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RESEARCH PAPER

Examining the Global Ripple Effects: Analyzing the Impact of First Republic Bank's Fall on Different Financial Market

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ABSTRACT

The collapse of First Republic Bank, the largest bank failure in the United States since the 2008 financial crisis, had significant ripple effects on various sectors within the global financial system. This research study examines the interconnectedness and vulnerabilities of the financial markets by analyzing the impact of the bank's fall on top United States banks, United States equity exchanges, global equity indices, and prominent cryptocurrencies. Using the event study methodology, we calculate abnormal returns and Cumulative Abnormal Returns (CARs) over a specified event window. The findings highlight the widespread and significant abnormal returns observed across sectors, emphasizing the systemic risks associated with bank failures. The results also demonstrate the decline in stock prices and investor confidence in the banking sector following the collapse. The study contributes to a more comprehensive understanding of the interconnectedness and spillover effects in the aftermath of a significant banking event, providing valuable insights into the global financial landscape's broader implications and risks.

Keywords:, Bank, Effects United States, Equity

Introduction

The collapse of banking institutions represents a critical episode in the annals of financial history that rings with profound consequences (Demirgüç-Kunt & Huizinga 2010). It is an event that disrupts economies, shatters investor confidence, and challenges the stability of the global financial system (Laeven & Valencia 2018).

In March 2023, two regional banks, Silicon Valley Bank and Signature Bank, failed. These failures caused a loss of confidence in the banking system, which led to a run on the First Republic. On May 1, 2023, a California-based first Republic Bank collapsed. This collapse was the largest bank failure in the United States since the 2008 financial crisis. The First Republic had a business model that relied on attracting deposits from wealthy individuals and businesses. These depositors were attracted to First Republic's high-interest rates. However, when interest rates began to rise, these depositors began to withdraw their money from the First Republic.

The collapse of First Republic Bank is a reminder of the interconnectedness of the financial system. When one bank fails, it can have a ripple effect on other banks and the overall economy. Reinhart and Kenneth (2009), focus on the causes and consequences of the global financial crisis, with a specific emphasis on banking crises. Flood and Garber (1981) explore the possibility of a systematic banking collapse in a perfect foresight world, examining the conditions and timing of such a collapse. Boyd and Gertler (1994) discussed that the large banks' risk-taking and the "too-big-to-fail" policy were key factors in the US

banking crisis of the 1980s, leading to increased loan losses and a higher likelihood of failure. Jiang et.al. (2023) emphasizes the potential systemic fragility of banks stems from their vulnerability to recent interest rate increases, resulting in marked declines in asset values and the possibility of uninsured depositor runs, posing a significant risk to financial stability.

This research aims to examine the global ripple effects of First Republic Bank's fall on different financial markets, specifically focusing on the top five US banks, five US equity exchanges, five global equity indices, and five prominent cryptocurrencies. By analyzing the impact of this event on these sectors, valuable insights can be gained into the interconnectedness and vulnerabilities of the global financial system.

In this research Binder's (1998) event study methodology is used to capture the true magnitude of market movements. The study calculated the actual daily returns for each variable by comparing the opening and closing prices. Expected returns are estimated using a 110-day estimation window, applying the market model which relates an asset's return to the market return through a linear regression model. Abnormal returns are then calculated by subtracting the expected returns from the actual returns. The Cumulative Abnormal Returns (CARs) over the event window are computed by summing the abnormal returns for each day. The event window starts from 17 April 2023 $(t - 10)$ and extends to 15 May 2023 $(t + 10)$.

Recent event studies have gained significant attention in the field of finance and economics due to their ability to analyze the impact of specific events on financial markets (El Ghou *et al* 2023; Gigante *et al* 2023; Chang *et al.* 2023; Alam & Abdurraheem 2023; Yousaf & Goodell 2023; Khoo 2023; Yadav *et al.* 2023; Sheppard 2023; Azimli 2023; Mundi & Yadav 2023; Takahashi & Yamada 2021, Al-Qudah & Houcine 2022).

Yadav et al. (2023) found that the Silicon Valley Bank (SVB) had a substantial impact on the top nine global equity indices between September 6, 2022, and March 22, 2023. The sharp decline in equities resulted from a bank run on March 10, 2023. Yousaf and Goodell (2023) found that the stock market reacted negatively to the news of Silicon Valley Bank's failure. The financial, materials, and real estate sectors were particularly hard hit.

