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Article

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Journal of Central Banking Theory and Practice

Provided in Cooperation with:

Central Bank of Montenegro, Podgorica

Suggested Citation: Kämpf, Vanessa; Stadtmann, Georg; Zimmermann, Lilli (2024) : Swiss National Bank: Is the recent loss a threat to monetary policy? A research note, Journal of Central Banking Theory and Practice, ISSN 2336-9205, Sciendo, Warsaw, Vol. 13, Iss. 1, pp. 43-55, <https://doi.org/10.2478/jcbtp-2024-0003>

This Version is available at:

<https://hdl.handle.net/10419/299092>

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UDC: 336.711(494)

DOI: 10.2478/jcbtp-2024-0003

Journal of Central Banking Theory and Practice, 2024, 1, pp. 43-55*Received: 03 February 2023; accepted: 15 May 2023*

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Swiss National Bank: Is the Recent Loss a Threat to Monetary Policy? A Research Note¹

Abstract: The Swiss National Bank (SNB) has announced it will refrain from profit distribution in 2022 owing to the accumulation of a huge financial loss. In this paper we examine key determinants of the SNB's loss and shed light on its implications to monetary policy pursuit. In particular, we show that different accounting principles yield different results concerning the equity position of a central bank's balance sheet, yet not affecting the ability to run monetary policy.

Keywords: Swiss National Bank, central bank, monetary policy, intervention.

JEL Classification: E5, G15.

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1. Introduction

In the past decade, the Swiss National Bank (SNB) performed several severe shifts in its monetary policy: In the aftermath of the financial crisis, many investors were looking for a safe haven (Baltensperger and Kugler, 2016) causing a drastic appreciation of the Swiss Franc (CHF). From the beginning of 2010 until mid-2011, the exchange

¹ The views expressed in this paper reflect those of the authors and not necessarily those of the institutions for which they work. Any remaining errors are the responsibility of the authors.

rate vis-à-vis the Euro (EUR) decreased from a level of 1.50 CHF/EUR to parity, causing a heavy burden for the Swiss export sector. Therefore, in August 2011, the SNB introduced a lower floor exchange rate at 1.20 CHF/EUR (Humpage, 2013). In order to hold the exchange rate at the predetermined level and to cope with tremendous money demand shocks, a zero interest rate policy of the European Central Bank (ECB) and ongoing appreciation pressures, the SNB was forced to drastically intervene in the foreign exchange market (Amador, Bianchi, Bocola and Perriet, 2016; Berthold and Stadtmann, 2018; Berthold and Stadtmann, 2019). The SNB's foreign reserves increased tremendously. In January 2015, the SNB officially abolished the 1.20 CHF/EUR lower floor followed by a sharp appreciation of the Swiss franc. This already caused a loss of 23 billion CHF in 2015 (see SNB's Annual Report 2015, p. 122). Now, the SNB announced another record loss of 132 billion CHF for 2022 via an ad hoc announcement. Given the population size of 8.8 million inhabitants in Switzerland, this loss amounts to 15,000 CHF per capita. A more common measure might be to relate the loss to nominal gross domestic product (GDP) of 2022: It amounts to 16.3 % of GDP ($= 132 \text{ bn loss} / 807.4 \text{ bn}$). This paper aims at answering the question of which consequences will the huge loss have for the SNB and is it a threat to monetary policy?

Usually, a central bank has a wide range of instruments to steer the provision of liquidity to commercial banks given a two-tier system. Monetary policy is performed by adjusting the policy rates. Main refinancing operations alter the central bank's balance sheet by the same amount on the asset side and the liability side. As long as the equity of the central bank is positive, it does not seem to be a problem to run monetary policy. However, what would happen if equity turns into negative territory because of high losses, comparable to the SNB loss?

Using the current case of the SNB, we first analyze the key determinants of a central bank's loss. Therefore, we lay out the set-up of the SNB's balance sheet and discuss the main drivers in Section 2. In Section 3, we introduce a stylized theoretical example in order to investigate the scenarios under which central bank's equity could become negative. We also briefly discuss the implications for monetary policy and price stability. Section 4 concludes.

