The UBS-Credit Suisse Merger: Helvetia's Gift

Pascal Böni
Tilburg University, The Netherlands

Tim Kröncke
FHNW School of Business, Basel, Switzerland

Florin Vasvari
London Business School, United Kingdom

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Abstract

The UBS- Credit Suisse (CS) merger in March 2023, one of the biggest banking unions in history, was an emergency rescue deal engineered by Swiss authorities to avoid more market-shaking turmoil in global banking. The merger resulted in a significant increase in the combined stakeholder net wealth, totaling 19.5 bn US dollars. This increase was distributed around the merger announcement through abnormal returns to UBS stockholders (7.95%) and CS bondholders (34.74%), equivalent to approximately 5.1 bn and 18.8 bn US dollars, respectively. In contrast, CS stockholders experienced negative abnormal stockholder returns of -55% (-4.4 bn USD) while the UBS bonds' value was not impacted by the merger. We infer that UBS stockholders received a wealth transfer from CS stockholders and that this transfer is likely explained by unusual restrictions on the number of bidders for CS. The observed effects on bondholders' wealth align with previous research on coinsurance and the implications of "too-big-to-fail" research findings. We conclude that the combined wealth effect, which cannot be attributed to the short-term abnormal returns on securities of the two banks, is externally driven. It appears to come at the expense of taxpayers: the merger-bailout has increased Switzerland's sovereign credit risk, resulting in an expected 6 to 7 bn US dollars in additional debt costs for the country.

Keywords: Economic crises, bank bailouts, merger, fire-sale, additional tier 1 (AT1), contingent convertible bonds (CoCo), regulation, security design, systemically important banks (SIB), too-big-to-fail

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1. Introduction

Veronesi and Zingales (2010) provide an account of the staggering costs of extensive government intervention in the US financial sector during the 2008 global financial crisis. To reduce such costs in the future, extensive regulation has been introduced to make banks more resilient, and to protect taxpayers and private investors from bearing bailout costs (Thakor, 2015). But a key question remains: Is the post-2008 regulatory framework effective? In this paper, we analyze the UBS-Credit Suisse merger to shed light on this question.

On the evening of Sunday, 19 March 2023, the Swiss Federal Council, the Swiss National Bank, and the Swiss Financial Market Supervisory Authority (Finma) jointly announced the orchestrated bailout-merger of Credit Suisse (CS) by its domestic banking rival UBS Group AG (UBS), marking the end of 167 years of proud Swiss banking history.[1] The demise of CS shook faith in a stable Swiss Confederation, often affectionately called "Helvetia".[2]

The bailout-merger, which aimed to restore confidence in the Swiss financial system, deviated significantly from standard bank resolution procedures. It lacked competitive bidding and circumvented a typical bank resolution or purchase and assumption (P&A) transaction, where the acquiring bank purchases the failed bank's assets and assumes its deposits. Instead, the Swiss government forced the implementation of a government emergency rescue deal, which consisted of a complete emergency merger share-deal between UBS and CS. This emergency rescue deal also included massive state liquidity guarantees in the amount of 214 billion (bn) US dollars (USD) and, additionally, a substantial loss guarantee totaling 9.63 bn USD to cover potential losses incurred on the realization of certain CS assets. We argue that the exclusion of competitive bidding, imposed by the government, and the relatively late intervention of the regulator have led to an unexpectedly favorable deal for the acquirer, UBS. We show that significant wealth transfers to specific asset owners have taken place due to the merger. While some of these wealth transfers were offset by redistributions from CS shareholders and AT1 bondholders, the ones who are supposed to bear the burden of

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[1] We prefer to use the term "bailout", rather than "rescue" or "lifeboat operation" to emphasize the use of emergency powers by the government (the Federal Council) and the significant guarantees provided by taxpayers to UBS, which posed a substantial risk to public funds. Therefore, we refer to the transaction as a "bailout-merger" as it involved a state-orchestrated merger with the primary goal of bailing out CS.

[2] Helvetia is the female national personification of Switzerland (Confederatio Helvetica), often pictured in a flowing gown, with a spear and a shield with the Swiss flag.

bankruptcy, the overall wealth effect cannot be solely explained by the participating firms' abnormal returns on securities. We provide insights into the merger-induced value creation and destruction and the redistribution of wealth amongst stakeholders and taxpayers. More specifically, we show that Switzerland's cost of debt increased substantially as a consequence of the state-orchestrated merger between UBS and CS. We conclude that an economically meaningful part of the costs is borne exogenously, i.e. primarily by the taxpayer. This is what we call the "Helvetia's gift", which suggests that the current regulatory framework does not actually protect the public from bad behavior by financial actors as much as one might hope.

To reach this conclusion, we undertake three steps. First, we quantify the wealth effects for the *stockholders and bondholders* of UBS (acquiror) and CS (target). Second, we compare our empirical findings with insights from extant academic literature on competitive bank mergers. Third, we assess the anticipated refinancing cost of the massive liquidity and loss guarantees granted by the Swiss government.

We estimate *stockholder wealth effects* using high-frequency intraday stock data over the period from Friday, 17 March (5:30pm) to Tuesday, 21 March (5:30pm). The bailout-merger resulted in a two-day cumulative abnormal return (CAR) of 7.95% for UBS shareholders and a -55% CAR for CS shareholders, while other European banks show no significant abnormal stock returns.[3] In absolute values, relative to their market capitalizations as of March 17, 2023, these abnormal returns translate to a wealth increase of 5.14 bn USD for UBS stockholders, and a wealth decrease of 4.35 bn USD for CS stockholders,[4] with a disproportionate negative impact on small equity retail investors in CS, as opposed to large institutional investors.[5] Therefore, we observe a positive combined stockholder wealth effect of approximately 0.79 bn USD.

Next, we examine *bondholder wealth effects* resulting from the merger-bailout. The deal involved the write-down of AT1 bonds with a nominal value of 17 bn USD and an

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[3] During the same event-window, other European global systemically important banks (G-SIBs) show no significant CARs, indicating that these abnormal positive combined returns indeed reflect news specific to the bailout- merger rather than a global shift in investors' perception of risk.

[4] According to Bloomberg data, the market capitalization of UBS and CS on March 17, 2023, was 60.37 bn Swiss francs and 7.44 bn Swiss francs, respectively. To calculate the approximate wealth increase or decrease in USD, we use the exchange rate of 1.07.

[5] According to Bloomberg data, institutional equity ownership in CS (as a percentage of free float) declined from 59.23% in mid-2022 to 39.64% just before the merger announcement. Concurrently, short interest positions increased from 11,310,009 shares shorted in July 2022 to 28,584,988 shares shorted in December 2022. These findings indicate that the bailout-merger has had a disproportionate negative impact on small equity retail investors in CS.

approximate market value of 3.9 bn USD.[6] While the AT1-write-down and associated numbers have received extensive media coverage, less attention has been given to the impact of the merger on CS's and UBS's holders of straight bonds even though they had significantly higher value compared to AT1 bonds. Since bond markets are generally less liquid (e.g., Edwards et al., 2007; Bessembinder et al., 2009), we first analyze intraday high-frequency data from credit default swap (CDS) spreads. Price information derived from CDS spreads is based on informed price discovery by traders in a liquid market known for accurately trading credit risk (see Veronesi & Zingales, 2010). Our findings reveal economically substantial and statistically significant cumulative abnormal CDS spread changes (CAC) of -755 basis points (bp) for CS over the two-day horizon. In contrast, UBS's spread decreases by an insignificant 4bp during the same period. The large abnormal CDS spread changes indicate that CS bondholders experienced significant abnormal returns since CDS spreads are sensitive to credit events and are closely related to yield spreads (e.g., Duffie, 1999; Jorion & Zhang, 2007; Blanco et al., 2005).

To estimate bondholder wealth effects more accurately in USD, we utilize daily bond data for 57 CS bonds, which account for approximately 80% of CS's long-term debt. The two-day cumulative abnormal return for the (observable) value-weighted CS bond portfolio amounts to an impressive +34.74%. In absolute values, relative to the market value of the target's bond portfolio as of March 17, 2023, these abnormal returns correspond to a significant and economically important value-weighted bondholder wealth increase of 22.65 bn USD. At the same time, we find no wealth increase for UBS bondholders. Accounting for the net AT1-bond wealth changes (-3.9 bn USD), these findings suggest a total wealth increase of 18.75 bn USD for CS's bondholders.

Therefore, considering the calculated total stockholder and bondholder wealth effects outlined above, the combined wealth increase amounts to 19.5 bn USD (0.79 bn USD net stockholder effects plus 18.75 bn USD net bondholder effects). This can be interpreted as the net market value created by the state orchestrated bailout-merger deal. The entire net wealth effect appears to be exogenous, not attributable to any wealth transfers from bondholders to stockholders within or across the merging banks.

Could CS have been rescued at a lower cost? We posit that allowing for competitive bidding for CS's equity would have likely resulted in a lower price for its rescue. While it is

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[6] On the evening of March 17, 2023, the equally weighted portfolio of AT1 bonds, for which price information was available, traded at an approximate value of 22.9% of the face value.

challenging to establish this quantitatively, we draw on comprehensive academic research on competitive merger bids to support this contention. First, prior literature finds negative stockholder abnormal returns for non-failed bank acquisitions (Bliss & Rosen, 2001; DeLong & DeYoung, 2007; Houston et al., 2001; and Sushka & Bendeck, 1988) and modest positive CARs for failed-bank acquisitions (Baibirer et al., 1992; Bertin et al, 1989; Cochran et al., 1995; Cowan & Salotti, 2015; James & Wier, 1987; Zhang, 1997). These modest CARs are primarily attributed to bidder restrictions (Baibirer et al., 1992; Bertin et al., 1989, Cochran et al., 1995; Cowan & Salotti, 2015; Gilberto & Varaiya, 1989; and James & Wier, 1987). In competitive bidding scenarios, the winning bidder often overpays, leading to more favorable terms of the target's shareholders. Therefore, drawing on the winner's curse hypothesis of Roll (1986) and existing literature, we argue that bidder restrictions likely resulted in a wealth transfer from CS to UBS stockholders.

Second, the literature suggests that the wealth transfer to CS bondholders may be attributed to a coinsurance effect (Billet et al., 2004; Bodnaruk & Rossi, 2016; Chen et al., 2022). With the merger announcement, the market anticipated a substantial decrease in CS's leverage and probability of default. It is evident that an unexpected decrease in firm leverage can lead to wealth transfers from stockholders to bondholders (e.g., Jorion & Zhang, 2007). This coinsurance effect is particularly pronounced when the target's rating is lower than the acquirer's or when the acquisition is expected to reduce the target's risk (Billet et al., 2004; Bodnaruk & Rossi, 2016). Both conditions were present in this merger, which supports the existence of large abnormal returns. However, the significant wealth gain of almost 18.75 bn USD for CS bondholders, combined with no change in the value of UBS bonds, suggests that this mechanism alone cannot fully explain the observed effects.

A third additional factor at play may be the "too-big-to-fail" channel (Penas & Unal, 2004) whereby the new bank likely benefits from reinforced gains associated with its "too-big-to-fail" status. An important element of this takeover was the loss protection agreement signed by UBS with the Federal Department of Finance (FDF). This agreement covered a specific portfolio of Credit Suisse assets, which corresponded to approximately 3% of the combined assets of the merged bank. UBS could draw the guarantee for any realized losses exceeding CHF 5 bn from the federal government (up to a maximum of CHF 14 bn). Only losses realized could be covered by this guarantee. In support for this channel, we find that the government intervention resulted in a significant jump in Switzerland's cost of debt, ultimately placing a burden on taxpayers. Consistent with the prior literature on the cost of government interventions (Acharya et al., 2014), the event caused a substantial increase in Switzerland's

sovereign credit risk and, consequently, its expected cost of capital. Switzerland's sovereign credit risk, as proxied by its CDS spread, more than doubled. The present value of the associated expected increase in capital costs, amounts to approximately 5.8 to 7.2 bn USD.