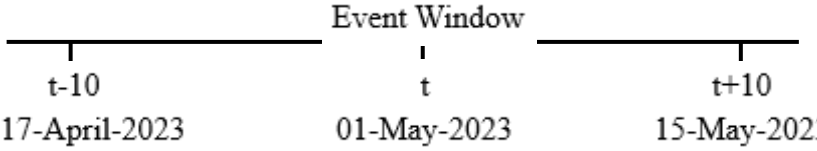
Material and Methods

Our ensemble of variables takes us across the globe, capturing the essence of Dow Jones-Utility, Telecom-Nasdaq, Transportation-Nasdaq, and *cryptocurrencies* (BTC, ETH, BNB, Tether, and XRP). We collected the daily data, and all the data is collected from *investing.com.* The central focus of interest in our study is the collapse of the First Republic Bank. By designating May 1, 2023, as the event day, we pinpoint the epicenter of the financial crisis that rolls across markets. To capture the full extent of the fallout, an event window spanning from 10 days before the event (T-10) to 10 days after the event (T+10) is established. This temporal framework allows for a comprehensive assessment of the subsequent impact on the selected variables. We applied an estimation window of 110 days, plus t-2 means that we used 112 days to estimate the actual returns.

To scale the true magnitude of market movement, the actual return for each variable is calculated daily. This reveals the relative change in price between the opening and closing prices of each trading day within the specified date range. By employing a simple yet powerful formula, we solve the essence of these returns:

$$R_{it} = \left[\frac{Current\ idex\ price - Previous\ Index\ price}{Previous\ Index\ price}\right] * 100 \qquad (1)$$

To estimate the expected returns of an asset, we use a 110-day estimation window from 03- November-2022, to 13- April- 2023. The event window starts from 17 April 2023 to 15-May-



2023. We use the market model to estimate expected returns, which is a linear regression model that relates the asset's return to the market return. The market model is defined as:-

$$R_{it} = \delta_i + \gamma_i R_{mt} + \epsilon_{it} \quad (2)$$

Where, R_{it} is the expected return for the selected variables at time t. The term $\delta_i$the intercept representing the expected return when the market return is zero. γ_i is the coefficient of the market return R_{mt}, indicating the sensitivity of the variable's expected return to changes in the market return. The ϵ_{it} is an error term, representing the unexplained variation in the variable's expected return at time t. The next step is to calculate the Abnormal return from equations (1) and (2).

$$AR_{it} = R_{it} - E(R_{it}) \quad (3)$$

Where, AR_{it} the abnormal return for the selected variables at time t, R_{it} is the actual return for the variable at time t. The term $E(R_{it})$ is the expected return at time t. To measure the impact of an event on the value of a stock, we can calculate the cumulative abnormal returns (CARs) over the event window. The CARs are calculated by summing the abnormal returns for each day in the event window. Finally, CARs are calculated over the event window from day $\eta 1$ *to* $\eta 2$.

$$CAR_I(\eta 1, \eta 2) = \sum_{t=\eta 1}^{\eta 2} AR_{it} \quad (4)$$

To assess the average abnormal performance of individual assets or securities during the specified event window, we computed the average abnormal return. The average abnormal return represents the mean deviation from expected returns for each asset or security in our sample. The equation for calculating the average abnormal return is expressed as follows:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{\eta} AR_{it} \quad (5)$$

Where AAR_t is the Average Abnormal Returns at time t, which represents the average deviation from expected returns across the indexes included in our analysis. Moreover, N denotes the number of indexes considered in our study. Additionally, we computed the Cumulative Average Abnormal Returns (CAARs) over the event window. CAARs provide a cumulative measure of the average abnormal returns across the specified period, taking into account the successive abnormal returns observed.

Table 1
Abnormal returns on the event day

	AR	**t-statistics**
Panel A: Top US Banks		
JPM	1.59023	5.74875***
Bank Of America	2.84318	8.15886***

Citibank	2.65395	8.84194***
Wells Fargo	3.81151	8.19130***
US Bancorp	7.29858	10.32566***
Panel B: US Equity Exchanges		
Health Care (Dow Jones)	0.63115	4.30805***
Oil & Gas (Dow Jones)	4.32643	12.98675***
Utility (Dow Jones)	1.32543	6.61097***
Telecom (Nasdaq)	1.91888	7.47999***
Transportation (Nasdaq)	1.17504	3.92922***
Panel C: Global Equity Indices		
DAX	1.32184	10.56407***
Euro Stoxx 50	1.59123	12.85657***
FTSE-100	-0.44432	-4.01354***
Nikkei 225	-0.16595	-1.27352
S&P 500	1.20415	6.64426***
Panel D: Crypto Currencies		
BTC	2.47473	3.92922***
ETH	5.33374	6.45976***
BNB	1.53485	11.09268***
TETHER	-0.08963	4.12829***
XRP	2.19546	-11.70248***

