



The response of the Swiss franc to SNB policy rate changes

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Abstract

What is the response of the Swiss franc to SNB policy rate changes? Standard economic theory suggests that a decrease in the policy rate weakens the exchange rate. But this effect is not always visible simply by observing interest rate and exchange rate movements. This is because exchange rates and interest rates reflect not just monetary policy but also other drivers such as safe-haven flows into the Swiss franc. Isolating the effect of monetary policy on the exchange rate therefore requires careful analysis. This article explains the mechanism by which a policy rate cut leads to an exchange rate depreciation, reviews the empirical evidence and summarises the results of two recent studies by SNB staff, which find that the Swiss franc does indeed depreciate following a decrease in the SNB policy rate. Theory and empirical evidence therefore suggest that lowering the policy rate into negative territory has weakened the Swiss franc. Conversely, an SNB policy rate hike would lead to an appreciation of the Swiss franc.

¹ We are grateful to Andreas Fuster, Petra Gerlach, Carlos Lenz, Thomas Nitschka, Jonas Stulz and Mathias Zurlinden for their useful comments.

1. INTRODUCTION

The exchange rate matters for the Swiss economy and inflation. Thus, it also matters for the monetary policy of the Swiss National Bank, whose mandate is to ensure price stability while taking due account of economic developments.

For a small open economy like Switzerland's, international trade plays a very important role.¹ Exchange rate movements affect the competitiveness of Swiss goods and services in international markets. A Swiss franc depreciation makes Swiss exports more competitive. This boosts economic activity not only in the export sector, but also throughout the economy. A booming economy, in turn, will put upward pressure on inflation. Moreover, because many goods and services consumed in Switzerland are imported, and because they become more expensive when the Swiss franc depreciates, a depreciation will also directly boost inflation in Switzerland.²

SNB monetary policy decisions influence the exchange rate. The SNB's monetary policy statements have regularly emphasised monetary policy's influence on the exchange rate. For example, in its December 2019 monetary policy assessment, the SNB stated that negative interest rates 'counteract the attractiveness of Swiss franc investments and thus ease the upward pressure on the currency'. When Swiss interest rates fall, investors move out of Swiss franc investments and into foreign currency investments, causing the Swiss franc to depreciate.

This article explains the effect of monetary policy rates on exchange rates and summarises the empirical evidence supporting the theoretical assertion that the Swiss franc depreciates when the SNB lowers its policy rate.

2. THEORY

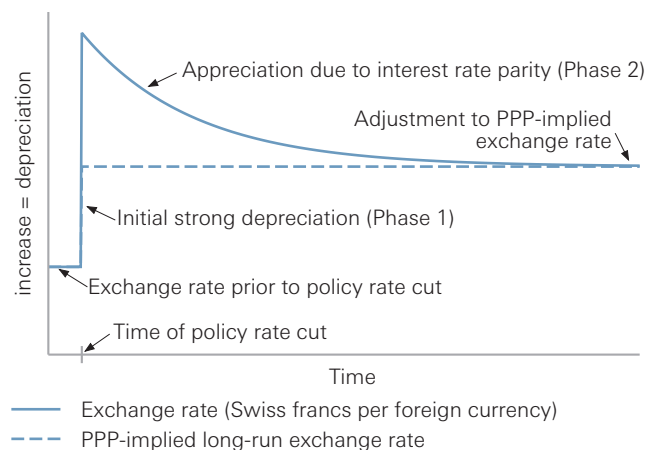
Two key economic principles explain the link between the central bank policy rate and the exchange rate: purchasing power parity (PPP) and interest rate parity.³ To explain the exchange rate response to a policy rate cut, it is easiest to start with the long-run effect of the rate cut, and then discuss the adjustment of the exchange rate towards its new long-run level.

PPP determines the exchange rate in the long run. PPP says that a given amount of money should buy the same goods in Switzerland and abroad. That is, the price of Swiss and foreign goods should be equal when converted into the

same currency.⁴ When the SNB cuts its policy rate, this easing of monetary policy boosts economic activity in Switzerland, which eventually leads to higher prices. With unchanged prices abroad, PPP requires a weaker Swiss franc in the long run (cf. dashed line in chart 1). This means that people get more Swiss francs for one unit of foreign currency and hence can pay the higher Swiss prices.