We thus conclude that the substantial combined net wealth increase of 19.5 bn USD, unexplained by abnormal security returns, ultimately falls on the shoulders of taxpayers. Both, the loss protection agreement mentioned above but also the observed jump in Switzerland's cost of debt do support this interpretation. A poorly managed bank is kept afloat, and an incentive for large banks to take excessive risks and lower their efforts to manage risks is heightened. While these costs may be outweighed by benefits such reducing the likelihood of a financial panic, achieving these benefits at a lower cost should have been the primary goal. This could have been accomplished through the avoidance of bidder restrictions and effective bank oversight that utilizes existing market signals in a timely manner to facilitate an orderly bank resolution.

The subsequent sections of the paper proceed as follows. Section 2 provides a description of the events leading up to the UBS/CS bailout-merger, Section 3 outlines the data and event study methodology used, Section 4 presents the empirical results along with robustness tests, Section 5 discusses the findings, and Section 6 concludes the paper.

2. Prelude to the UBS/CS - Merger

On March 19, 2023, the Swiss Financial Market Supervisory Authority (Finma) and the Swiss National Bank (SNB) jointly announced a state-orchestrated bailout-merger between UBS and CS. This bailout involved the wipeout of Additional Tier 1 (AT1) bonds with a nominal amount of 17 bn USD. The crisis stemmed from a loss of investor confidence in CS, one of Switzerland's largest banks, which had previously been known for its robust financial safeguards mandated by regulators. Several events preceded the bailout-merger:

1. The series of events began with a *spying scandal* in February 2020, leading to the abrupt departure of CS's CEO, Tidjane Thiam. The bank had hired private detectives to spy on its former head of wealth management, Iqbal Khan, who had joined UBS.

2. In March 2021, CS faced pressure to close four funds connected to the *collapse of Greensill Capital*, a British financial firm specializing in short-term corporate loans in which around 10 bn USD had been invested. Finma claimed that CS had severely breached its supervisory obligations, resulting in four enforcement proceedings against former CS managers.

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3. Also in March 2021, CS's investment bank suffered a loss of 5.5 bn USD due to its involvement with *Archegos Capital Management,* a US hedge fund that went into default. The hedge fund held highly leveraged assets, primarily technology stocks, and CS had partially financed its activities.[7]

4. In October 2021, CS was fined 547 million USD by US and British authorities for its involvement in *dealings related to 1.3 bn USD loans to state-owned companies in Mozambique*. Allegedly, CS had paid 200 million USD in kickbacks to bankers and government officials in Mozambique.[8]

5. In January 2022, CS's new chairman since May 2021, *Antonio Horta-Osorio* faced accusations of violating Switzerland's Covid restrictions and subsequently resigned.[9] He was hired from Lloyds Banking Group, where he was a CEO, to manage CS's turnaround and implement better risk management practices.

6. In February 2022, a *global media investigation and data leak concerning more than 18,000 bank accounts* revealed that CS had allegedly been involved in banking transactions with dubious legal entities and individuals, including heads of state, intelligence officials, drug lords, and sanctioned businessmen associated with serious crimes such as drug trafficking, corruption, and money laundering. The scandal again further tarnished the bank's reputation.[10]

7. In March 2022, a Bermuda judge ruled that CS Life Bermuda, CS's local life insurance subsidiary, *owed damages of 553 million USD to former Georgian prime minister Bidzina Ivanishvili* due to mismanagement. The fraud committed by a former CS banker, Patrice Lescaudron, who abused the trust of CS clients, also contributed to the ruling.[11] Lescaudron was sentenced to five years in prison in 2018 and later committed suicide in 2020.

8. In June 2022 Switzerland's Federal Criminal Court found CS and a former employee guilty of *money laundering on behalf of a Bulgarian cocaine-trafficking ring*. The illicit funds

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[7] See the 165-page review by law firm Paul Weiss, Rifkind, Wharton & Garrison for more details related to the Archegos default and CS's involvement: https://www.credit-suisse.com/about-us/en/reports-research/archegos-info-kit.html.

[8] See https://www.reuters.com/business/finance/spies-lies-regulators-round-credit-suisse-2021-10-20/ for more information in respect to the Mozambique case.

[9] See https://www.faz.net/aktuell/wirtschaft/unternehmen/credit-suisse-praesident-horta-osorio-geht-wegen-quarantaeneverstoss-17735433.html for more information on this.

[10] See https://www.reuters.com/business/finance/swiss-prosecutors-launch-case-over-credit-suisse-dirty-money-data-leak-reports-2023-02-03/ for more information on the dirty money scandal.

[11] See https://www.reuters.com/world/europe/former-georgian-pm-wins-bermuda-claim-against-credit-suisse-subsidiary-2022-03-29/ for more information on the Bidzina Ivanishvili scandal.

were allegedly laundered through CS accounts, resulting in a fine of 2 million Swiss francs (CHF).[12]

9. In October 2021, CS's new Chairman, Axel Lehmann and CS's new CEO, Ulrich Koerner, unveiled a plan to *cut 9,000 jobs and successfully raised 4.3 bn USD* in fresh capital through a fully underwritten rights issue and a private capital placement of 1.76 bn USD. The Saudi National Bank became CS's largest shareholder as a result.[13] The two also announced a plan to carve out the investment banking operations and spin off the revived First Boston unit, the US-based investment bank it acquired in 1990.[14]

10. In the fourth quarter of 2022, CS suffered significant *customer outflows of over 100 bn CHF (approximately 119 bn USD), leading to a record annual loss of 7.29 bn CHF*, accounting for approximately 50% of CS's net revenues![15] In response, longtime CS shareholder Harris Associates sold its entire stake in the bank.[16]

These events have likely damaged CS's reputational capital, which matters in financial contracting (see Beatty et al., 1998; Fang, 2005; Atanasov et al., 2012). Not surprisingly, CS's market capitalization lost an estimated 30 bn USD or 90% of its value over the period starting at the beginning of 2020 and ending with the bailout-merger. This decrease in value aligns with prior research which provides evidence that news about possible financial misconduct significantly and negatively impacts share prices (see Amiram et al., 2018, for a comprehensive review of this literature). However, the events surrounding CS had not yet to reached their peak:

1. On March 8, 2023, *CS delayed its annual report* following a call from the U.S. Securities and Exchange Commission (SEC), which raised questions about revisions to cash flow statements from 2019 and 2020, as well as related controls.

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[12] See https://www.reuters.com/business/finance/court-convicts-credit-suisse-money-laundering-case-2022-06-27/ for more information on the cocaine cash laundering case.

[13] See https://www.bloomberg.com/professional/blog/credit-suisse-raises-4-3-bn-capital-after-wild-ride/ for details on the capital raise here.

[14] See https://www.credit-suisse.com/media/assets/corporate/docs/about-us/media/media-release/2022/10/strategy-update-press-release-en.pdf for more details.

[15] See https://www.credit-suisse.com/media/assets/corporate/docs/about-us/media/media-release/2023/02/q4-22-press-release-en.pdf for the 4th quarter 2022 results and CS 4Q22 and Full Year 2022 Results.

[16] See Financial Times, March 5, 2023, "Former top Credit Suisse shareholder Harris Associates sells out of bank".

Electronic copy available at: https://ssrn.com/abstract=4486417

2. On March 14, CS released its annual report *admitting "material weaknesses" in its financial controls* and announcing the elimination of board bonuses.

3. On March 15, 2023, the *chairman of Saudi National Bank*, responded with a blunt "absolutely not" when asked by a journalist if they would offer additional financial support to Credit Suisse if needed. This response added to the mounting concerns surrounding CS.

4. On March 16, in line with its legal mandate, the SNB provided a liquidity line of 50 bn Swiss francs.

5. On the weekend of March 18 and 19, the SNB, Finma and the Federal Council convened to address the crisis. They brokered a deal for UBS to acquire CS, aiming to stabilize Switzerland's financial system. The Financial Times reported on March 18 that BlackRock was considering a rival bid for CS, but ultimately abandoned the idea as SNB and Finma favored a Swiss solution.[17]

6. On the evening of March 19, 2023, a press conference was held where the SNB, Finma and the Federal Council announced UBS's agreement to acquire CS for 3.23 bn USD in stock, along with assuming up to 5.4 bn USD in losses. Additionally, AT1 bonds with a nominal amount of 17 bn USD were written off.[18]

To facilitate the bailout-merger, the Federal Council enacted emergency measures based on articles 184 and 185 of the Federal Constitution. These measures included the creation of a legal framework allowing the national bank to provide additional liquidity assistance beyond standard emergency liquidity assistance. The Federal Council also provided a default guarantee

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[17] See FT, March 18, 2023: "BlackRock explored rival Credit Suisse takeover bid"

[18] Together with common equity tier one (CET1) capital, Additional Tier 1 (AT1) bonds, also known as contingent convertibles or "CoCos," act as a first line of defense to absorb losses. They serve to protect taxpayers, depositors, and senior debt investors from the financial consequences of a distress event. AT1 bonds are converted into equity or written off in specific scenarios, often related to the capital ratio of the issuing bank. They were introduced after the 2008 financial crisis, as regulators aimed to shift risk away from taxpayers and increase the capital reserves held by financial institutions to safeguard against future crises. If AT1 bonds are triggered in a distress scenario, bondholders may lose their entire investment, lose interest payments, or end up with equity holdings in a weakened bank. In the case of CS, the write-off of AT1 bonds was consistent with their prospectus, which explicitly stated that in the event of a "contingency event," such as the Core Equity Tier One capital ratio falling below the required threshold or a "viability event," "the full principal amount of each Note will be written down to zero," and "the holders will be deemed to have irrevocably waived their rights to repayment of the aggregate principal amount of the Notes." To remove any ambiguity regarding the status of Credit Suisse's AT1 bonds, a legislative amendment was made on the day the deal was agreed upon: "At the time of the credit approval in accordance with Article 5, Finma may order the borrower and the financial group to write down additional Tier 1 capital" (Swiss Federal Council ordinance, March 19, 2023). The bonds contractually stipulate that they will be entirely written down if extraordinary government support is granted. The Finma argued that this condition was met and given that Credit Suisse "received extraordinary liquidity assistance loans secured by a federal default guarantee on 19 March." However, various CS investors sue the Swiss regulator over this AT1 bond wipeout and claim that Finma failed to behave proportionately and in good faith.

to the SNB. The Finance Delegation, representing the federal government and driven by the Federal Council), granted a 9 bn Swiss franc guarantee to cover potential losses arising from specific assets UBS acquired as part of the transaction.[19] UBS was responsible for the first CHF 5 bn of any realized losses associated with winding down inherited Credit Suisse assets that were deemed non-core or incompatible with its risk profile. If losses exceed this amount, the federal government has committed to cover up to a maximum of CHF 9 bn. This Swiss federal guarantee obliged UBS to manage the assets in such a way that losses are minimised (and realisation proceeds are maximized) and the federal government received broad information and audit rights in order to verify this. Furthermore, CS and UBS received a total of 200 bn Swiss francs in additional liquidity assistance loans from the Swiss National Bank, comprising a 100 bn Swiss franc loan with privileged creditor status in bankruptcy and a loan of up to 100 bn Swiss francs backed by a federal default guarantee.[20] As of the end of May 2023, Credit Suisse had repaid its outstanding liquidity amounts received in full to the Swiss National Bank.

Almost a month later, on May 16, 2023, UBS disclosed potential costs and benefits amounting to tens of bns of dollars from its takeover of CS, highlighting the significant stakes involved in completing the rescue of its struggling Swiss rival. UBS estimated a negative impact of $13 bn from fair value adjustments and $4 bn in potential litigation and regulatory costs resulting from outflows. Additionally, the switch in accounting standards brought the total hit to $28.3 bn. However, UBS expected to offset these costs with a write-down of $17.1 bn from Credit Suisse's AT1 bonds as well as taking over CS for a fraction of its book value, resulting in a one-off gain of $34.8 bn from the acquisition.

While the disclosure of the accounting gain was seen as less favorable than expected, it did offer UBS a cushion to absorb losses and costs associated with the merger and was likely to contribute to a boost in UBS's future profits if the transaction proceeded as planned. The numbers underscored CS's frailty and the integration challenges that UBS faced. UBS has imposed several restrictions on Credit Suisse during the takeover, including limits on lending, spending, and contract sizes. These measures were seen as reasonable given the lapses in CS's risk controls, although they could cause certain clients to leave the bank.