Notes: t-statistics are given in parentheses. ***, **, * indicates the level of significance at 1%, 5% and 10% respectively. Table 4.2 Cumulative abnormal returns (CAR) of Top US Banks

Table 2
Impact on the banks

	JPM	BOA	Citibank	Wells Fargo	US Bancorp
t-10	2.9346*** (-4.19828)	4.3591*** (-2.59286)	7.1781*** (-2.80588)	3.459*** (-3.31083)	16.4527 (1.26428)
t-9	4.0959 (0.27639)	5.2626*** (3.96444)	8.0203** (-2.32668)	4.9996** (-2.26764)	15.5591*** (-3.5654)
t-8	4.0195 (0.86821)	3.8811 (0.72686)	8.7187*** (6.5328)	6.0547** (2.55457)	18.0792*** (4.74371)
t-7	3.7793 (0.51012)	3.6278 (-0.52052)	6.7579** (2.30281)	4.866* (1.85566)	14.7262*** (4.88971)
t-6	3.6382 (-0.67246)	3.8092 (0.25195)	6.0667 (-0.21137)	4.0026 (-1.47396)	11.27*** (2.80579)
t-5	3.8242*** (7.85081)	3.7214*** (8.34542)	6.1301*** (7.64819)	4.6884*** (4.38472)	9.2867*** (4.19831)
t-4	1.6525 *** (6.33837)	0.8132*** (3.22731)	3.8345*** (7.18275)	2.6482*** (5.55127)	6.3192 (0.77826)
t-3	-0.1008*** (-4.98512)	-0.3114*** (-5.27855)	1.6785 (-1.41565)	0.0651 (-1.46891)	5.7691*** (-4.9047)
t-2	1.2782*** (-3.29631)	1.528*** (-4.63098)	2.1034 (-0.49449)	0.7486 (-0.87174)	9.236*** (-7.4010)
t-1	2.1900*** (-7.76269)	3.1418 (1.56286)	2.2519 (-1.48055)	1.1542*** (-3.7905)	14.4673*** (5.41136)
t+1	2.7471*** (7.63165)	-0.246** (2.28132)	0.0423** (2.19598)	-0.8935 (0.67132)	3.3438*** (3.59656)
t+2	0.6360*** (4.82903)	-1.041*** (8.44127)	-0.6168*** (5.5021)	-1.2059*** (10.91046)	0.8016*** (3.65924)
t+3	-0.6998*** (-7.111)	-3.9826*** (-8.265)	-2.2683*** (-10.42487)	-6.2827*** (-7.29578)	-1.7849*** (8.44391)

t+4	1.2673 (-1.05473)	-1.1024 (-0.60146)	0.8608 (-0.49882)	-2.8878*** (-2.84894)	4.1836*** (4.41321)
t+5	1.559 (1.5647)	-0.8928 (-0.49749)	1.0105 (-1.35724)	-1.5622 (-1.27736)	1.0642 (1.14795)
t+6	1.1262 (-0.36981)	-0.7194*** (2.76255)	1.4179 (0.86636)	-0.9678 (1.07452)	1.8756* (1.86595)
t+7	1.2285 (0.95818)	-1.6821 (-1.54211)	1.1578** (2.24953)	-1.4678 (-0.66549)	0.5567** (2.24888)
t+8	0.9634*** (5.0724)	-1.1447** (2.36915)	0.4826*** (4.0402)	-1.1582*** (4.4301)	-1.0329 (1.36375)
t+9	-0.4397*** (-3.20518)	-1.9703*** (-6.62063)	-0.7301*** (-4.55224)	-3.2195*** (-7.48043)	-0.069*** (2.82503)
t+10	0.4469 (1.61561)	0.3368 (0.96651)	0.6363** (2.11996)	0.2612 (0.56134)	1.9279*** (2.72745)

