−0.1350	−6.5521
+5	15-Mar-23	−0.1587	−6.9665	−0.1278	−6.9523
+6	16-Mar-23	−0.1384	−15.9792	−0.1084	−13.1690

Note. The t-test refers to a standard test for equality of the Satterthwaite–Welch with unequal variances.

3.3. OLS regressions

To examine the determinants of the observed negative CARs, we conducted a cross-sectional OLS regression analysis on the banks in our sample, as presented in **Tables 6** and **7**. In this analysis, the CARs serve as the dependent variable, while accounting for factors such as the percentage of insured deposits relative to total liabilities, bank size, and the total risk-weighted capital ratio. We believe these factors play a crucial role in influencing CARs, albeit different from those used by Pradey et al. (2023), who considered factors such as banking sector development, stability, gross domestic product, inflation rate, past returns, and past volatility. Additionally, our selected factors further differ from those employed by Martins (2024), who focused on size, liquidity risk, institutional ownership, profitability, operational efficiency, capitalization/risk aversion, credit risk/asset structure, foreign deposits ratio, uninsured deposits, and the size of bank balance-sheet items.

Our findings demonstrate a consistently positive relationship between insured deposit concentration and CARs, particularly within the [−3, 3] to the [−6, 6] event windows. This result is not only statistically significant but also remains robust across diverse regression specifications, with the exception of the [−1, 1] event window in the mean returns model[1].

We repeated our analysis using total deposits instead of total liabilities as the denominator in calculating the insured deposit ratio, and found qualitatively and quantitatively similar results. These outcomes support the hypothesis that the market incorporates the concentration of insured deposits into its pricing, potentially serving as a significant predictor of bank runs. Consequently, this emphasizes the crucial role that insured deposit concentration plays in fostering financial stability, supporting our hypothesis that stocks of banks with a high concentration of insured deposits are more stable during bank run crises.

Table 6. Market model $CAR_{i,t}$ OLS regressions.

Panel (A)									
	Market Model CARs [−1, 1]			Market Model CARs [−2, 2]			Market Model CARs [−3, 3]		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Insured Deposit Ratio	0.843***	0.401***	0.406***	1.460***	0.713***	0.693***	2.408***	1.178***	1.127**
	(0.234)	(0.138)	(0.147)	(0.438)	(0.242)	(0.251)	(0.787)	(0.437)	(0.437)
Log(Total Assets)		−0.0309***	−0.0305***		−0.0523***	−0.0509***		−0.0860***	−0.0835***
		(0.00625)	(0.00645)		(0.0118)	(0.0120)		(0.0200)	(0.0200)
Total Risk Based Capital Ratio			−0.00283			−0.00826			−0.0144
			(0.00251)			(0.00579)			(0.0102)
Constant	−0.0796***	0.280***	0.320***	−0.139***	0.470***	0.585***	−0.235***	0.767***	0.969***
	(0.0189)	(0.0642)	(0.0811)	(0.0345)	(0.120)	(0.164)	(0.0605)	(0.205)	(0.284)
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.182	0.429	0.443	0.177	0.407	0.435	0.163	0.373	0.400
Panel (B)									
	Market Model CARs [−4, 4]			Market Model CARs [−5, 5]			Market Model CARs [−6, 6]		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Insured Deposit Ratio	3.308***	1.633**	1.566**	4.161***	1.989**	1.892**	4.922***	2.267**	2.134**
	(1.101)	(0.629)	(0.630)	(1.420)	(0.805)	(0.797)	(1.749)	(0.980)	(0.953)
Log(Total Assets)		−0.117***	−0.114***		−0.152***	−0.148***		−0.186***	−0.180***
		(0.0277)	(0.0278)		(0.0345)	(0.0348)		(0.0414)	(0.0416)
Total Risk Based Capital Ratio			−0.0188			−0.0235			−0.0289
			(0.0139)			(0.0166)			(0.0196)
Constant	−0.324***	1.041***	1.304***	−0.413***	1.356***	1.685***	−0.494***	1.668***	2.073***
	(0.0847)	(0.286)	(0.391)	(0.108)	(0.358)	(0.473)	(0.130)	(0.432)	(0.561)
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.156	0.355	0.379	0.154	0.361	0.383	0.150	0.366	0.388

Note.Robust standard errors in parentheses,*** p<0.01, ** p<0.05, * p<0.1

Table 7. Mean-adjusted returns $CAR_{i,t}$ OLS Regressions.