On June 12, 2023, UBS successfully finalized its emergency acquisition of CS, thereby establishing a colossal Swiss banking institution with a balance sheet of $1.6 trillion and a

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[19] See press release of the Federal Council of March 19, 2023:
https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-93793.html
[20] See press release of Swiss National Bank of March 19, 2023:
www.snb.ch/en/mmr/reference/pre_20230319/source/pre_20230319.en.pdf

robust foothold in wealth management. In tandem with this announcement, UBS revealed that CS will operate as a separate subsidiary. Additionally, CS's bankers will be prohibited from acquiring new clients from high-risk countries or investing in complex financial products. These preventative measures, formulated by UBS's compliance department, aimed to mitigate potential risks associated with the transaction.

3. Data and Methodology

3.1. High-Frequency Data

We employ high-frequency data as the foundation of our single-event study. The use of high-frequency data offers two advantages over daily sampled data. First, it allows us to estimate the event's impact more precisely on asset prices compared to low-frequency data. By narrowing the time window around the event, we can minimize the influence of noise on the estimates, enabling us to accurately determine the event's effect on asset prices (Barclay and Litzenberger, 1988).

Second, high-frequency data enable us to account for different volatility regimes, which is crucial for statistical inference (Elsas and Schoch, 2023). This aspect is particularly important in our single-event analysis, as the statistical significance of abnormal returns is based on the time series of two single banks' stock and bond returns, where we observe a significant increase in price volatility during the event compared to the estimation window (Fisch et al. 2018).

Although the relatively liquid CDS data allows us to analyze how the event impacted credit spreads intraday, it does not the detailed structure of the bond portfolio, including differences in duration and convexity across bonds. As the merging banks have multiple bond issues, each with its own return series, we rely on daily (end-of-the-day) bond prices to measure the market value of the bond portfolio accurately and precisely quantify the effects on bondholder wealth in USD.

3.2. Data

Intraday stock prices are sourced from Refinitiv Eikon while intraday 5-year Credit Default Swap (CDS) data and daily bond prices and are collected from Bloomberg. The stock price and CDS spread data are sampled at 30-minute intervals, and we limit the sample to observations from 9:30 to 17:30 (CET) to ensure a stock price and a CDS spread at each point in time. To

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facilitate the analysis, we convert the data into logarithmic stock returns and simple CDS changes. The observation at 9:30 represents the overnight stock log return or CDS change. In terms of the cross-section, our analysis covers CS, UBS, and a subset of six systemically significant European banks (BNP Paribas, Deutsche Bank, HSBC, Société Générale, Santander, and UniCredit).[21]

CS has a diverse range of bonds, with more than 90 in total. Among them, there are 59 corporate bonds, 22 AT1 bonds and 11 zero-coupon bonds that were traded in the bond markets. However, we consider AT1 bonds as a separate category of capital that cannot be directly compared to the other bonds. Because they were fully written down and we do not further consider them in our event study. As for the zero-coupon bonds, Bloomberg does not report their prices, so we do not include them in our bond analysis. These bonds have a minimal impact on our bond analysis as their face value represents only a marginal portion (1.72%). Other studies have also excluded zero-coupon bonds due to their unique behavior and distinct characteristics compared to non-zero-coupon bonds (Bessembinder et al., 2009). This leaves us with 59 corporate bonds for analysis. We remove two corporate bonds from the sample due to incomplete data or infrequent trading resulting in an insufficient number of observations for the analysis. Hence, our final bond sample consists of 57 corporate CS bonds with an approximate face value of about 96.35 bn USD. This bond portfolio represents approximately 80% of CS's total net long-term debt.[22]

3.3. Event Study Methodology

We begin by estimating intraday abnormal stock log returns during the broad event window which spans from Friday, March 10, 2023, 17:30 to Friday, March 24, 2023, 17:30. This timeframe provides us with 170 observations for abnormal returns and CDS changes. To measure abnormal returns, we employ factor models and estimate the necessary model parameters using data from the pre-event window which ranges from February 24 to March 10, comprising 180 observations.

For stock log returns, our factor model incorporates the Stoxx Europe 600 index as a market factor and the Stoxx Europe 600 Banks index as an industry factor. Unfortunately, we do not have access to an intraday benchmark for estimating abnormal CDS changes. Instead, we

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[21] We constrain the sample to European banks due to the different trading hours in different geographical regions. We constrain the analysis to large banks due to the availability of CDS data.

[22] Details on how these 80 % are calculated here.

construct a single factor using CDS changes from six systemically relevant large European banks, with equal weightings. However, the choice of the factor model is not expected to significantly impact the results of the event study. This is due to the substantial market movements observed for CS and UBS in comparison to other comparable stocks and CDSs.

We define sub-event windows as follows:

- *Weekend response (Day 0)*: The announcement of the CS takeover by UBS occurred on Sunday, March 19. Consequently, we define the most narrow event window (Day 0) as the single abnormal return from Friday, March 17, 17:30 to Monday, March 20, 09:30.
- *Day (+1)*: The remaining trading day following the announcement is defined as event day (+1), spanning from Monday, March 20, 09:30 to Monday, March 20, 17:30.
- *Days (+2; +3; +4; +5)*: The subsequent 24-hour intervals are denoted as event days (+2) through (+5), encompassing Monday, March 20, 17:30 to Tuesday, March 21, 17:30, up to Thursday, March 23, 17:30 to Friday, March 24, 17:30.
- *Days (-1; -2; -3; -4; -5)*: Similarly, the preceding 24-hour intervals prior to the event are referred to as event days (-1) through (-5), covering Thursday, March 16, 17:30 to Friday, March 17, 17:30, up to Friday, March 10, 17:30 to Monday, March 13, 17:30.

Cumulative event days combine the defined event time intervals above. For example, the event window *Day (0; +1)* corresponds to the time span between Day 0 plus Day 1, ranging from Friday, March 17, 17:30 to Monday, March 20, 17:30.

3.4. Statistical Inference

We calculate two types of standard errors for statistical inference in our analysis. First, we follow Campbell, Lo, and MacKinlay (1997) to calculate standard errors that consider the estimation of factor model parameters.These standard errors incorporate the residual variance from the estimation window.[23] We expect that the residual variance will be higher during the news-rich period within our event window. Since we employ high-frequency data, we can estimate the residual variance in the event window using a comparable number of observations to the estimation window. Consequently, we present a modified version of standard errors that account for estimation error in the parameters and rely on the residual variance in the event

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[23] Campbell, Lo, and MacKinlay (1997), page 159, Equation 4.4.9.

Electronic copy available at: https://ssrn.com/abstract=4486417

window. Our approach aligns with the methodology proposed by Elsas and Schoch (2023), who have recently advocated the usage of high-frequency data in single event studies.[24]

4. Empirical Results

4.1 Stockholder wealth effects

The results of our event study on cumulative abnormal stock returns (CAR) are presented in Figure 1 (30-minute intervals) and Table 1 (sub-event windows). On the event weekend (Day 0), UBS experienced a significant abnormal stock return of -12%, while CS had a much larger abnormal return of -62%. Both returns were statistically significant based on t-statistics using either the estimation window residual variance (t-esw) or the event period residual variance (t-evw). However, both stocks showed recovery by the evening of the first trading day, with CARs of approximately 12% for UBS and CS on Day +1. By Day +2, CS stock had a CAR of 6% and UBS stock had a CAR of 8.9%. The two-day stockholder CAR (Day 0 to +2) was -55.16% for CS and +7.95% for UBS, corresponding to significant wealth effects. Both point estimates are economically large. In absolute terms, the CAR (0; +2) corresponds to stockholder wealth effects of +5.48 bn USD for UBS and -4.35 bn USD for CS. Given the large point estimate over the two-day event window, we recognize that in the case of UBS, statistical significance at the 5% level is modest and imprecisely measured. The much larger t-statistics based on the residual variance of the estimation period (t-esw) suggest that the reason for low statistical significance comes from a much larger event window residual variance and underlines the importance of using high-frequency data.

A closer examination of institutional equity ownership in CS (as a percentage of free float) based on Bloomberg data reveals some interesting trends. At the end of 2021, institutional ownership stood at 52.36%, increasing slightly to 59.23% by mid-2022. However, just prior to the merger announcement event, there was a marked decrease in institutional ownership, dropping to 39.64%. Following the event, institutional ownership showed a constant trend: 40.3% on the 26th of March (post-event), 39.03% on the 30th of April (post-event), and 38.31% by the end of May (post-event). We also investigate the short interest positions over the period

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[24] It is common to exploit the cross-section of abnormal returns to take the event-specific variance into account (Campbell, Lo, and MacKinlay (1997)). However, the cross-sectional approach is not feasible in our case because we have a single-event study. In such a setting, Elsas and Schoch (2023) propose a parametric estimate of the residual variance based on intraday data in the event window. Due to the large market movements, particularly in the case of Credit Suisse, we choose a non-parametric estimate of the residual variance. For the same reason, we remove the smallest 2.5% and largest 2.5% of the 170 observations before estimating the residual variance in the event window.

from mid-2022 until the February 2023, just prior to the event. We find that short positions have increased significantly from July 2022 (11,310,009 shares shorted) to December 2022 (28,584,988 shares shorted) and March 3023 (17,950,392 shares shorted). Overall, these patterns show that "smart" institutional investors offloaded their shares during the second half of 2022, suggesting that small retail investors suffered the most.

4.2 Bondholder wealth effects

We next analyze high-frequency data on corporate default swap (CDS) spreads. The cumulative abnormal CDS changes (CAC, expressed in basis points) are summarized in Figure 2 (30-minute intervals) and Table 2 (sub-event windows as defined above). Over the event weekend they were -74 bp for CS and 7.6 bp for UBS. By the end of the first trading day (Day +1), the CDS changes were -4.5 bp for CS and +12.0 bp for UBS. On Tuesday (Day +2), CS saw a significant drop of -676 bp in CDS changes, while UBS had a smaller drop of 22.5 bp, both indicating significant changes. The two-day CDS changes (Day 0 to +2) were -751 bp for CS (highly significant) and -3.0 bp for UBS (insignificant). These abnormal CDS spread changes suggest large positive abnormal returns for CS bondholders, although accurately measuring the bondholder wealth effects in USD faces challenges. First, the CDS is not necessarily representative of the value-weighted bond portfolio of CS. Second, large movements in the CDS that we observe are likely to render any approximation based on the yield-duration relationship inaccurate.

To accurately measure the *bondholder wealth effects in USD*, we re-estimate at the daily frequency the bond return for a value-weighted CS bond portfolio. This portfolio has a face-value of about 96 bn USD (approximately 80% of CS's total net long-term debt) and includes 57 bonds. Table 3 presents the results of cumulative abnormal daily bond returns for Credit Suisse (CS) during the event window from March 10, 2023, to March 24, 2023. The table provides results for CDS (Credit Default Swap) and two different averages: EW (the equally weighted bond portfolio average) and VW (the value-weighted bond portfolio average). The daily abnormal log bond returns are calculated using a one-factor model, with the factor being the iShares Core CHF Corporate Bond ETF (CH). The table displays the cumulative abnormal return (CAR) percentages, which represent the exponential function of the sum of the abnormal log returns over the specified event window minus one, expressed in percentage points. The "Day" column denotes the cumulative window in calendar days, as defined for the intraday data. The "t-esw" column provides the t-statistic for the CARs, based on the residual variance from the estimation window.

We find a cumulative abnormal CS bond portfolio return of +34.74% (value-weighted) over the period from Day 0 to Day +2, which corresponds to an abnormal bondholder wealth increase of 22.65 bn USD. This abnormal USD bond return is computed as the market value of the bond portfolio containing 57 bonds on the evening of March 17, 2023, multiplied by the bondholder CAR (65.2 bn USD × +34.74% = 22.65 bn USD). Results, using the equally weighted portfolio are similar.