2. The SNB's balance sheet and the key drivers of the loss

Since it first started operations in 1907, the SNB has had a significant influence on Switzerland's economic policy. The SNB's mandate derives directly from the Swiss Federal Constitution. Consequently, the SNB has to conduct a monetary policy that serves the overall interests of the country. In contrast to the ECB or

the Federal Reserve Bank (FED), the SNB is a special law stock corporation. The share capital of the SNB amounts to 25 million CHF. It is divided into 100,000 registered shares with a par value of 250 CHF each.² Today, the shares are listed on the SIX Swiss Exchange. During 2022, the stock price decreased from a level of 5,380 CHF in the beginning of 2022 to the level of 4,790 CHF in the end of 2022 (–11%).

Because the National Bank has a public mandate, the rights of private shareholders are limited in comparison with a joint-stock company under private law. Private shareholders are thus entitled to vote with a maximum of 100 shares (see SNB's Annual Report 2021, p. 143). As a listed company, the SNB is subject to the regulations of the Swiss stock exchange. Therefore, the SNB regularly publishes interim reports to provide information on the development of its business. In December 2022, the Swiss National Bank announced it would refrain from profit distribution owing to the accumulation of a huge annual loss. This has affected both dividend payments to the SNB shareholders as well as the profit distribution to the Confederation and the Cantons. To understand the drivers of the loss, we lay out the setup of the balance sheet and discuss the key determinants of changes in the balance sheet positions.

Table 1 displays a simplified representation of the SNB's balance sheet as of December 2021. In 2021, the balance sheet total amounted to 1,056 billion CHF. Given a nominal GDP of 800.6 billion CHF for the year 2021, the balance sheet amounts to 132% of GDP. This is about double the ratio of the ECB and almost four times the value of the FED.³

The asset side of the balance sheet is split into the following positions: Gold and receivables from gold transactions, foreign currency holdings, and other assets. Gold and other assets amount to around 55.7 billion CHF and 34.9 billion CHF. With 966.2 billion CHF, foreign exchange reserves account for approximately 90% of the balance sheet total. Large positions of foreign reserves involve at least three kinds of risks:

² In principle, any investor from Switzerland or abroad is free to purchase or resell share certificates of the SNB via the stock market. At the end of 2021, around 78% of the voting shares were held by public-sector shareholders. These included 26 cantons and 24 cantonal banks. The Swiss Federation is not a shareholder. Private shareholders held around 22% of the voting shares. The largest shareholders at the end of 2021 were the Canton of Berne, the Canton of Zurich, the German entrepreneur Prof. Dr. Theo Siebert, the Canton of Vaud, and the Canton of St. Gallen.

³ Only the Bank of Japan (BoJ) has a higher ratio than the SNB. However, while the BoJ invests predominantly in Yen dominated assets, the SNB invests in foreign assets. To some extent, this is due to the fact that the outstanding government debt of Switzerland is smaller than the size of the SNB's balance sheet.

1. the risk of speculative attacks,
2. higher interest rate, which will lower the market prices of bonds, and
3. stock market shocks.

With respect to the currency distribution, foreign reserves were held in Euros (38%), in US-Dollars (USD) (38 %), Japanese yen (8%), Pound sterling (7%), Canadian dollars (3%) and others. Hence, in particular exchange rate fluctuations vis-à-vis the Euro and the US-Dollar, seem to be crucial for SNB's balance sheet developments.

On the liability side the balance sheet includes the typical positions: banknote circulation (90.7 bn CHF), sight deposits (727.2 bn CHF), other liabilities (34.7 bn CHF) and equity (204.2 bn CHF). Given that the equity position takes a value of 204 billion CHF at the end of 2021, it becomes clear that the loss of 132 billion CHF will decrease equity by more than 60 %. However, equity will still show a positive sign in the balance sheet as of 2022.

Table 1: Simplified balance sheet of the SNB as of December 2021

Assets		Liabilities	
Gold and receivables from gold transactions	55,690.74	Banknote circulation	90,685.26
Foreign currency holdings	966,202.18	Sight deposits	727,162.13
Other assets	34,883.29	Other liabilities	34,679.77
		Equity	204,249.05
Balance sheet total	1056,776.21	Balance sheet total	1056,776.21

Notes: Units: Swiss Franc Millions. Source: <https://data.snb.ch/de/topics/snb/cube/snbbipo>, own illustration

Since the foreign exchange investments were already decisive for the SNB's losses in 2015, it is worth analyzing them in more detail to identify the drivers of the current loss. The foreign currency holdings are invested in bonds and stocks. In detail, Table 2 shows that 77% of foreign exchange are invested in bonds and 23% in shares. With respect to bonds, the focus is on the AAA rating class.