Chart 1

STYLISED EXCHANGE RATE RESPONSE TO CENTRAL BANK POLICY RATE CUT



Source: SNB

Interest rate parity explains how the exchange rate adjusts to policy rate changes in the short run. It states that Swiss franc and foreign currency investments should yield the same expected return, so that investors are equally willing to hold them.⁵ Measured in foreign currency, the expected return on a Swiss franc investment is the Swiss interest rate plus the expected Swiss franc appreciation. The return on foreign currency investments is simply the foreign interest rate. To illustrate how interest rate parity works, suppose that SNB and foreign policy rates are initially equal, with investors expecting a stable Swiss franc in line with interest rate parity. After the SNB cuts its policy rate, the interest rate is lower in Switzerland than abroad, so that investors must expect the Swiss franc to appreciate, in order to compensate them for the lower interest rate in Switzerland.

1 For example, in 2018 Swiss trade (exports + imports) amounted to 120% of GDP.

2 For information on the effect of exchange rates on the Swiss economy, cf., for example, Baurle and Steiner (2015). Stulz (2007) and Bonadio, Fischer and Sauré (2018) present empirical evidence for the pass-through of exchange rate changes to Swiss prices.

3 A more detailed discussion of the mechanism outlined in this section can be found in many economic textbooks, such as for example Krugman, Obstfeld and Melitz (2018), chapters 14–16.

4 This is how the literature defines 'absolute' PPP. In practice there are deviations from absolute PPP, for example because trade costs may make it unprofitable to take full advantage of PPP deviations. The weaker 'relative' PPP theory states that the price of domestic goods in terms of foreign goods – the real exchange rate – should be stationary (rather than constant to one, as absolute PPP requires). In practice, there are persistent deviations from relative PPP in the short run, although it does appear to hold in the long run (cf., for example, Rogoff (1996)). In fact, neither absolute nor relative PPP is needed to arrive at the conclusion that policy rate cuts weaken the nominal exchange rate in the long run. The weaker condition – that nominal variables (such as the SNB's policy rate) do not affect real variables (such as the Swiss franc real exchange rate) in the long run – is sufficient. An easing of monetary policy leads to higher inflation and a weaker nominal exchange rate, compensating for the inflation differential versus foreign countries and leaving the real exchange rate unchanged in the long run.

5 This is referred to as 'uncovered' interest parity (UIP) in the literature (as opposed to 'covered' interest parity, which does not entail exchange rate risk). In practice, there may be deviations from UIP. This is the subject of a large body of empirical literature (cf. Engel (2014)). These UIP deviations do not imply, however, that policy rate cuts do not weaken the exchange rate.

Together, PPP and interest rate parity imply that the Swiss franc depreciates immediately after an SNB policy rate cut (Phase 1). An immediate and strong depreciation after the interest rate cut is needed to be compatible with an appreciation in Phase 2 and a weaker long-run exchange rate. This is known as ‘overshooting’ (cf. chart 1).

Economic theory thus suggests that the Swiss franc depreciates markedly following a cut in the SNB policy rate, and remains weaker than before the cut in the long run. Several other theoretical considerations are important as well. First, the effects described here do not depend on the interest rate level. Cutting interest rates below zero depreciates the Swiss franc in the same way as when interest rates are positive. When it comes to assessing the exchange rate effects of rate cuts in negative territory, it is therefore instructive to examine the effects of policy rate changes on the exchange rate before the global financial crisis, when Swiss interest rates were well above zero.

Second, the effects of domestic and foreign interest rate changes on the exchange rate are symmetric. If policy rates abroad are raised, the bilateral Swiss franc exchange rate depreciates in the same way as it does when the SNB cuts its policy rate. If interest rates are cut in both Switzerland and abroad at the same time and by the same amount, the exchange rate should stay stable. What matters for the value of the Swiss franc is the differential between Swiss interest rates and interest rates abroad. For instance, since the onset of the global financial crisis, the SNB has cut its policy rate several times, but ECB policy rates have come down even more strongly. The interest rate differential between ECB and SNB policy rates has therefore narrowed. It is not surprising, then, that the Swiss franc has appreciated against the euro since the start of the crisis, despite the SNB’s policy rate cuts.