Panel (A)									
	Mean Model CARs [−1, 1]			Mean Model CARs [−2, 2]			Mean Model CARs [−3, 3]		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Insured Deposit Ratio	0.120	0.306	0.395	0.454	0.797	0.937*	1.294	1.887**	2.129***
	(0.363)	(0.354)	(0.304)	(0.579)	(0.542)	(0.479)	(0.809)	(0.720)	(0.656)
Log(Total Assets)		0.0131	0.0113		0.0240*	0.0211		0.0415*	0.0361*
		(0.00811)	(0.00745)		(0.0139)	(0.0131)		(0.0220)	(0.0212)
Total Risk Based Capital Ratio			0.00792			0.0127			0.0244
			(0.00477)			(0.00961)			(0.0163)
Constant	−0.200***	−0.352***	−0.464***	−0.366***	−0.645***	−0.824***	−0.635***	−1.118***	−1.461***
	(0.0203)	(0.0974)	(0.115)	(0.0372)	(0.165)	(0.224)	(0.0631)	(0.258)	(0.380)
Observations	72	72	72	72	72	72	72	72	72
R−squared	0.003	0.033	0.095	0.010	0.039	0.087	0.029	0.060	0.122
Panel (B)									
	Market Model CARs [−4, 4]			Market Model CARs [−5, 5]			Market Model CARs [−6, 6]		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Ratio of Total Deposits < $250K to Total Liabilities	1.909*	2.674***	3.022***	2.594**	3.436***	3.874***	3.210**	4.016***	4.523***
	(1.083)	(0.968)	(0.882)	(1.295)	(1.186)	(1.108)	(1.481)	(1.400)	(1.346)
Log (Total Assets)		0.0535*	0.0455		0.0589	0.0484		0.0564	0.0440
		(0.0304)	(0.0293)		(0.0381)	(0.0370)		(0.0462)	(0.0451)
Total Risk Based Capital Ratio			0.0370*			0.0493*			0.0591*
			(0.0222)			(0.0271)			(0.0321)
Constant	−0.875***	−1.498***	−2.018***	−1.120***	−1.806***	−2.498***	−1.324***	−1.981***	−2.810***
	(0.0870)	(0.354)	(0.524)	(0.108)	(0.445)	(0.647)	(0.128)	(0.539)	(0.780)
Observations	72	72	72	72	72	72	72	72	72
R-squared	0.034	0.061	0.135	0.039	0.059	0.140	0.041	0.054	0.134

Note. Robust standard errors in parentheses,*** p<0.01, ** p<0.05, * p<0.

4. Conclusion

This paper contributes to the literature on bank failures and their systemic and market impacts. By analyzing CARs, coupled with bank-specific metrics, including the percentage of insured deposits, we have demonstrated the market's perception of the potential spillover effects of SVB's collapse and the response to subsequent government actions.

The collapse of financial institutions can lead to significant social and economic ramifications. In examining the S&P 500 listed stocks during the SVB collapse, we discovered a considerable negative impact on U.S. stock returns. Our additional analyses indicate that this negative response was also felt in other markets like the S&P 1000, but was particularly pronounced within the banking industry, as anticipated.

The prompt intervention by the U.S. Treasury Department and other agencies to safeguard all depositors, beginning on Monday, 13 March resulted in a positive response in the U.S. financial markets overall, and an even more pronounced positive effect within the banking sector specifically.

Furthermore, the collapse of SVB highlights several critical policy implications that can be learned to avert recurrences in the future. These include reinforcing risk management practices and incentivizing financial institutions to adopt more robust risk management frameworks. Such frameworks should effectively monitor and manage various risks, including liquidity and significant concentration of uninsured depositors. Furthermore, a reassessment of certain elements and provisions of the Dodd-Frank Act that have been repealed may be warranted. Specifically, the Economic Growth, Regulatory Relief, and Consumer Protection Act was enacted in 2018, which scaled back some provisions of the Dodd-Frank Act, especially for small and mid-sized banks. Banks like SVB, with assets between $100 billion and $250 billion, were no longer subject to the enhanced prudential standards established by the Dodd-Frank Act, including Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) requirements. This change led to more lenient liquidity requirements for these banks, providing them with increased flexibility in managing their balance sheets and capital.

Author contributions: Conceptualization, SA, AB and AMA; methodology, SA and AMA; software, SA and AMA; validation, SA, AB and AMA; formal analysis, SA, AB and AMA; investigation, SA and AMA; resources, SA and AMA; data curation, SA and AMA; writing—original draft preparation, SA and AMA; writing—review and editing, SA, AB and AMA; visualization, AMA; supervision, AMA. All authors have read and agreed to the published version of the manuscript."

Data availability statement: The data that support the findings of this study are available upon reasonable request.

Conflict of interest: The authors declare no conflict of interest.

Notes

[1] Upon review, we acknowledge the differences in the sign and significance of some variables across the tables. Specifically, while the Total Risk-Based Capital Ratio in Table 7 is positive and significant, it is negative in Table 6 but insignificant, which does not necessarily indicate conflicting results. As for Bank Size, although the sign is positive in Table 7, it is only significant at the 10% level in 4 out of 12 specifications in the Mean-adjusted Returns model, indicating a very weak and inconsistent effect for this variable. In contrast, it is negative and significant at the 1% level in all 12 specifications in the Market model of Table 6. It is also important to note that our main variable of interest remains the Insured Deposit Ratio.

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