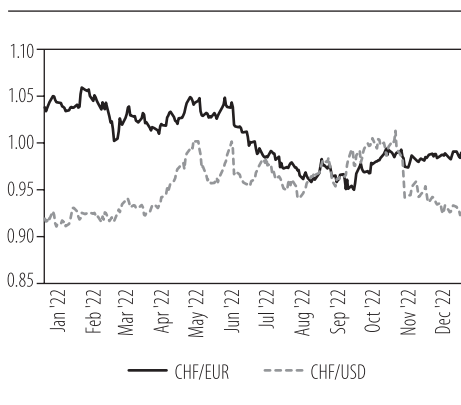
Table 2: SNB foreign exchange investments: Asset classes and structure of interest bearing investments in Q4 2021

Government bonds	66%
Other bonds	11%
Shares	23%
Investments with AAA-Rating	60%
Investments with AA-Rating	19%
Investments with A-Rating	16%
Investments with a poorer Rating	5%
Duration (years)	4.3

Source: <https://data.snb.ch/de/topics/snb/cube/snbcurrinvc>, own illustration

The exchange rate as a key determinant

An appreciation of the Swiss Franc, which implies a depreciation of the foreign currencies, has a considerable influence on the valuation of the assets, denominated in foreign currency. If the Euro and the US. Dollar, which account for the largest share of the SNB's foreign currency holdings, weaken against the Swiss franc, the SNB will face losses.

Figure 1: Exchange rate development in 2022: CHF/EUR and CHF/USD

Source: Refinitiv data, own illustration

Figure 1 shows the CHF/EUR and CHF/USD exchange rate development in 2022. It is visible that the Swiss franc was strong against the Euro in 2022 and changed from a level of about 1.0380 CHF/EUR to the level of 0.9895 CHF/EUR, which is a relative change of about 4.6%. Assuming 966 billion CHF in foreign currency holdings and a share of about 38% denominated in Euro, the exchange rate change can account for a loss of about 16.9 billion CHF. As a consequence, about 13% (=16.9/132) of the overall loss can be attributed to the depreciation of the Euro.

Figure 1 also reveals that despite some volatility within the year 2022, the CHF/USD exchange rate was relatively stable when comparing the beginning

and the end of 2022. The USD even appreciated slightly and the exchange rate increased by 0.6%. Hence, foreign denominated assets in USD, which also amount to 38% of overall foreign assets, were not a driver of the overall loss.

The interest rate development as a key determinant

Another determinant for the high losses of the SNB was the general rise in interest rates throughout the world. Table 3 shows the development of interest rates in different regions in detail. The rising key interest rates lead to valuation losses and the SNB's own interest rate decision (sharp increase by 0.75 to 0.50%) put pressure on the SNB's result as well (see SNB 2022b). The higher interest rate level led to price losses on government bonds, which are a major investment focus.

Table 3: Interest rate development in 2022: Various regions

Time	Switzerland (SNB- key interest rate)	United States (FED – Target)	Euro Area (EZB – main refinancing operations)	United Kingdom (BoE- key interest rate)	Japan (BoJ – key interest rate)
2022 – 01	– 0.75	0.00 – 0.25	0.0	0.25	– 0.1
2022 – 02	– 0.75	0.00 – 0.25	0.0	0.50	– 0.1
2022 – 03	– 0.75	0.25 – 0.50	0.0	0.75	– 0.1
2022 – 04	– 0.75	0.25 – 0.50	0.0	0.75	– 0.1
2022 – 05	– 0.75	0.75 – 1.00	0.0	1.00	– 0.1
2022 – 06	– 0.25	1.50 – 1.75	0.0	1.25	– 0.1
2022 – 07	– 0.25	2.25 – 2.50	0.50	1.25	– 0.1
2022 – 08	– 0.25	2.25 – 2.50	0.50	1.75	– 0.1
2022 – 09	0.50	3.00 – 3.25	1.25	2.25	– 0.1
2022 – 10	0.50	3.00 – 3.25	2.0	2.25	– 0.1
2022 – 11	0.50	3.75 – 4.00	2.0	3.00	– 0.1
2022 – 12	1.0	4.25 – 4.50	2.5	3.50	– 0.1