Table 3
Cumulative abnormal Returns (CAR) of US equity exchanges

	Health Care (Dow Jones)	Oil & Gas (Dow Jones)	Dow Jones Utility	Telecom (Nasdaq)	Transportation (Nasdaq)
t-10	3.0709*** (4.76254)	9.2231 (-1.34044)	4.5155** (2.30201)	4.353 (0.92182)	0.5659 (-0.94454)
t-9	2.3732** (-2.06853)	9.6697 (0.55521)	4.054*** (-3.82367)	4.1165*** (7.36814)	0.8483*** (-2.87774)
t-8	2.6763*** (3.50725)	9.4847** (2.41425)	4.8206 (0.16449)	2.2263*** (7.82809)	1.7089 (0.32221)
t-7	2.1624*** (-4.92876)	8.6804 (1.47059)	4.7876 (-1.13729)	0.2181 (-0.96499)	1.6126* (-1.85394)
t-6	2.8845*** (-3.07797)	8.1905*** (-4.71854)	5.0156** (-2.4407)	0.4657 (1.05324)	2.167 (-0.9258)
t-5	3.3355*** (7.68287)	9.7625*** (5.59134)	5.505 (-0.2956)	0.1955** (2.00566)	2.4439*** (6.74289)
t-4	2.2099*** (9.61737)	7.8997*** (3.74774)	5.5642*** (10.92531)	-0.319*** (2.65015)	0.4274*** (12.48987)
t-3	0.8009*** (-3.12345)	6.6512 (-1.63711)	3.3738*** (-4.25699)	-0.9989*** (-13.0466)	-3.3077*** (-7.45395)
t-2	1.2585*** (-5.58829)	7.1966*** (-4.41081)	4.2273** (2.14471)	2.348*** (-3.04927)	-1.0786*** (-6.72511)
t-1	2.0772*** (-3.96479)	8.666*** (3.42483)	3.7973 (-0.42224)	3.1303 (0.10118)	0.9325** (-2.5328)
t+1	2.0269 (0.27438)	3.1986*** (5.69116)	2.5565* (1.66197)	1.1854** (2.45195)	0.5149 (-0.82947)
t+2	1.9867*** (5.32338)	1.3027*** (2.91123)	2.2233*** (-5.08532)	0.5564*** (2.64073)	0.763*** (4.48936)
t+3	1.2068*** (-6.39848)	0.3328*** (-8.38976)	3.2429*** (-3.16329)	-0.121*** (-3.65459)	-0.5795*** (-6.79414)
t+4	2.1442* (1.85553)	3.1278 (-0.50819)	3.8771* (1.71376)	0.8165 (-0.6594)	1.4522 (0.4108)
t+5	1.8724*** (4.51718)	3.2971 (-0.2152)	3.5335 (0.25277)	0.9857*** (5.22807)	1.3294 (-0.61569)
t+6	1.2106** (-1.97199)	3.3688*** (2.98855)	3.4828*** (-3.66932)	-0.3555 (-1.02546)	1.5135* (1.84657)
t+7	1.4995** (2.40904)	2.3732*** (3.44358)	4.2185*** (5.57301)	-0.0925 (-0.13554)	0.9613* (1.84001)
t+8	1.1466 (1.43915)	1.226* (-1.68359)	3.1011 (-1.32283)	-0.0577 (-0.39022)	0.411 (-0.1002)

t+9	0.9357 (0.38738)	1.7869 (-0.97486)	3.3664*** (7.38578)	0.0424** (-2.50455)	0.441 (-1.14012)
t+10	0.879*** (5.99963)	2.1116*** (6.33853)	1.8856*** (9.40486)	0.6849*** (2.669)	0.782*** (2.61482)

Notes: t-statistics are given in parentheses. ***, **, * indicates the level of significance at 1%, 5% and 10% respectively.