4.3 Additional Notes

Resolution of Post Event Uncertainty: We use the Day 0 to Day +2 CARs and CACs as our baseline results to assess the impact of the event on asset prices. The subsequent evolution of stock prices and CDS spread changes on Monday and Tuesday indicates that the weekend's bailout-merger announcement was accompanied by announcement-related uncertainty, which was largely resolved between Monday and Tuesday afternoon. Two observations shed light on the vanishing announcement-related uncertainty within two days. Firstly, the CDS of CS exhibited a hesitant reaction at the Monday open and began to decline from Monday after 17:30 onwards (Day +2 in Table 2). Secondly, the CDS of UBS initially rose at the market open on Monday and continued to increase until the end of the day (Day 0; +1). However, this initial reaction proved to be temporary as it reversed on Tuesday (Day +2), resulting in a two-day change that was economically insignificant and lacked statistical significance. The behavior of UBS's stock price mirrored the opposite patterns of the CDS from Monday's open to Tuesday's close, suggesting that the initial stock price response partly reflected announcement-related uncertainty.

Pre-event response: The release of the CS annual report on Tuesday (Day -4) had a minimal and insignificant impact on the CDS and equity returns. However, the announcement by Saudi National Bank to withdraw further financial support had a substantial impact on CS, reflected in a CAR of -19%, which was largely reversed on the following day. The CS CAC increased by 289 bp and continued to rise on the subsequent day. In the case of UBS, we did not observe significant CARs, but we did observe a CAC of 15 basis points on Wednesday, which was statistically significant at the 10% level. There were no abnormal returns or abnormal CDS changes observed on Friday, March 17, for either CS or UBS, whether on a daily or intraday basis.

4.4 Other European banks

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Table 4 presents the CARs and CACs for our control portfolio consisting of six major European banks namely BNP Paribas, Deutsche Bank, HSBC, Societe Generale, Santander, and UniCredit. Panel A shows the cumulative abnormal stock returns (CAR) for the six systematically relevant European banks. Panel B displays the cumulative abnormal CDS spread changes as a proxy for bondholder returns for the same set of banks. The mean values are provided for both panels. The data spans various time periods, indicated by the day and time stamps.

In Panel A, the CAR percentages fluctuate across the banks and time periods. Notable movements include a decline in CAR just prior to the merger announcement, followed by a mix of positive and negative returns in subsequent days. The mean CAR for the six banks shows a negative value overall. Panel B focuses on the cumulative abnormal CDS spread changes, measured in basis points (bp), reflecting bondholder returns. Similar to Panel A, there is variation across the banks and time periods. Some banks experienced significant increases or decreases in CDS spreads, indicating shifts in bondholder returns. The mean CAC (cumulative abnormal CDS spread changes) for the six banks also fluctuates throughout the observed periods. Overall, we do not observe significant abnormal movements in equity or CDS returns during the event window for these banks. These findings suggest that the impact of the bailout-merger announcement event was confined to the two Swiss banks and that the performance and market reactions of the six other banks is not impacted by any changes in investor sentiment and expectations. This is significant as it underscores that the reaction in asset prices for the Swiss banks is directly linked to news about these two banks, rather than being a consequence of a broader shift in investor perception of risk or market-wide changes in discount rates. Consequently, our findings emphasize the unique impact of the merger-bailout event on the Swiss banking sector.

4.6 Robustness

Appendix Tables A.1 and A.2 present two robustness checks related to stockholder CARs. In Appendix Table A.1, we report stockholder CARs based on the constant mean return model. Furthermore, in Appendix Table A.2, we substitute the Banking factor with the equally weighted average of the six prominent European banks and calculate the stockholder CARs. Finally, in Appendix Table A.3, we replicate the abnormal CDS change results by replacing the factor model with a constant mean model. The results from all our robustness checks align closely with those of our baseline results mentioned earlier, indicating consistent findings across different models and methodologies.

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5. Explaining the wealth effects

5.1 Bidding restrictions

We argue that the observed stockholder wealth effects of the CS bailout-merger contradict what is typically observed in the literature regarding competitive bids for failed banks. Firstly, the large positive acquirer stockholder wealth effect of 7.95% observed in this case deviates from prior research on bank mergers.[25] Previous studies extensively document negative abnormal returns for acquiring banks in non-failed bank acquisitions (Bliss & Rosen, 2001; DeLong & DeYoung, 2007; Houston et al., 2001; Sushka & Bendeck, 1988). In the case of failed-bank acquisitions, acquirer returns are usually positive but significantly lower, ranging from 1% to 3%.[26] Comparatively, the two-day CAR of 7.95% for UBS stockholders is more than double the typical abnormal returns for bidders in Federal Deposit Insurance Corporation (FDIC) failed bank auctions in the US (Cowan & Salotti, 2015).

It is likely that UBS stockholders benefited from the bidding restrictions imposed by SNB and Finma. Prior research indicates that the number of competing bidders in failed bank auctions positively influences the bids submitted (Baibirer et al., 1992; Bertin et al., 1989; Cochran et al., 1995; Cowan & Salotti, 2015; Gilberto & Varaiya, 1989; James & Wier, 1987). This aligns with Roll's (1986) winner's curse hypothesis, suggesting that the winning bidder in a sealed-bid auction of an object with an uncertain value tends to overestimate its unobservable value. It appears that restricting the number of bidders to just one (UBS) was unnecessary. Aside from BlackRock, which allegedly prepared a rival bid for CS, there were 23 global systemically important banks (G-SIBs) larger than UBS that could have participated in an

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[25] Prior research shows that the bulk of positive takeover returns typically accrue to the stockholders of the target firm and not the acquiring firm (see Alexandridis et al., 2017; Brooks et al., 2018; and Renneboog & Vasteenkiste, 2019 for comprehensive reviews of empirical studies on short-run stock returns). Across different industries, acquirer announcement returns are often close to zero or indistinguishable from zero (Netter et al., 2011), and low or zero for anticipated deals (Tunyi, 2021). For example, Asquith et al. (1983), Eckbo (1983), Martynova and Renneboog (2011) and Alexandridis et al. (2017) report slightly positive acquirer announcement CARs, while Morck et al. (1990) and Chang & Suk (1998) report slightly negative abnormal short-run announcement returns. Not even distressed target acquisitions do typically create large acquirer abnormal returns. They are often negative (Ang & Mauck, 2011) and when positive, they average around 1% (Oh, 2018).

[26] Recently, Cowan and Salotti (2015) found that banks acquiring failed institutions (non-failed institutions) experience cumulative two-day abnormal returns (CARs) in the magnitude of 3.23% (-0.05%). Their finding is in line with prior research, which finds two-day CARs of 2.36% (James & Wier, 1987), 1.01% (Bertin et al, 1989) or 0.98% (Zhang, 1997), and a three-day CAR of 1.16% (Cochran et al., 1995) or 1.94% (Baibirer et al., 1992). These studies investigate Federal Deposit Insurance Corporation (FDIC) failed bank acquisitions. The study of Baibirer et al. (1992) investigates Federal Home Loan Bank Board (FHLBB) supervised mergers of troubled savings and loan associations arranged by the Federal Savings and Loan Insurance Corporation.

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auction.[27] Such an auction would likely have resulted in a higher transaction price.[28] Consequently, the bidder restrictions probably led to a transfer of wealth from CS to UBS shareholders, as indicated by the large negative abnormal stock return experienced by CS stockholders.

While we are uncertain why no other banks were invited to submit a bid for CS, prior research suggests (Acemoglu et al., 2016; Brown & Huang, 2020; Igan et al., 2022) that political access may have influenced this decision. Political access holds significant value for corporations. As shown by Igan et al. (2022), banks that engage in regulatory lobbying have a higher probability of winning auctions on more favorable terms. Theoretically, the industry-wide lack of liquidity may have created a situation in which no other bidders were willing to make an offer for CS (Shleifer & Vishny, 1992; Acharya & Yorulmazer, 2007). The UBS/CS bailout-merger took place during a period of industry-wide shocks, with two US banks (Silicon Valley Bank and Signature Bank) being closed shortly before the event. This liquidity constraint would explain why the Swiss government, Finma, and SNB did not, to the best of our knowledge, develop any activity to receiving alternative offers within a reasonable timeframe.

However, it seems that SNB and Finma should not have been caught off guard by the CS crisis. Bond spreads serve as warning signals for bank supervisors from the financial markets, typically rising as early as six quarters before a bank failure (Jagtiani & Lemieux, 2001). This was also the case for CS, with numerous market prices indicating the approaching bank failure. For instance, the spread between AT1 bond prices of UBS and CS started to significantly widen from the first quarter of 2021, nine quarters before the merger-bailout, steadily increasing from approximately zero to over 20% by the end of the third quarter in 2022. Similarly, CS's CDS spreads surpassed their 2007/2008 crisis levels in mid-2022, implying that Finma and SNB could have been prepared to resolve the bank or facilitate a merger involving multiple bidders if necessary. In addition, six months provided more than

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[27] G-SIBs as of December 31, 2022, as measured by their balance sheet total. Data is from Bloomberg as per end of 2022, retrieved in April 2023.

[28] A simple back-of-the-envelope calculation shows that the price attributed to the CS shares is at a very low level. Measured by Tobin's q, a metric that is frequently used in the corporate finance literature, the value attributed to CS shares was the equivalent to 0.07 or one tenth of the average G-SIBs Tobin's q of 0.73. The acquirer Tobin's q amounted to 1.02. Using the price/sales-ratio (P/S), another frequently used valuation proxy, at the price attributed to CS shares, it amounts to 0.21, while the average P/S-ratio for G-SIBs (UBS) amounted to 1.67 (1.59). We use data from Bloomberg and values as per December 31, 2022. We employ Tobin's q as a proxy for firms' equity valuations and compute Tobin's q as the market-value of equity to the book value of equity. It is essentially a market-to-book ratio for the entity. We compute the price-sales-ratio (P/S) as the market-value of equity scaled by net revenues.

sufficient time to arrange a multi-bidder process for a bailout-merger with CS. Moreover, it is publicly known[29] that top-level representatives of CS, UBS and the Swiss government engaged in active talks with respect to M&A, contingency planning and a potential merger of CS and UBS as early as December 2022. In the US, when a bank is on the verge of failing, FDIC typically allows only 90 days for the bank to take corrective actions, such as recapitalization or voluntary merger negotiations with a competitor. Concurrently, the FDIC begins structuring the resolution process. Considering international standards, there was ample time to organize a multi-bidder process for a CS bailout-merger. The Swiss government thus disposed of sufficient time to involve more than just one bidder into this merger-bailout.

5.2 Coinsurance

The positive bondholder wealth effects observed align with previous research in principle. However, their magnitude appears unprecedented based on our knowledge. Billet et al. (2004) and, more recently, Bodnaruk and Rossi (2016) find a significant coinsurance effect, showing that target bonds exhibit significantly higher returns when the target's rating is below that of the acquirer or when the combination is anticipated to reduce target risk. [30] This holds true for the UBS/CS merger. Chen et al. (2022) also support the notion that coinsurance can significantly impact bondholder abnormal returns. Nonetheless, the effect of coinsurance is likely to be much smaller than what we observe in the present case. For example, Billet et al. (2004) find an average positive mean excess return of 4.30% for below investment-grade target bonds.

The 34.74% or 22.65 bn USD bondholder wealth increase that we find thus appears to be extraordinarily high. The AT-1 bond write-down may explain some portion of it: Risky debt may, in several states of the world, not be paid in full. This applies specifically to banks, as they are highly levered by construction. Any intervention that increases equity or equity like capital provides a safety cushion to debt and should thus increase its value. Writing down AT-1 bonds may thus represent the equivalent to an equity injection, resulting in coinsurance. Veronesi and Zingales (2010), who investigate the US government interventions in the

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[29] See page 39 of UBS Group AG filing with the Securities Exchange Commission (SEC) as of May 16, 2023: Ammendment No. 1 to Form F-4, registration statement under Securities Act of 1933, registration no. 333-271453.