Source: <https://data.snb.ch/de/topics/snb/cube/snbhoffzisa>, own illustration

Another example will be used to proxy the loss from this determinant: The return for a five-year German government bond increased from a negative level of –0.4% at the beginning of 2022 to the level of +2.6% in the end of 2022. Assuming a zero coupon bond, a five-year bond would trade at about $100/(1 - 0.004)^5 = 102$ EUR at the beginning of 2022 versus $100/(1 + 0.026)^5 = 88$ EUR at the end of the year. The relative change in the bond price is equal to –13.7%. Assuming 966 billion CHF in foreign currency holdings and a bond/stock split of 77% to 23%, we can quantify the amount of the loss related to this driver as follows:

$$966 \cdot 0.77 \cdot (-0.137) = -102 \text{ bn CHF} \quad (1)$$

As a consequence, about 77% (=102/132) of the overall loss can be attributed the increase in the interest rate of bonds.

The international stock market development as a key determinant

As already mentioned, the SNB holds around a quarter of its investments in shares (see Table 2). Due to the war in Ukraine, the sharp rise in inflation and increasing fear of recession, the value of these shares declined and thus contributed to the SNB's loss. For example, the EURO STOXX 50 traded at 4304 index points at the beginning of the year and closed at 3829 index points in the end of 2022, which implies a relative change of -11.0 %. Hence, this relative change in stock prices is in the same range as the bond prices. Assuming 966 bn CHF in foreign currency holdings and a proportion of 23% in the form of stocks, we can quantify the amount of the loss related to this driver as follows:

$$966 \cdot 0.23 \cdot (-0.11) = -24 \text{ bn CHF} \quad (2)$$

As a consequence, about 18% (=24/132) of the overall loss can be attributed to the decrease in stock prices.

The gold price as a key determinant

Furthermore, the gold price was relatively stable when comparing the beginning and end of 2022. Hence, the gold holdings had a rather insignificant impact on the SNB's result.

Preliminary results

The main driver of the loss stems from the interest rate development. Increasing interest rates implies lower bond prices, which affect the value of the SNB's assets. Furthermore, a weaker Euro decreases the value of the Euro denominated positions, measured in Swiss Franc.

Our quick and oversimplified analysis yields the following first results: The loss can be attributed to 13% to the depreciation of the Euro, to 77% to the increase in interest rates and to 18 % to changes in stock prices. We are fully aware of the fact that the effects do not sum up completely. Nevertheless, this gives an indication of the importance of the loss drivers. The overall loss for the SNB is so huge

because the balance sheet in relation of GDP is one of the highest in the world. Nevertheless, it seems like equity will still be positive at the end of 2022.

However, the bond price development affects the value of the assets of all central banks around the world. Hence, it is interesting to deepen the examination beyond the case of the SNB. In the following section, we will create a theoretical example and highlight the condition under which equity of a central bank might become negative. We also introduce alternative accounting rules under which it is impossible that equity can become negative. Overall, we argue that a loss of a central bank has no implications for the monetary policy and price stability. A loss of a central bank does not change money supply in circulation and is, therefore, not a threat for price stability.⁴ This applies only as long as losses do not affect the independence or credibility of the central bank. Of course, this can be disputed.

3. Accounting principles: Stylized example

3.1. Traditional accounting rules

In this section, we use a stylized example of the traditional accounting rule and contrast it with an alternative method. When the traditional accounting rules are applied, negative equity can occur. In case of the alternative accounting rules this is impossible.

The initial situation of a stylized central bank is displayed in Scenario A in Table 4.

Table 4: Scenario analysis: Traditional accounting rules

Scenario A: The balance sheet of a central bank after the start of its normal business activities

Assets		Liabilities	
Gold	100	Banknote circulation	400
Other assets	400	Equity	100
Sum	500	Sum	500

⁴ This argument – of course – is based on the quantity theory of money, which claims that changes in money supply have an 1:1 impact on the inflation rate. However, the empirical evidence with respect to this relationship has weakened in the last decades. For example, the ECB has abolished its money growth target (see Deutsche Bundesbank, 2003).