Table 4
Cumulative abnormal returns (CAR) of global equity exchanges

	DAX (GER)	Euro Stoxx 50 (Euro Zone)	FTSE 100 (UK)	Nikkei 225 (Japan)	S&P 500 (USA)
t-10	1.1664 (1.5420)	3.7068*** (5.0107)	2.3143*** (-2.8124)	-6.479** (-2.1864)	1.4402 (-0.2951)
t-9	0.9735*** (-4.0542)	3.0866*** (-4.1133)	2.6257 (-0.4099)	-6.1941*** (-9.2250)	1.4937 (0.2227)
t-8	1.4808 (0.0024)	3.5957 (0.8000)	2.6711*** (-2.9568)	-4.992 (-0.7357)	1.4534*** (3.4804)
t-7	1.4805*** (5.6529)	3.4967** (2.3350)	2.9984* (1.6815)	-4.8961*** (-4.0194)	0.8226 (-0.3216)
t-6	0.7731*** (-3.6796)	3.2077*** (-3.6188)	2.8122 (0.0224)	-4.3723 (1.2345)	0.8809 (-0.2932)
t-5	1.2335 (1.5246)	3.6556** (1.9764)	2.8098 (-0.8535)	-4.5332 (-1.5228)	0.934*** (9.0405)
t-4	1.0428 (0.2205)	3.4109*** (5.1502)	2.9043 (0.6816)	-4.3348** (2.3416)	-0.7044** (2.3039)
t-3	1.0152*** (4.4979)	2.7735*** (6.3312)	2.8288*** (2.8732)	-4.6399 (-0.9445)	-1.1219*** (-10.4127)
t-2	0.4524 (0.3937)	1.9899 (-1.1868)	2.5107*** (4.8889)	-4.5168 (-0.8741)	0.7652*** (-4.3404)
t-1	0.4031*** (-5.4875)	2.1368 (0.4965)	1.9695*** (2.8904)	-4.4029*** (5.3360)	1.5518 (0.3894)
t+1	-0.2321*** (-3.8205)	0.4841** (-2.1435)	2.0938*** (11.796)	-4.9323*** (-10.7667)	0.2771*** (4.0649)
t+2	0.2460*** (4.7375)	0.7494*** (5.0931)	0.7879 (-1.3178)	-3.5293*** (-7.1908)	-0.4596*** (4.1883)
t+3	-0.3468*** (-10.722)	0.1190*** (-9.2101)	0.9338*** (10.5151)	-2.5923 (-1.0773)	-1.2187*** (-9.8328)
t+4	0.9949 (1.0427)	1.259 (-0.7971)	-0.230*** (-8.3343)	-2.4519*** (5.3532)	0.5633 (-0.0730)
t+5	0.8644 (0.4997)	1.3576*** (5.5071)	0.6924** (2.1239)	-3.1495*** (-7.8496)	0.5766*** (2.7146)
t+6	0.8019*** (3.6112)	0.6760*** (3.7936)	0.4572*** (3.1171)	-2.1266*** (3.0167)	0.0846** (-2.2868)
t+7	0.3500*** (3.7272)	0.2065 (0.1695)	0.1121* (1.7174)	-2.5197 (-0.2818)	0.499 (1.1140)
t+8	-0.1164*** (-3.3304)	0.1855 (-0.7911)	-0.0780** (-2.3389)	-2.4829*** (-6.9927)	0.2971 (1.0512)
t+9	0.3003 (0.4607)	0.2834 (1.0052)	0.1810** (-2.2191)	-1.5717*** (-6.3281)	0.1066 (-1.4512)
t+10	0.2427* (1.9395)	0.159 (1.2845)	0.4266*** (3.8537)	-0.7471*** (-5.7333)	0.3696** (2.0394)

Notes: t-statistics are given in parentheses. ***, **, * indicates the level of significance at 1%, 5% and 10% respectively.