[30] This is the case here. The acquirer's ratings are significantly higher than those of the target: As per the event date, the acquirer (UBS) disposed of a bank operating companies Moody's (Fitch, S&P) Aa3 (AA-, A1) rating, while the target was ranked some two notches lower at A3 (BBB+, A-). Moreover, the target's rankings of Moody's and Fitch were on a negative outlook. Rating information is from the CS fixed income investor presentation dated March 14, 2023.

financial sector announced in 2008, find a coinsurance effect in the magnitude of 29% of the value of new money (equity) invested by the government, which accrued to bondholders. Immediately prior to the event, on the evening of March 17, 2023, the equally weighted portfolio of CS's AT-1 bonds traded at an approximate value of 22.9% of face value or an approximate 3.9 bn USD. Even if all of the AT-1 write-down created a coinsurance effect, we are still left with a high unexplained bondholder wealth increase.

One other way to look at coinsurance is to investigate the asset quality of the two banks prior to the bailout-merger agreement. In Table 4 we provide various metrics related to asset quality and capital adequacy for the two banks. The data includes historical averages, standard deviations, and other relevant indicators over different time periods. Under the "Asset Quality (%)" section, metrics such as loan loss coverage, loan loss provision/total loans, loan loss reserves/total loans, net charge-offs/average loans, and other similar ratios are presented. These ratios measure the banks' ability to handle loan losses and their loan loss reserve coverage. The "Capital Adequacy" section focuses on metrics related to capital strength and risk-based capital ratios. Common equity tier 1 capital ratio, tier 1 risk-based capital ratio, leverage ratio, and total capital adequacy ratio are included. These indicators assess the banks' capital adequacy and their ability to absorb losses and manage risks. These metrics are crucial in evaluating the banks' ability to manage risks, maintain sufficient capital, and safeguard against potential financial stress.

Overall, the descriptive statistics in the table suggest that the asset quality metrics of CS are generally weaker compared to those of UBS. This indicates that CS bondholders are more likely to gain from a merger that reduces overall asset risk compared to UBS bondholders, which can be attributed to the coinsurance effect. The coinsurance effect implies that a merger can result in a more diversified and robust asset base, reducing the risk for bondholders and potentially benefiting CS bondholders more significantly in this context.

5.3 Too-big-to-fail and Taxpayer's Cost

The "too big to fail" (TBTF) effect refers to the perception that certain financial institutions, particularly large banks, are deemed so crucial to the functioning of the economy that their failure could have severe systemic consequences. As a result, these banks may receive special treatment or support from the government and regulators to prevent their collapse. Penas and Unal (2004) demonstrate that achieving TBTF status leads to abnormal returns for bondholders in merger situations. The bailout-merger between UBS and CS has resulted in the creation of a new bank that undeniably falls under the TBTF category. Therefore, it is highly

unlikely that CS bondholders will experience any defaults in the near future. Our findings suggest that bond markets strongly believe in TBTF policies. Quantifying which effect (coinsurance or TBTF) dominates is however challenging. We contend that the combination of coinsurance and the TBTF effect largely explains the observed wealth effects for CS bondholders.

It is not feasible to estimate the total economic costs of the TBTF effect. However, we can assess it indirectly by looking at changes in the financing costs for the Swiss government. The government has certainly taken some risk to rescue CS, and its sovereign credit risk may have been affected by doing so. Acharya et al. (2014) describe the theoretical and empirical relationship between sovereign credit risk and bank bailouts. They evidence a loop between the financial sector and sovereign credit risk and present evidence that bank bailouts transfer risk from bank balance sheets to sovereigns, triggering the rise in sovereign credit risk during and after the global financial crisis (GFC).

As in Acharya et al. (2014), we use CDS spreads to assess whether Switzerland's sovereign credit risk has increased due to the merger-bailout. Figure 3 shows the CDS spreads of Switzerland throughout the event period, alongside several European countries. CDS spreads of Switzerland moved in line with that of other European countries until the merger-bailout. Germany, the Netherlands, and Sweden show relatively stable CDS spreads during the event window, while Switzerland's CDS spread (depicted by the red solid line) experiences a significant increase. The CDS spreads of UK and France also respond to the event, although their CDS spread changes are more gradual. Before the event, Switzerland's CDS spread hovers around 11 basis points, lower than Germany, the Netherlands, and Sweden, which range from 13 to 15 basis points. However, on the Friday just prior to the event, Switzerland's CDS spread jumps from 11.16 basis points to 20.08 basis points and maintains this level until the following Friday of the first trading week after the bailout-merger. Subsequently, it further increases to 25.01 basis points on the subsequent Monday. Throughout the 60-day period following the event, Switzerland's CDS spread remains at an average level of 20.4 basis points.

Klingler and Lando (2018) show that there may be a disconnect between changes in bond yield spreads and CDS premiums. We therefore additionally estimate cumulative abnormal returns on an equally weighted portfolio of twenty-two Swiss government bonds. The result is shown in Table 5. The yield of Swiss government bonds increased by a significant 16 basis points from Friday to Tuesday close, approximately matching the observed increase in the CDS spreads (see Figure 3).

Our findings suggest that the merger-bailout has had a discernible impact on Switzerland's sovereign credit risk, as reflected by the significant jump in CDS spreads, reflected by an abnormal approximate increase in Switzerland's sovereign bond yield in the amount of 16 basis points. The elevated and sustained levels of the CDS spread indicate increased market perceptions of risk associated with Switzerland's creditworthiness during and after the event.

Lending from prior research (e.g. Elton et al., 2001; Collin-Dufresne et al., 2001; Campbell & Taksler, 2003), an increase in Switzerland's credit risk should affect Switzerland's expected cost of debt. To gauge for this effect in USD, we estimate the expected present value of Switzerland's increased cost of debt. We assume that each maturing bond is immediately replaced at the due date by the issuance of a new bond of the same nominal amount. For each sovereign bond in the portfolio, we calculate and then discount the marginal increase in the cost of debt of between 8 to 10 bp with the discount factor $(1+YTM)^t$ back to June 1, 2023, whereas YTM is the yield to maturity of the respective bond, and t is the remaining term of the respective bond in years. The present value of the expected marginal increase in the cost of debt amounts to approximately 56.0 to 70.5 million USD respectively. Next, we capitalize this expected increase in the cost of debt. To this end, we use Switzerland's existing bond portfolio, its value weighted remaining term (t) and the value weighted discount factor $(1+YTM)^t$ to approximate the present value by assuming a perpetuity (see the details in Table 6). Based on our estimation, the capitalized value of the expected jump in Switzerland's cost of debt amounts to an approximate 5.8 to 7.2 bn USD.[31]

6. Conclusions

We show that the UBS-CS-merger substantially impacted the wealth of the participating firms' stockholders and bondholders. It created a net value of 19.5 bn USD, distributed to UBS stockholders (5.1 bn USD), CS stockholders (-4.4 bn USD), and CS bondholders (18.8 bn USD). The combined wealth effect cannot be explained by the participating firms' abnormal returns on securities. While the Swiss government claims that the bailout-merger is a private transaction that has the potential to come at zero cost to the

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[31] We acknowledge that these amounts are gross of any fees and charges that shall be paid by UBS/CS to the government. Such fees shall obviously reduce the present value of the increase in Switzerland's cost of debt. They are, however, expected to be of short-term nature only and therefore of relatively small magnitude.

taxpayer, we find that there have likely been large transfers of wealth from taxpayers to UBS/CS stakeholders.

We identify various channels that may have created this surprisingly large, combined wealth effect. First, we argue that UBS stockholders have profited from bidding restrictions imposed by the government. These bidding restrictions may be the result of political ties between the government and top-level representatives of UBS and CS, who engaged in meetings to discuss the potential merger and other contingency plans as early as in December 2022. Second, we believe that CS bondholders profited from substantial coinsurance effects. Third, the "too-big-to-fail" channel, combined with a material loss protection agreement which covered a specific portfolio of CS assets (corresponding to approximately 3% of the combined assets of the merged bank) may have contributed to the combined wealth effect. Finally, and importantly, we infer from our analysis that the government intervention likely came at the cost of a significant jump in Switzerland's sovereign credit risk and thus an increase in its expected cost of debt, implying the risk of a substantial taxpayer wealth transfer in the magnitude of approximately six to seven bn USD.

It seems that the reforms adopted after the 2007-2009 crisis still fall short in resolving issues with systemically important bank institutions. Staggering costs of extensive government intervention in a banking crisis, as described in Veronesi and Zingales (2010) for the US financial sector during the 2008 global financial crisis, seem to be inherent in the banking system. As in the GFC, and described in more detail by Thakor (2015), taxpayers and private investors still appear to bear the bailout costs for failing banks. Authorities act late, apply corrections only after the risks of failure have become severe. Both the failure of bank executives and the deficit of supervisors to anticipate necessary tasks in case of an intervention (such as avoiding unnecessary restrictions on bidder participation) have created costly inefficiencies in the bailout process, including substantial wealth transfers from taxpayers to the banking sector. Restoring confidence to the financial system should have been achieved at a lower cost.

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Table 1

Cumulative Abnormal Stock Returns

This table reports cumulative abnormal stock returns for Credit Suisse and UBS during the event window from March 10, 2023, 17:30 to March 24, 2023, 17:30 (#170 return observations). Abnormal log returns are computed in 30 minute intervals using a two factor model. The factors are the Stoxx Europe 600 index and the Stoxx Europe 600 Banks index. Factor model parameters are estimated during an estimation window from February 24, 2023, 13:00 to March 10, 2023, 17:30 (#180 return observations). The cumulative abnormal return (CAR%) is the exponential function of the sum of the abnormal log returns over the specified event window minus one and is expressed in percentage points. "Day" reports the cumulation window in calendar days and, and "Time stamp" provides the precise cumulation window. t-esw is the t-statistic for the CARs as in Campbell, Lo and MacKinlay (1997) and is based on the residual variance from the estimation window. t-evw is the t-statistic for the CARs based on the residual variance from the event window after truncating the residuals at the 2.5 and 97.5 percentiles and account for an increased residual variance in the event window.

Day	Time stamp	Credit Suisse			UBS		
		CAR,%	t-esw	t-evw	CAR,%	t-esw	t-evw
-5	Fr,10/03,17:30 : Mo,13/03,17:30	-3.82	-1.45	-0.52	-2.55	-2.72	-0.99
-4	Mo,13/03,17:30 : Tu,14/03,17:30	-3.92	-1.51	-0.54	0.74	0.79	0.29
-3	Tu,14/03,17:30 : We,15/03,17:30	-19.05	-7.80	-2.78	-3.24	-3.43	-1.25
-2	We,15/03,17:30 : Th,16/03,17:30	17.91	6.23	2.22	1.84	1.95	0.71
-1	Th,16/03,17:30 : Fr,17/03,17:30	-6.32	-2.48	-0.88	1.54	1.64	0.60
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**-62.05**	**-109.95**	**-39.16**	**-11.78**	**-40.13**	**-14.58**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	11.70	4.21	1.50	12.11	12.28	4.46
+2	Mo,20/03,17:30 : Tu,21/03,17:30	5.88	2.15	0.77	8.88	9.03	3.28
+3	Tu,21/03,17:30 : We,22/03,17:30	-5.41	-2.11	-0.75	-4.39	-4.81	-1.75
+4	We,22/03,17:30 : Th,23/03,17:30	-1.78	-0.68	-0.24	-1.70	-1.83	-0.66
+5	Th,23/03,17:30 : Fr,24/03,17:30	-0.75	-0.28	-0.10	-0.43	-0.46	-0.17
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**-57.65**	**-31.27**	**-11.14**	**-0.86**	**-0.89**	**-0.32**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-55.16**	**-20.05**	**-7.14**	**7.95**	**5.39**	**1.96**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-58.65	-12.79	-4.55	1.02	0.41	0.15
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	-65.80	-9.56	-3.41	-1.00	-0.25	-0.09

Table 2
Cumulative Abnormal CDS Spread Changes

This table reports cumulative abnormal CDS changes for Credit Suisse and UBS during the event window from March 10, 2023, 17:30 to March 24, 2023, 17:30 (#170 CDS change observations). Abnormal CDS changes are computed in 30 minute intervals using a one factor model. The factor is the equally weighted average CDS change of BNP Paribas, Deutsche Bank, HSBC, Societe Generale, Santander, and UniCredit. Factor model parameters are estimated during an estimation window from February 24, 2023, 13:00 to March 10, 2023, 17:30 (#180 CDS change observations). The cumulative abnormal CDS change (CAC) is the sum of the abnormal CDS change over the specified event window and is expressed in basis points. "Day" reports the cumulation window in calendar days and, and "Time stamp" provides the precise cumulation window. t-esw is the t-statistic for the CACDSs as in Campbell, Lo and MacKinlay (1997) and is based on the residual variance from the estimation window. t-evw is the t-statistic for the CARs based on the residual variance from the event window after truncating the residuals at the 2.5 and 97.5 percentiles and account for an increased residual variance in the event window.