Scenario B: The balance sheet after intervention in the foreign exchange market

Assets		Liabilities	
Gold	100	Banknote circulation	400
Other assets	400	Sight deposits	2000
Currency reserves	2000	Equity	100
Sum	2500	Sum	2500

Scenario C: The balance sheet after depreciation of the foreign currency

Assets		Liabilities	
Gold	100	Banknote circulation	400
Other assets	400	Sight deposits	2000
Currency reserves	1800	Equity	–100
Sum	2300	Sum	2300

Let's assume that the central bank has established a fixed exchange rate system. The domestic currency gets under appreciation pressure so that the central bank intervenes in the foreign exchange market and purchases foreign assets of the value of 2000. Under the traditional accounting rules, the currency reserves as well as the sight deposits positions would be affected (see Scenario B).

A shock occurs and the central bank abolishes the fixed exchange rate system. The foreign currency depreciates by 10% so that the value of the reserves decreases to the level of 1800. Mark-to-the-market-rules lead to a financial loss, which reduces equity by 200. In this extreme example, equity becomes even negative (Scenario C).

Nevertheless, the question emerges whether the loss and the negative equity position have an impact on monetary policy or the price stability in the future. The answer is: No! Money supply in circulations does not change when equity becomes negative. Money supply in circulation is constant and, therefore, does not impact price stability according to the quantity theory of money. Nonetheless, the argument related to the independence or credibility of the central bank still applies.

3.2. Alternative accounting rules

In the previous subsection, it was shown that the central bank's equity can become negative. This is due to the fact that the balance sheet position "banknote circulation" is regarded as a liability. However, as explained by Schumann (2015),

these are fictitious liabilities. Hellwig (2015) argues that the rule that money created by the central bank appears on the liabilities side of the balance sheet is a pure convention. There is no economically compelling reason for this accounting procedure (Hellwig 2015). An alternative accounting system does not display the position “sight deposits” on the liabilities side of the central bank balance sheet. Hence, any creation of demand deposits leads to an increase in equity on the liabilities side.

Table 5: Scenario analysis: Alternative accounting method

Scenario D: Alternative accounting method – The balance sheet after intervention at the foreign exchange market

Assets		Liabilities	
Gold	100	Banknote circulation	400
Other assets	400	Equity	2100
Currency reserves	2000		
Sum	2500	Sum	2500

Scenario E: Alternative accounting method – The balance sheet after depreciation of the foreign currency

Assets		Liabilities	
Gold	100	Banknote circulation	400
Other assets	400	Equity	1900
Currency reserves	1800		
Sum	2300	Sum	2300

Applying the alternative accounting rule from Table 5, Scenario D shows the set-up of the central bank's balance sheet after the foreign exchange intervention of the central bank and before depreciation of the reserve currency. If the depreciation of the foreign currency occurs, the equity position is reduced as before. The advantage of the alternative accounting system would be that equity position can never become negative. After the depreciation, the equity position would still be positive (Scenario E).

4. Summary and conclusion

For the year 2022 the SNB announced a huge loss of 132 billion Swiss Franc, which amounts to 16.3% of GDP. To a large extent, this loss is caused by higher interest rates which implies lower bond prices. Additionally, depreciation of the Euro also contributed to this loss, but to a smaller extent.

The question that arises is how to interpret the balance sheet developments from the monetary policy perspective. In the specific case of the SNB, equity is not yet negative due to the loss in 2022. However, if we focus on the loss determinants, in particular the rising interest rates, it might be the case that other central banks will also incur losses in the near future. However, negative equity of a central bank does not seem to be a problem because it does not affect its general ability to conduct monetary policy. An automatic obligation for the taxpayer to make additional contributions to recapitalize the central bank does not exist or is not even necessary.

In a recent contribution, Tucker and Cecchetti (2021) point out, that the role of central banks have changed in the recent decade and that they fulfill different functions, other than being responsible for monetary policy. If nowadays a central bank, for example, fulfills its new role as a lender of last resort, losses might accumulate in the central bank's balance sheet.

However, the magnitude of the loss could potentially undermine (political) independence of the central bank. Is it necessary for elected officials to exert greater control over a central bank and its decisions than in the past? These are inquiries that will be on the agenda in the near future.⁵

⁵ See also a recently published paper by Kafle (2023) on how to quantify reputational risks for central banks.

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