Table 5
Cumulative abnormal returns (CAR) of Crypto Currencies

	BTC	ETHER	BNB	TETHER	XRP
t-10	12.1865 (-0.1120)	7.765 (0.4478)	11.1375*** (6.7057)	-0.0058*** (-2.5848)	17.3274*** (5.2829)
t-9	12.2294*** (-8.3733)	7.5497*** (-4.2031)	8.6444 (0.1220)	0.014*** (2.6365)	15.3762* (-1.9525)
t-8	15.4373** (2.1431)	9.5707** (2.4222)	8.599*** (5.7619)	-0.0062*** (-5.1941)	16.0974*** (-6.5026)
t-7	14.6162* (1.6471)	8.406 (-1.3800)	6.4568** (2.1229)	0.0336 (1.3306)	18.499* (1.6648)
t-6	13.9852 (0.8708)	9.0696*** (4.7776)	5.6675*** (-12.2084)	0.0234 (0.0255)	17.8841*** (5.1841)
t-5	13.6516*** (11.5597)	6.7723*** (4.8019)	10.2065*** (7.6350)	0.0232 (0.0255)	15.9694*** (4.0306)
t-4	9.2231*** (-4.3266)	4.4633*** (-3.8811)	7.3678*** (6.2160)	0.023 (-1.2793)	14.4808 (1.0136)
t-3	10.8806** (-2.3295)	6.3296*** (-3.3646)	5.0568*** (-3.3384)	0.0328*** (2.636)	14.1064 (1.4465)
t-2	11.773*** (2.6352)	7.9474*** (3.5247)	6.298 (2.0290)	0.0127 (-1.2794)	13.5721** (2.2902)
t-1	10.7635*** (-5.14065)	6.2526*** (-11.669)	5.5436** (-1.9395)	0.0225*** (-7.8001)	12.7263*** (-2.7216)
t+1	10.2581*** (4.9695)	6.5297*** (3.2791)	4.7299* (1.1228)	0.1718*** (5.2401)	11.536*** (6.4742)
t+2	8.3543*** (8.0784)	4.953*** (3.1033)	4.3124*** (6.3791)	0.1317*** (7.8521)	9.1448*** (13.8084)
t+3	5.2594 (1.2000)	3.4608 (0.5615)	1.9407* (1.6458)	0.0716*** (6.5509)	4.0449 (0.5322)
t+4	4.7997 (1.3233)	3.1908 (1.0962)	1.3288 (-1.5038)	0.0214*** (-3.8884)	3.8483 (-0.1088)
t+5	4.2928*** (6.7438)	2.6637*** (5.8128)	1.8879*** (6.2326)	0.0512*** (2.6354)	3.8885*** (6.9449)
t+6	1.7092*** (2.8158)	-0.1313 (-0.9931)	-0.4293 (-0.6740)	0.031 (-1.2792)	1.3235*** (-5.3794)
t+7	0.6304 (1.1614)	0.3462* (1.8678)	-0.1787 (-1.5418)	0.0408 (0.0255)	3.3103*** (4.8644)
t+8	0.1855 (-0.5358)	-0.5519 (-0.0298)	0.3946 (-0.9046)	0.0406*** (2.6357)	1.5137 (0.0144)
t+9	0.3907 (-1.5401)	-0.5376 (-1.5793)	0.7309 (-0.8396)	0.0204 (2.6362) ***	1.5084 (-0.3813)
t+10	0.9808** (2.5601)	0.2218 (0.4613)	1.0431*** (2.8055)	0.0002 (0.0255)	1.6492*** (4.4654)

Notes: t-statistics are given in parentheses. ***, **, * indicates the level of significance at 1%, 5% and 10% respectively.

Table 6
Aggregate AR & CAR of US banks, US equity exchanges, global equity exchanges, and Crypto Currencies

	Average Abnormal Returns	**t-stats (ARR)**	**Cumulative Average Abnormal Returns**	**t-stats (CAARs)**
t-10	0.0937	0.5074	5.3336	12.0261***
t-9	-0.5389	-2.9199***	5.2399	11.8149***
t-8	0.6223	3.3713***	5.7789	13.0301***
t-7	0.2845	1.5416	5.1566	11.6271***
t-6	-0.1087	-0.5891	4.8721	10.9855***

t-5	1.5345	8.3136***	4.9808	11.2306***
t-4	0.9023	4.8883***	3.4463	7.7708***
t-3	-0.9385	-5.0844***	2.5441	5.7364***
t-2	-0.4562	-2.4718**	3.4825	7.8524***
t-1	-0.4574	-2.4780**	3.9388	8.8811***
t	2.1265	11.5213***	4.3961	9.9124***
t+1	0.7648	4.1435***	2.2696	5.1175***
t+2	1.4680	7.9536***	1.5048	3.3931***
t+3	-1.3164	-7.1319***	0.0368	0.0830
t+4	0.0870	0.4716	1.3532	3.0511***
t+5	0.5487	2.9727***	1.2661	2.8548***
t+6	0.1399	0.7581	0.7174	1.6177
t+7	0.4113	2.2281**	0.5775	1.3022
t+8	0.0884	0.4792	0.1663	0.3749
t+9	-0.6371	-3.4517***	0.0778	0.1754
t+10	0.7149	3.8733***	0.7149	3.8733***

Notes: t-statistics are given in parentheses. ***, **, * indicates the level of significance at 1%, 5% and 10% respectively.