Day	Time stamp	Credit Suisse			UBS		
		CAC,bp	t-esw	t-evw	CAC,bp	t-esw	t-evw
-5	Fr,10/03,17:30 : Mo,13/03,17:30	47.15	5.81	1.08	2.55	1.64	0.33
-4	Mo,13/03,17:30 : Tu,14/03,17:30	53.79	7.16	1.34	7.41	5.14	1.03
-3	Tu,14/03,17:30 : We,15/03,17:30	289.12	34.76	6.48	15.40	9.65	1.93
-2	We,15/03,17:30 : Th,16/03,17:30	227.04	29.75	5.55	5.84	3.99	0.80
-1	Th,16/03,17:30 : Fr,17/03,17:30	-80.58	-9.58	-1.79	11.55	7.16	1.43
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**-74.01**	**-36.19**	**-6.75**	**7.61**	**19.37**	**3.88**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	-4.52	-0.62	-0.12	11.95	8.58	1.72
+2	Mo,20/03,17:30 : Tu,21/03,17:30	-676.03	-87.13	-16.24	-22.51	-15.11	-3.03
+3	Tu,21/03,17:30 : We,22/03,17:30	-44.61	-5.72	-1.07	-12.01	-8.02	-1.61
+4	We,22/03,17:30 : Th,23/03,17:30	-25.14	-3.25	-0.61	0.20	0.13	0.03
+5	Th,23/03,17:30 : Fr,24/03,17:30	-6.54	-0.78	-0.15	6.03	3.73	0.75
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**-75.27**	**-9.62**	**-1.79**	**19.52**	**12.99**	**2.60**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-751.30**	**-66.71**	**-12.44**	**-2.99**	**-1.38**	**-0.28**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-827.59	-41.83	-7.80	-8.78	-2.31	-0.46
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	-294.33	-8.41	-1.57	34.03	5.06	1.01

Table 3
Cumulative Daily Abnormal Bond Returns

This table reports cumulative abnormal daily bond returns for Credit Suisse during the event window from March 10, 2023, to March 24, 2023, (#10 return observations). Below CDS are results for the CDS reference bond (ISIN: USH3698DCR38). EW refers to the equally-weighted average of 57 CS bonds. VW is the value-weighted average of 57 CS bonds (weighted by market value in USD). Daily abnormal log returns are computed using a one factor model, where the factor is the iShares Core CHF Corporate Bond ETF (CH). Factor model parameters are estimated during an estimation window from August 3, 2022, to March 10, 2023, (#152 return observations). The cumulative abnormal return (CAR,%) is the exponential function of the sum of the abnormal log returns over the specified event window minus one and is expressed in percentage points. "Day" reports the cumulation window in calendar days as defined for the intraday data. t-esw is the t-statistic for the CARs as in Campbell, Lo and MacKinlay (1997) and is based on the residual variance from the estimation window.

Day	Time stamp	CAR,%			t-esw(CAR,%)		
		CDS	EW	VW	CDS	EW	VW
-5	Fr,10/03,Close : Mo,13/03,Close	-0.49	-2.22	-2.51	-1.59	-4.94	-5.13
-4	Mo,13/03,Close : Tu,14/03,Close	-0.98	-2.07	-2.30	-3.20	-4.64	-4.72
-3	Tu,14/03,Close : We,15/03,Close	-26.62	-11.60	-12.99	-99.87	-27.17	-28.04
-2	We,15/03,Close : Th,16/03,Close	4.59	-2.87	-3.01	14.56	-6.46	-6.19
-1	Th,16/03,Close : Fr,17/03,Close	-4.38	-1.95	-2.61	-14.49	-4.36	-5.34
0; +1	**Fr,17/03,Close : Mo,20/03,Close**	**35.20**	**26.63**	**28.77**	**96.29**	**51.45**	**50.45**
+2	Mo,20/03,Close : Tu,21/03,Close	5.14	4.34	4.63	16.14	9.33	9.11
+3	Tu,21/03,Close : We,22/03,Close	0.04	1.65	1.81	0.12	3.62	3.64
+4	We,22/03,Close : Th,23/03,Close	-0.01	-0.89	-0.79	-0.02	-1.97	-1.60
+5	Th,23/03,Close : Fr,24/03,Close	-3.22	-0.92	-1.24	-10.62	-2.05	-2.52
0; +2	**Fr,17/03,Close : Tu,21/03,Close**	**42.15**	**32.12**	**34.74**	**78.50**	**42.44**	**41.58**
0; +5	Fr,17/03,Close : Fr,24/03,Close	37.62	31.88	34.42	45.66	27.01	26.43
-5; +5	Fr,10/03,Close : Fr,24/03,Close	-0.49	6.30	5.24	-0.49	4.17	3.19

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Table 4
Cumulative Abnormal Stock Returns and CDS Spread Changes of Systematically Relevant European Banks

This table reports stockholder cumulative abnormal equity returns for six systematic European banks in Panel A, and bondholder cumulative abnormal returns, as proxied by abnormal CDS changes, in Panel B : BNP Paribas (BNP), Deutsche Bank (DB), HSBC Holdings, Société Générale (SG), Santander (SANT), UniCredit (UC). Mean refers to the mean CAR/CAC of the six individual banks. The calculations are the same as described in the caption to Tables 1 & 2.

Panel A: Cumulative Abnormal Stock, European Banks

Day	Time stamp	CAR,%						
		BNP	DB	HSBC	SG	SANT	UC	Mean
-5	Fr,10/03,17:30 : Mo,13/03,17:30	0.36	3.64	3.14	0.91	-0.86	-3.45	0.62
-4	Mo,13/03,17:30 : Tu,14/03,17:30	0.55	0.14	-0.92	-0.64	-1.11	0.71	-0.21
-3	Tu,14/03,17:30 : We,15/03,17:30	-1.76	0.63	3.97	-3.87	1.14	-2.22	-0.35
-2	We,15/03,17:30 : Th,16/03,17:30	0.51	-2.98	1.05	-2.16	0.26	0.83	-0.42
-1	Th,16/03,17:30 : Fr,17/03,17:30	0.58	1.88	0.41	1.79	-2.27	-1.04	0.22
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**0.26**	**-2.24**	**1.40**	**-0.35**	**-0.43**	**0.19**	**-0.19**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	1.71	-0.46	-2.41	-1.30	0.28	0.06	-0.35
+2	Mo,20/03,17:30 : Tu,21/03,17:30	-0.28	0.35	-2.45	-0.93	-0.39	2.76	-0.16
+3	Tu,21/03,17:30 : We,22/03,17:30	0.15	-1.68	1.83	-1.25	-0.27	-1.02	-0.37
+4	We,22/03,17:30 : Th,23/03,17:30	1.29	0.26	0.95	1.15	0.44	0.41	0.75
+5	Th,23/03,17:30 : Fr,24/03,17:30	-0.35	-3.05	1.94	-1.40	0.76	-1.11	-0.54
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**2.35**	**-2.65**	**-1.15**	**-1.87**	**-0.20**	**0.02**	**-0.58**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**2.06**	**-2.32**	**-3.57**	**-2.78**	**-0.59**	**2.78**	**-0.74**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	3.16	-6.65	1.04	-4.26	0.34	1.02	-0.89
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	3.02	-3.66	9.04	-7.90	-2.47	-3.95	-0.99

Panel B: Cumulative Abnormal CDS Spread Changes, European Banks

Day	Time stamp	CAC,bp						
		BNP	DB	HSBC	SG	SANT	UC	Mean
-5	Fr,10/03,17:30 : Mo,13/03,17:30	2.55	3.61	4.33	3.38	5.99	0.05	3.32
-4	Mo,13/03,17:30 : Tu,14/03,17:30	7.41	0.29	0.52	-0.96	-0.34	-1.28	0.94
-3	Tu,14/03,17:30 : We,15/03,17:30	15.40	4.82	8.03	0.55	3.57	-1.51	5.14
-2	We,15/03,17:30 : Th,16/03,17:30	5.84	1.15	13.62	-2.53	3.85	-0.49	3.57
-1	Th,16/03,17:30 : Fr,17/03,17:30	11.55	-0.19	23.71	-6.20	8.58	3.38	6.81
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**7.61**	**3.36**	**-2.58**	**-1.68**	**3.73**	**2.68**	**2.19**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	11.95	-3.22	7.11	-0.28	-5.09	-5.60	0.81
+2	Mo,20/03,17:30 : Tu,21/03,17:30	-22.51	-6.28	-27.08	1.04	-6.75	2.29	-9.88
+3	Tu,21/03,17:30 : We,22/03,17:30	-12.01	-4.71	11.59	-0.72	-6.02	-4.23	-2.68
+4	We,22/03,17:30 : Th,23/03,17:30	0.20	0.49	13.37	-1.16	3.76	-2.16	2.42
+5	Th,23/03,17:30 : Fr,24/03,17:30	6.03	4.10	24.18	-0.06	6.44	-5.81	5.81
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**19.52**	**-0.22**	**7.73**	**-2.19**	**-1.69**	**-3.51**	**3.27**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-2.99**	**-6.50**	**-19.36**	**-1.15**	**-8.44**	**-1.22**	**-6.61**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-8.78	-6.62	29.79	-3.09	-4.26	-13.42	-1.06
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	34.03	3.41	76.81	-8.62	17.71	-12.67	18.44

Table 5
Cumulative Abnormal Yield Change of Swiss Government Bonds

Cumulative abnormal yield changes (CAC) are calculated for an equally weighted portfolio of all outstanding Swiss government bonds with available trading data (see Table 6). The data are sampled at the daily frequency (close-to-close). t-esw is the t-statistic as in Campbell, Lo and MacKinlay (1997) and is based on the residual variance from the estimation window.

Day	Time stamp	Swiss Government Bonds (EW)	
		CAC,bp	t-esw
-5	Fr,10/03,close : Mo,13/03,close	-21.73	-3.74
-4	Mo,13/03,close: Tu,14/03,close	10.28	1.77
-3	Tu,14/03,close: We,15/03, close	-24.82	-4.27
-2	We,15/03,close : Th,16/03,close	2.54	0.44
-1	Th,16/03,close : Fr,17/03,close	-9.52	-1.64
0;+1	**Fr,17/03,close : Mo,20/03,close**	**0.68**	**0.12**
+2	Mo,20/03,close : Tu,21/03,close	15.17	2.61
+3	Tu,21/03,close : We,22/03,close	7.08	1.22
+4	We,22/03,close : Th,23/03,close	-4.96	-0.85
+5	Th,23/03,close : Fr,24/03,close	-3.70	-0.64
0; +2	**Fr,17/03,close : Tu,21/03,close**	**15.85**	**1.92**
0; +5	Fr,17/03,close : Fr,24/03,close	14.26	1.09
-5; +5	Fr,10/03,close : Fr,24/03,close	-28.99	-1.54