5 US Equity Exchanges: Oil & Gas (45), Technology (101), Telecom (91), Transportation (84), Health Care (92)

Top 5 Global Equity Exchange

Dow Jones Industrial Average (USA)-30

S&P/TSX Composite (Canada)-232

Euro Stoxx 50 (Euro Zone)-49

SZSE Component (SZI) (China)-500

FTSE 100 (UK)-94

Results and Discussion

The results presented in Table 4.1 provide evidence of the impact and significance of the collapse of First Republic Bank on various sectors. On the event day, the collapse of First Republic Bank had significant and statistically significant abnormal returns across top US banks, US equity exchanges, global equity indices, and prominent cryptocurrencies, indicating deviations from expected returns in all sectors. Overall, the findings suggest that the collapse of First Republic Bank had widespread and significant ripple effects on various sectors within the financial markets, both domestically and globally. It highlights the interconnectedness and vulnerabilities of the global financial system, emphasizing the potential risks and systemic implications associated with bank failures. Authors such as Berger and Demirgüç-Kunt (2021); Huizinga *et al.* (2013); Laeven, (2011); Reinhart and Rogoff (2013); Garber *et al.* (2002); Boyd et al. (2005); Boyd and Gertler (1994); Jiang *et al.* (2011) and Yadav *et al*. (2023) have highlighted the interconnectedness and ripple effects of bank failures on various financial markets.

Table 2 presents the Cumulative Abnormal Returns (CAR) for the top US banks, including JPM, BOA, Citibank, Wells Fargo, and US Bancorp. The table shows the CAR values for each bank before and after the event day (t-10 to t+10). The values in the table represent the cumulative abnormal returns, and the numbers in parentheses indicate the corresponding t-statistics, which measure the statistical significance of the abnormal

returns. Positive CAR values indicate that the banks had positive abnormal returns, meaning their stock prices performed better than expected Rebucci *et al.* (2022). Negative CAR values suggest negative abnormal returns, indicating underperformance compared to the expected returns Shingjergji and Hyseni (2015). The t+1 represents the immediate reaction after the event, where positive values indicate higher-than-expected returns and negative values suggest lower-than-expected returns. In t+1, JPM, Citibank, and US Bancorp had positive CAAR values, indicating higher-than-expected returns, while BOA and Wells Fargo had negative CAAR values, indicating lower-than-expected returns. The t+2 captures the short-term impact, with positive values indicating continued higher-than-expected returns. In t+2, JPM and US Bancorp had positive CAAR values, while BOA, Citibank, and Wells Fargo had negative CAAR values. In t+3, all banks (JPM, BOA, Citibank, Wells Fargo, and US Bancorp) had negative CAAR values. The negative CAAR values at t+3 after the collapse of First Republic Bank suggest a decline in stock prices and investor confidence in the banking sectors. The exact impact on the real world would depend on the specific circumstances surrounding the collapse and the subsequent reactions of market participants, regulators, and policymakers. The findings from my analysis of the collapse of First Republic Bank align with previous research conducted by Aldasoro *et al.* (2020)) on the impact of bank failures on different sectors. Studies have consistently shown that bank collapses can have far-reaching consequences for the economy, affecting sectors that heavily rely on bank financing.

Table 3 presents the CAR values for different sectors following the collapse of First Republic Bank. The analysis reveals several key findings. In the Health Care sector, positive abnormal returns were observed at t-10 and t-5, indicating favorable market sentiment. However, at t+3, a significant negative abnormal return is observed (-6.39848), suggesting a substantial impact from the bank's collapse. The t-statistic (-3.12345) confirms the statistical significance of this negative abnormal return. In the Oil & Gas sector, positive abnormal returns are observed at t-10, t-5, and t+10, indicating initial market optimism and recovery after the event. However, at t+3, a negative abnormal return is observed, indicating a significant adverse impact.

For the Dow Jones Utility Historical Data sector, positive abnormal returns are observed at t-10 and t+10. However, negative abnormal returns are observed at t-9, t-7, and t-6, indicating market volatility and potential disruptions. The t-statistics provide evidence of statistical significance for these abnormal returns. In the Telecom sector, positive abnormal returns are observed at t-10, t-8, and t+1, suggesting initial optimism and market recovery. However, negative abnormal returns are observed at t-3, t-2, and t+3, indicating a negative impact from the bank's collapse. The t-statistics confirm the statistical significance of these abnormal returns.

In the Transportation sector, positive abnormal returns are observed at t-10, t-6, and t+4, indicating market resilience. However, negative abnormal returns are observed at t-3 and t+3, indicating vulnerability to the event. The t-statistics confirm the statistical significance of these abnormal returns.

Table 4 presents the CAR values for major global equity exchanges at various time points (t-10 to t+10). At t-10, the DAX (GER) and Euro Stoxx 50 (Euro Zone) exhibit positive and significant abnormal returns, indicating favorable market performance. The FTSE 100 (UK) also shows a positive abnormal return, although it is not statistically significant. However, the Nikkei 225 (Japan) and S&P 500 (USA) experience negative abnormal returns at t-10. The t-statistics indicate statistical significance for the Nikkei 225 (Japan), while the S&P 500 (USA) return is not statistically significant.

At t-9, the DAX (GER), Euro Stoxx 50 (Euro Zone), and FTSE 100 (UK) continue to exhibit positive abnormal returns. The t-statistics confirm the statistical significance of these returns for the DAX (GER) and Euro Stoxx 50 (Euro Zone), but not for the FTSE 100

(UK). The Nikkei 225 (Japan) and S&P 500 (USA) still show negative abnormal returns, with the Nikkei 225 (Japan) return being statistically significant. However, the Nikkei 225 (Japan) experiences negative abnormal returns throughout most of the observed period, suggesting a more challenging market environment.

Table 5 presents the Cumulative Abnormal Returns (CAR) of various cryptocurrencies over a specific time. The results indicate the performance and fluctuations in value for each cryptocurrency. Bitcoin (BTC) demonstrated a mixed pattern of positive and negative cumulative abnormal returns. The initial return of 12.1865 gradually decreased to 10.2581 at t+1 and further declined to 0.9808 at t+10. Ethereum (ETHER) also exhibited a combination of positive and negative returns. Starting at 7.765, the cumulative abnormal returns decreased to 6.5297 at t+1 and continued to decline to 0.2218 at t+10. Binance Coin (BNB) displayed varied cumulative abnormal returns, with fluctuations throughout the period. The returns ranged from a low of 0.1220 at t-9 to a high of 10.2065 at t-5 and eventually decreased to 1.0431 at t+10. Tether (USDT), a stablecoin, showed minimal fluctuations in its cumulative abnormal returns, maintaining values close to zero. There were no significant deviations from the initial return of -0.0058. Ripple (XRP) demonstrated a mix of positive and negative returns. Starting at 17.3274, the returns gradually decreased to 11.536 at t+1 and further declined to 1.6492 at t+10, with fluctuations observed throughout the period.

Table 6 presents an assessment of the comprehensive impact of the First Republic Bank run on the analyzed markets. It provides insights into the collective effects observed across different sectors as a result of this event. We estimated the AAR and CAAR for examining the event window of the bank's collapse, and several key findings emerge. The market displayed a positive AAR at t-10, indicating a statistically significant deviation from expected returns. However, at t-9, they recorded a significant negative AAR, reflecting underperformance compared to anticipated returns. Conversely, a notable negative AAR was observed before the three days of the bank collapse(t-3).

The market experienced a substantial positive AAR after the first and second days of the bank collapse (t+1 and t+2), with significant positive AAR values recorded. However, at t+3, a notable negative AAR was observed, suggesting significant underperformance. Finally, at t+10, the market displayed a positive AAR, indicating a statistically significant deviation from expected returns. Examining the cumulative effects of the collapse, the cumulative average abnormal returns (CAAR) provide additional insights. While the cumulative impact of the collapse varied across different periods, it is notable that both t-1 and t+10 exhibited statistically significant deviations from the expected returns for the market. These findings emphasize the lasting repercussions of the First Republic Bank's collapse on the performance of the different financial markets, both in the immediate aftermath and over an extended period.

Conclusion

The collapse of First Republic Bank on May 1, 2023, had significant ripple effects on various sectors within the financial markets. The event resulted in notable abnormal returns across top US banks, US equity exchanges, global equity indices, and prominent cryptocurrencies. The interconnectedness and vulnerabilities of the global financial system were highlighted, emphasizing the risks associated with bank failures. The analysis revealed negative cumulative abnormal returns (CARs) for all banks after the event, indicating a decline in stock prices and investor confidence. In sectors such as Health Care, Oil & Gas, Dow Jones Utility, Telecom, and Transportation, both positive and negative abnormal returns were observed, indicating market volatility and impacts from the bank's collapse. Major global equity exchanges also experienced mixed abnormal returns. Overall, the findings underscore the far-reaching consequences of bank failures and the need for a comprehensive understanding of systemic risks in the global financial landscape.

In response to the collapse of First Republic Bank and its global implications, key policy recommendations emerge. Strengthening financial regulations, improving interbank collaboration, assessing cross-sector risks, fostering international cooperation, promoting transparency, and investing in financial education are vital measures. Implementing these recommendations will mitigate risks, safeguard stability, and support long-term economic growth.

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