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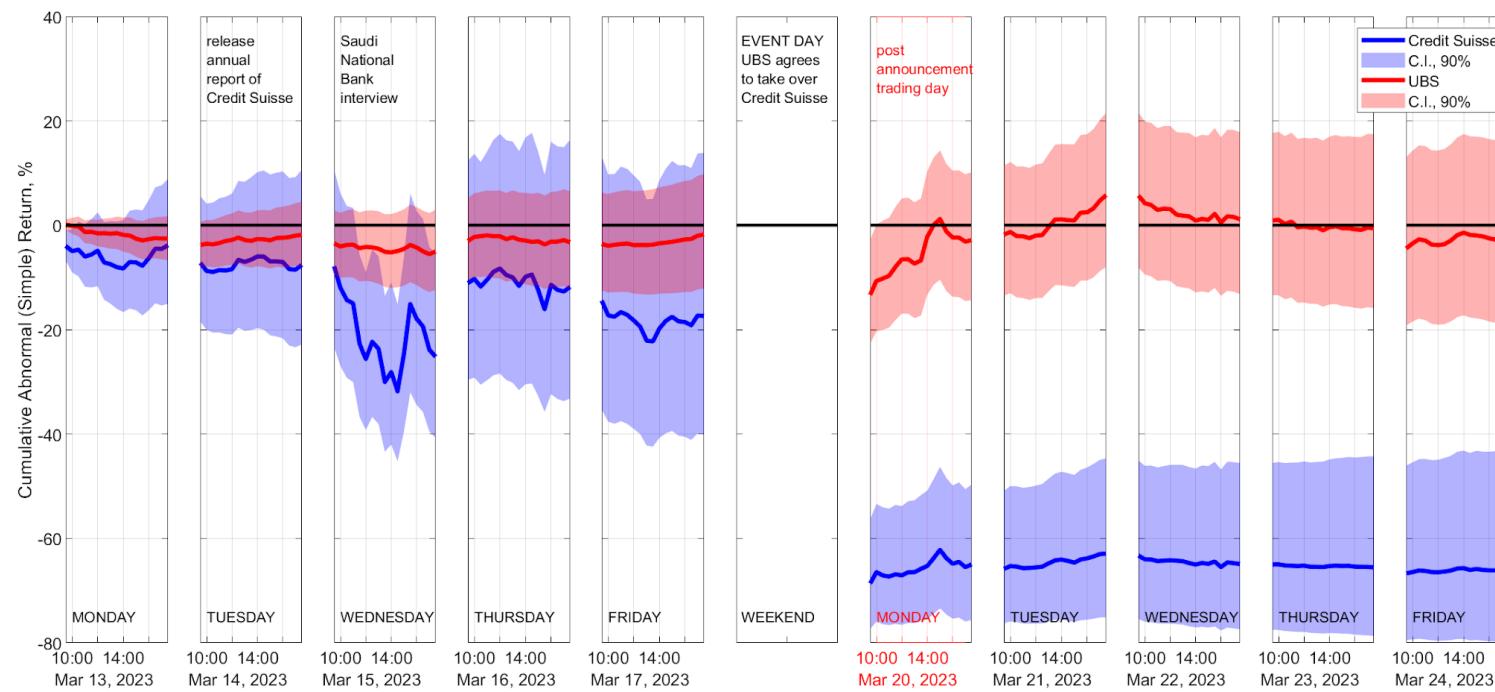
Table 6
Switzerland's Marginal Increase in the Cost of Debt

The table reports for the outstanding Swiss government bonds the issue amount, the remaining term in years, and the yield to maturity (YTM). Scenario (I) reports the change in cost of dept assuming that refinancing costs are persistently 10bp higher (ΔCD). PV is the present-value of the respective increase in the cost of dept assuming that the higher refinancing costs become effective at the due date and a complete rollover of the dept. Scenario (II) reports the same calculations assuming a persistent 8bp increase. The present value of taxpayer's cost is calculated as the perpetuity value of the sum of the present-values of the increase in cost of debt using the issue amount weighted YTM. The data are from Bloomberg as of June 12, 2023.

ISIN	Issue amount CHF	Term years	YTM	(I) 10bp increase		(II) 8bp increase	
				ΔCD	PV	ΔCD	PV
CH0127181177	3,343.40	1.04	0.0111	3.34	3.30	2.67	2.64
CH0184249990	3,760.65	2.18	0.0100	3.76	3.67	3.01	2.94
CH0224396983	3,803.48	3.03	0.0095	3.80	3.69	3.04	2.95
CH0031835561	3,080.52	4.13	0.0092	3.08	2.96	2.46	2.37
CH0008680370	5,612.46	4.93	0.0090	5.61	5.37	4.49	4.29
CH0224397346	4,613.03	6.15	0.0090	4.61	4.37	3.69	3.49
CH0224397171	3,500.09	7.09	0.0090	3.50	3.29	2.80	2.63
CH0127181029	3,378.47	8.18	0.0090	3.38	3.14	2.70	2.51
CH0344958688	3,111.42	9.21	0.0092	3.11	2.86	2.49	2.29
CH0015803239	4,555.96	10.00	0.0095	4.56	4.16	3.64	3.33
CH0440081393	2,272.17	11.23	0.0098	2.27	2.04	1.82	1.63
CH0557778310	2,165.78	12.24	0.0100	2.17	1.92	1.73	1.54
CH0024524966	4,305.89	12.96	0.0102	4.31	3.79	3.44	3.03
CH0127181193	4,054.08	14.28	0.0103	4.05	3.51	3.24	2.81
CH0440081567	1,412.15	15.63	0.0103	1.41	1.20	1.13	0.96
CH0440081401	2,532.25	16.38	0.0102	2.53	2.14	2.03	1.71
CH0127181169	4,365.97	19.19	0.0102	4.37	3.59	3.49	2.87
CH0344958498	3,650.15	22.40	0.0101	3.65	2.91	2.92	2.33
CH0009755197	2,790.82	25.98	0.0095	2.79	2.15	2.23	1.72
CH0344958472	2,517.72	32.44	0.0091	2.52	1.85	2.01	1.48
CH0224397338	2,186.35	35.51	0.0083	2.19	1.58	1.75	1.27
CH0224397007	3,408.21	41.67	0.0132	3.41	2.41	2.73	1.93

Issue amount weighted YTM: 0.0098		∑PV=65.90	∑PV=52.72
Present value of taxpayer's cost:	**CHF**	**6,737.59**	**CHF** **5,390.07**
(=∑PV/ weighted YTM)	**USD**	**7,209.22**	**USD** **5,767.36**
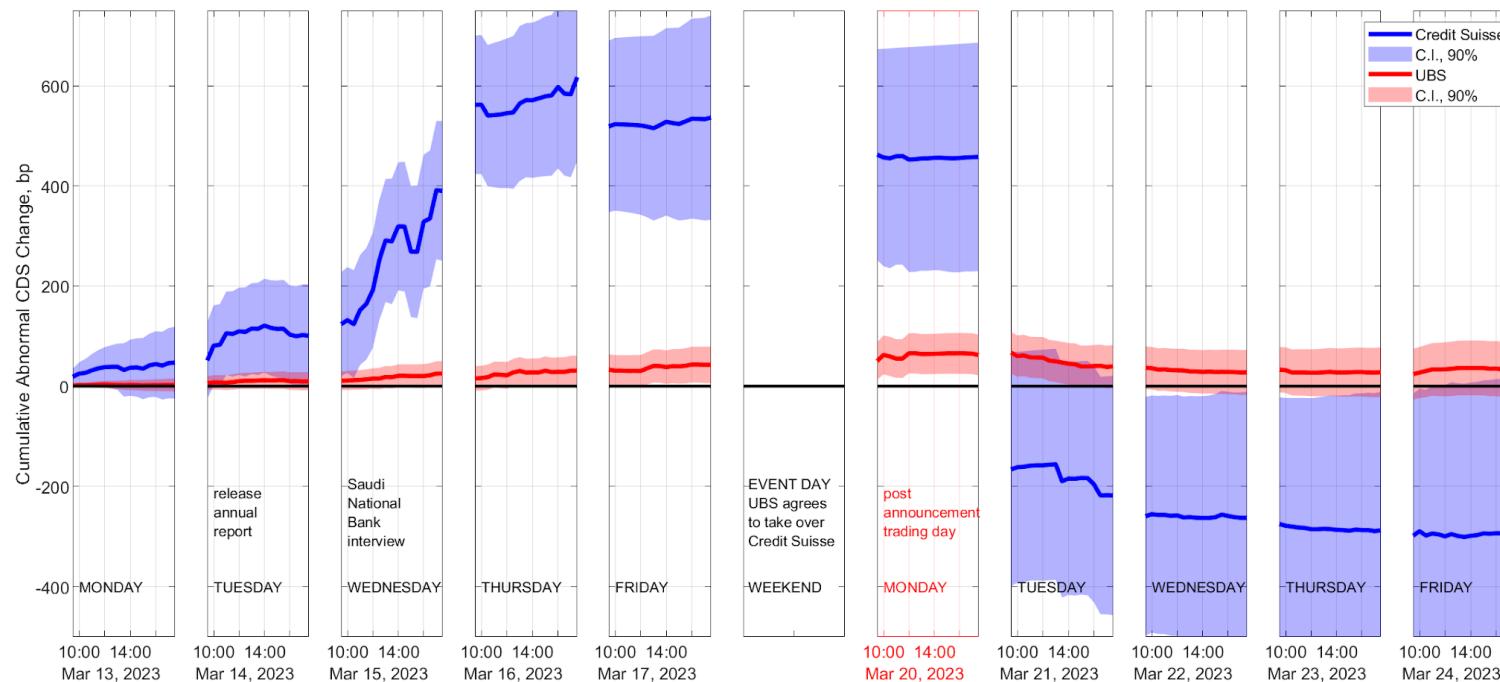
Figure 1

Event Time Figure: Cumulative Abnormal Stock Returns

The figure reports the cumulative abnormal stock return (CAR) for Credit Suisse (blue) and UBS (red) from Friday, March 10, 2023, 17:30 to Friday, March 24, 2023, 17:30. Calculations are the same as described in the caption to Table 1. Confidence intervals are the point estimate +/- two standard errors. The standard errors are based on the residual variance from the event window and account for an increased residual variance in the event window.
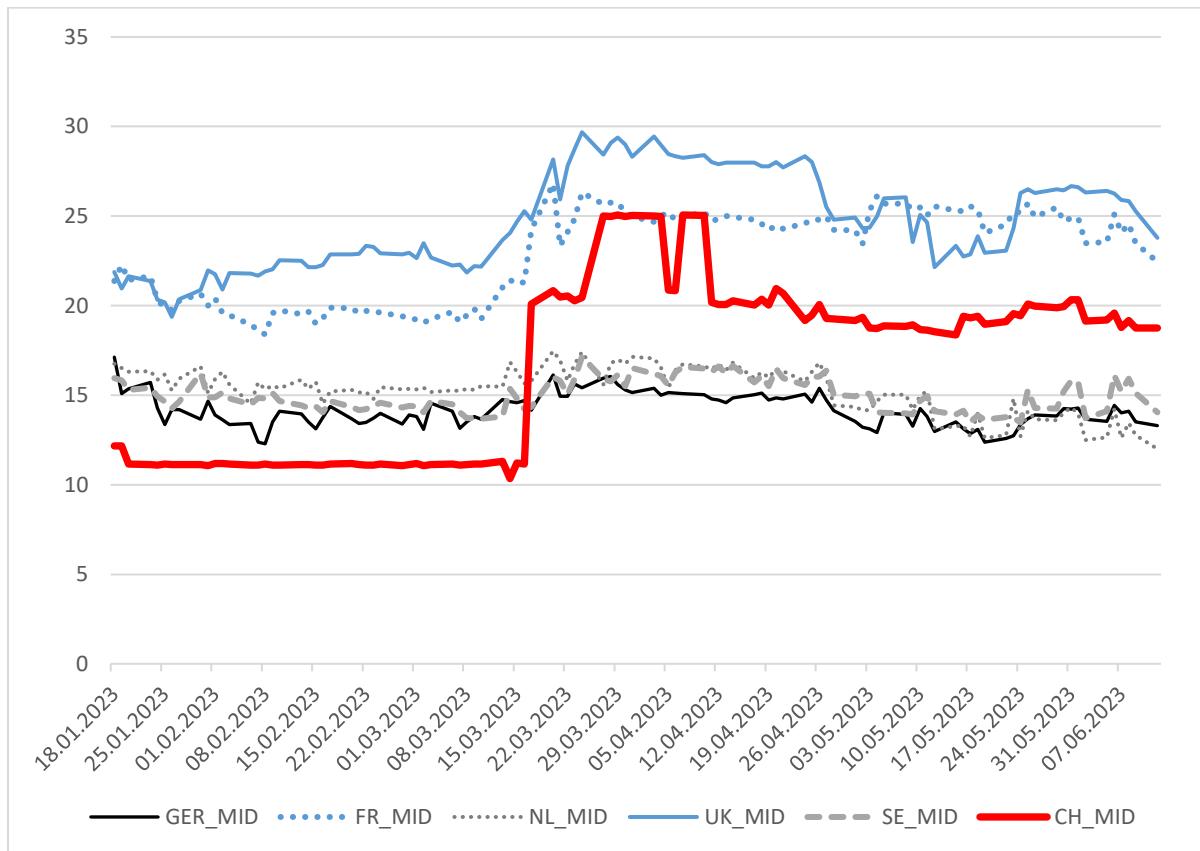
Figure 2

Event Time Figure: Cumulative Abnormal CDS Spread Changes

The figure reports the cumulative abnormal CDS change (CAC) for Credit Suisse (blue) and UBS (red) from Friday, March 10, 2023, 17:30 to Friday, March 24, 2023, 17:30. Calculations are the same as described in the caption to Table 2. Confidence intervals are the point estimate +/- two standard errors. The standard errors are based on the residual variance from the event window and account for an increased residual variance in the event window.

Figure 3

Sovereign CDS Spreads: Before and After the Credit Suisse - Bailout

The figure reports the CDS spreads for Switzerland (red solid line), Germany (black solid line), Sweden (grey dotted line), the Netherlands (grey dots), the United Kingdom (blue solid line) and France (blue dots). Data are from Bloomberg. We use daily mid-prices.

Appendix Table A.1
Cumulative Abnormal Stock Returns: Constant Mean Return Model

Cumulative abnormal stock returns are calculated as in Table 1, except that the factor model is replaced by the constant mean model.

| Day	Time stamp	Credit Suisse			UBS		
		CAR,%	t-esw	t-evw	CAR,%	t-esw	t-evw
-5	Fr,10/03,17:30 : Mo,13/03,17:30	-8.56	-2.66	-1.06	-6.96	-3.62	-1.89
-4	Mo,13/03,17:30 : Tu,14/03,17:30	-0.26	-0.08	-0.03	3.64	1.80	0.94
-3	Tu,14/03,17:30 : We,15/03,17:30	-23.35	-7.90	-3.15	-8.17	-4.28	-2.23
-2	We,15/03,17:30 : Th,16/03,17:30	21.00	5.66	2.26	3.65	1.80	0.94
-1	Th,16/03,17:30 : Fr,17/03,17:30	-8.10	-2.51	-1.00	-0.22	-0.11	-0.06
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**-63.02**	**-127.14**	**-50.64**	**-14.55**	**-33.97**	**-17.72**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	19.05	5.35	2.13	18.74	8.92	4.65
+2	Mo,20/03,17:30 : Tu,21/03,17:30	9.67	2.74	1.09	12.59	5.96	3.11
+3	Tu,21/03,17:30 : We,22/03,17:30	-4.23	-1.28	-0.51	-3.60	-1.84	-0.96
+4	We,22/03,17:30 : Th,23/03,17:30	-3.28	-0.99	-0.39	-3.58	-1.83	-0.96
+5	Th,23/03,17:30 : Fr,24/03,17:30	-4.10	-1.24	-0.50	-3.53	-1.80	-0.94
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**-55.89**	**-23.57**	**-9.39**	**2.03**	**0.98**	**0.51**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-51.62**	**-14.39**	**-5.73**	**14.88**	**4.65**	**2.42**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-57.03	-9.60	-3.82	3.00	0.57	0.30
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	-66.66	-7.74	-3.08	-6.19	-0.76	-0.40

Appendix Table A.2
Cumulative Abnormal Stock Returns: Alternative Industry Factor

Cumulative abnormal stock returns are calculated as in Table 1, except that the banking factor is replaced by the equally weighted average of six systematic European banks (BNP Paribas, Deutsche Bank, HSBC Holdings, Société Générale, Santander, UniCredit).

Day	Time stamp	Credit Suisse			UBS		
		CAR,%	t-esw	t-evw	CAR,%	t-esw	t-evw
-5	Fr,10/03,17:30 : Mo,13/03,17:30	-3.86	-1.49	-0.53	-2.87	-3.19	-1.12
-4	Mo,13/03,17:30 : Tu,14/03,17:30	-3.80	-1.48	-0.52	0.87	0.96	0.34
-3	Tu,14/03,17:30 : We,15/03,17:30	-18.62	-7.69	-2.72	-3.00	-3.28	-1.16
-2	We,15/03,17:30 : Th,16/03,17:30	18.25	6.41	2.27	2.10	2.30	0.81
-1	Th,16/03,17:30 : Fr,17/03,17:30	-6.33	-2.52	-0.89	1.42	1.57	0.55
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**-61.85**	**-110.12**	**-38.94**	**-11.64**	**-40.84**	**-14.39**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	11.56	4.24	1.50	12.30	12.97	4.57
+2	Mo,20/03,17:30 : Tu,21/03,17:30	5.73	2.13	0.75	8.96	9.45	3.33
+3	Tu,21/03,17:30 : We,22/03,17:30	-5.19	-2.05	-0.72	-4.17	-4.73	-1.67
+4	We,22/03,17:30 : Th,23/03,17:30	-1.87	-0.72	-0.26	-2.10	-2.35	-0.83
+5	Th,23/03,17:30 : Fr,24/03,17:30	-0.33	-0.12	-0.04	-0.11	-0.12	-0.04
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**-57.49**	**-31.47**	**-11.13**	**-0.52**	**-0.55**	**-0.19**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-55.05**	**-20.27**	**-7.17**	**8.39**	**5.90**	**2.08**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-58.32	-12.82	-4.53	1.58	0.66	0.23
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	-65.21	-9.52	-3.37	-0.29	-0.07	-0.03

Appendix Table A.3
Cumulative Abnormal CDS Spread Changes

Cumulative abnormal CDS changes are calculated as in Table 2, except that the factor model is replaced by the constant mean model

Day	Time stamp	Credit Suisse			UBS		
		CAC,bp	t-esw	t-evw	CAC,bp	t-esw	t-evw
-5	Fr,10/03,17:30 : Mo,13/03,17:30	63.38	7.87	1.54	6.28	3.95	0.78
-4	Mo,13/03,17:30 : Tu,14/03,17:30	56.08	6.97	1.36	7.94	4.99	0.99
-3	Tu,14/03,17:30 : We,15/03,17:30	308.00	38.26	7.48	19.74	12.42	2.46
-2	We,15/03,17:30 : Th,16/03,17:30	234.61	29.14	5.69	7.58	4.77	0.95
-1	Th,16/03,17:30 : Fr,17/03,17:30	-60.63	-7.53	-1.47	16.14	10.15	2.01
0	**Fr,17/03,17:30 : Mo,20/03,09:30**	**-68.40**	**-36.55**	**-7.14**	**8.89**	**24.07**	**4.78**
+1	Mo,20/03,09:30 : Mo,20/03,17:30	-4.47	-0.57	-0.11	11.96	7.78	1.54
+2	Mo,20/03,17:30 : Tu,21/03,17:30	-686.55	-85.27	-16.67	-24.93	-15.68	-3.11
+3	Tu,21/03,17:30 : We,22/03,17:30	-55.93	-6.95	-1.36	-14.61	-9.19	-1.82
+4	We,22/03,17:30 : Th,23/03,17:30	-14.92	-1.85	-0.36	2.55	1.60	0.32
+5	Th,23/03,17:30 : Fr,24/03,17:30	13.39	1.66	0.32	10.60	6.67	1.32
0; +1	**Fr,17/03,17:30 : Mo,20/03,17:30**	**-68.91**	**-8.30**	**-1.62**	**20.98**	**12.80**	**2.54**
0; +2	**Fr,17/03,17:30 : Tu,21/03,17:30**	**-755.45**	**-62.60**	**-12.23**	**-3.94**	**-1.65**	**-0.33**
0; +5	Fr,17/03,17:30 : Fr,24/03,17:30	-812.91	-38.63	-7.55	-5.40	-1.30	-0.26
-5; +5	Fr,10/03,17:30 : Fr,24/03,17:30	-215.45	-6.35	-1.24	52.15	7.78	1.54

Appendix Table A.4
Comparison of Asset Quality Metrics and Capital Adequacy Ratios

Asset Quality (%)	UBS							Credit Suisse						
	Ø 10 Yrs	Ø 5 Yrs	Ø 3 Yrs	Ø 2 Yrs	Last Year	σ 10 Yrs	σ 5 Yrs	Ø 10 Yrs	Ø 5 Yrs	Ø 3 Yrs	Ø 2 Yrs	Last Year	σ 10 Yrs	σ 5 Yrs
Loan Loss Coverage (x)	50.17	61.64	77.72	103.99	129.74	30.97	38.85	6.22	8.68	2.61	-3.40	-19.53	13.26	14.24
Loan Losses Provision/Total Loans (x)	0.03	0.04	0.05	-0.01	0.01	0.05	0.08	0.24	0.40	0.60	0.72	0.01	0.41	0.53
Loan Losses Reserves/Total Loans (x)	0.22	0.22	0.22	0.20	0.19	0.02	0.03	0.37	0.42	0.49	0.48	0.51	0.08	0.09
Net Charge-Offs / Average Loans	0.04	0.05	0.05	0.02	0.02	0.02	0.03	0.09	0.09	0.09	0.08	0.06	0.02	0.02
Loan Loss Provisions / Net Charge-Offs	62.81	47.72	37.73	-43.12	39.19	78.73	103.46	257.79	416.23	615.60	747.75	9.64	418.36	546.35
Loan Losses Reserves/Non-Perf. Loans	35.20	33.09	34.18	34.59	33.56	6.02	1.58	45.69	44.07	44.91	43.34	39.81	6.17	3.18
Loan Losses Reserves/Non-Perf. Assets	35.20	33.09	34.18	34.59	33.56	6.02	1.58	45.69	44.07	44.91	43.34	39.81	6.17	3.18
Non-Performing Loans/Total Loans (x)	0.64	0.68	0.65	0.58	0.58	0.11	0.09	0.82	0.96	1.10	1.11	1.29	0.22	0.21
Non-Performing Loans/Loan Loss Res.	292.66	302.90	292.80	289.39	297.96	50.98	14.33	222.58	228.09	224.23	232.27	251.21	27.71	16.64
NPAs / Total Assets	0.22	0.24	0.24	0.21	0.21	0.04	0.03	0.31	0.39	0.47	0.51	0.64	0.13	0.13
NPAs / Total Equity	4.00	4.47	4.43	4.00	4.08	0.74	0.49	5.26	6.22	7.08	6.90	7.55	1.47	1.15
Texas Ratio	4.52	4.99	4.92	4.43	4.54	0.76	0.54	5.87	6.69	7.53	7.26	7.94	1.34	1.16
Capital Adequacy	Ø 10 Yrs	Ø 5 Yrs	Ø 3 Yrs	Ø 2 Yrs	Last Year	σ 10 Yrs	σ 5 Yrs	Ø 10 Yrs	Ø 5 Yrs	Ø 3 Yrs	Ø 2 Yrs	Last Year	σ 10 Yrs	σ 5 Yrs
Common Equity Tier 1 Capital Ratio (x)	13.79	13.92	14.33	14.60	14.20	0.64	0.69	12.82	13.34	13.80	14.25	14.10	1.54	0.76
Tier 1 Risk Based Capital Ratio (%)	17.44	19.03	19.21	19.10	18.20	2.33	1.01	17.14	18.44	19.63	20.15	20.00	1.91	1.60
Leverage Ratio	5.11	5.52	5.60	5.70	5.70	0.59	0.24	5.63	6.18	6.73	6.90	7.70	1.02	0.87
Total Capital Adequacy Ratio (%)	18.80	19.07	19.28	19.20	18.40	1.89	0.98	18.62	19.02	19.83	20.25	20.00	1.34	1.14
Risk Weighted Assets	244,691.05	267,518.89	275,529.53	285,518.89	295,680.04	26,511.33	16,290.97	275,622.10	273,691.20	264,470.33	259,163.50	250,540.00	11,606.07	13,947.62
Tangible Common Equity / Ta. Assets (%)	4.76	4.81	4.74	4.75	4.61	0.34	0.13	4.99	5.62	6.02	6.66	7.91	1.08	1.16

All figures in millions of Swiss Franc except per share and labelled items.