Chart 2

EURCHF EXCHANGE RATE AND EUR-CHF INTEREST RATE DIFFERENTIAL (3-MONTH LIBOR)

Daily data



Sources: ICE Benchmark Administration, SNB

Third, the exchange rate responds as soon as market participants start expecting a policy rate change. When, later on, the policy rate is actually changed, the response may be close to nil. To assess the relationship between interest rates and exchange rates, we need to look at longer-maturity market interest rates, rather than central bank policy rates. Market rates, such as the three-month Libor, reflect the current monetary policy stance and market participants’ expectations about future monetary policy. Suppose, for example, that the SNB cuts its policy rate, and that this decision comes as a surprise to markets. Because the rate cut is unexpected, market rates also decline, and the Swiss franc depreciates. By contrast, when an SNB rate cut is anticipated, market rates change when the anticipation is formed, but do not change subsequently when the rate cut is announced. Consequently, empirical analyses typically rely on market interest rates.

3. A FIRST LOOK AT THE DATA

The raw data appear to show no clear relationship between the Swiss franc exchange rate and interest rate differentials. Chart 2 plots EURCHF – the price of one euro in Swiss francs – against the differential between euro area and Swiss short-term interest rates (three-month Libor), using daily data since 2000.⁶ According to theory, the Swiss franc should depreciate (move up in the chart) when the Swiss interest rate declines relative to the euro area interest rate (the interest rate differential moves up in the chart). On average over the long run, this co-movement is visible, but the relationship is weak; and in the short run, EURCHF and the interest rate differential have often not moved in the same direction.

Why do we not see the expected effect of changes in the interest rate differential on the exchange rate? Because interest rate and exchange rate movements reflect not just monetary policy but also the effects of other drivers.

In principle, various types of economic news can move interest rates and exchange rates. For example, a data release showing that Swiss unemployment is higher than anticipated by markets is likely to be associated with lower Swiss interest rates and a weaker Swiss franc. This is because markets expect more expansionary monetary policy in response to worse-than-expected economic conditions.

⁶ We focus on three-month Libor because this was the reference rate for SNB monetary policy between 2000 and 2019. During this period, the SNB ensured that three-month Libor was within the target range set by the SNB. Within the range, three-month Libor was left free to move, reflecting expected future policy rate changes. The three-month Libor reflects the borrowing costs for three-month, unsecured loans on the interbank market.

By contrast, when safe-haven capital flows are the main driver of exchange rate movements, exchange rates and interest rate differentials move in opposite directions. Safe-haven capital inflows into Switzerland cause the Swiss franc to appreciate, putting downward pressure on economic activity and inflation. This may lead to expectations of SNB monetary policy easing, and thus lower interest rates. This is an example of lower Swiss interest rates being associated with a stronger Swiss franc.

To sum up: depending on the drivers, the franc may appreciate or depreciate when Swiss interest rates fall. An easing of monetary policy weakens the Swiss franc, but this effect can be eclipsed by other forces. It is therefore difficult to quantify the effect of interest rate changes on the exchange rate.

4. MEASURING THE EFFECT OF INTEREST RATE CHANGES ON THE EXCHANGE RATE

Empirical studies – including two new papers on Switzerland – have sought to estimate the impact of interest rate changes on the exchange rate by using econometric methods to isolate the causal effect of interest rates. Table 1 lists selected papers.⁷ These studies consistently find that the exchange rate depreciates in the short run following a decrease in the interest rate, as predicted by theory. The results of studies investigating the longer-term effects of more expansionary monetary policy show that, in the long run, the exchange rate remains weaker than before the policy rate change. These results hold both for the Swiss franc and for other major currencies.

Beyond these qualitative results, the papers listed in Table 1 arrive at different conclusions with respect to the estimated size of exchange rate responses to interest rate changes; the estimates range from about 1% to 25% exchange rate response for a 1 percentage point (pp) interest rate change. This wide range reflects differences in sample period, currency studied and methodology.

Table 1

Studies for the Swiss franc	Studies for other currencies
Cuche-Curti et al. (2009)	Bjørnland (2009)
Ferrari et al. (2017)	Eichenbaum and Evans (1995)
Fink et al. (2020)	Faust and Rogers (2003)
Grise (2020)	Inoue and Rossi (2019)
Kugler (2020)	Kearns and Manners (2006?)
Lenz and Savioz (2009)	Kim et al. (2017)
Rinaldo and Rossi (2010)	Rogers et al. (2018)
Rudolf and Zurlinden (2014)	Scholl and Uhlig (2008)

In particular, the time horizon for which the exchange rate response is estimated matters for the results: as explained in section 2, the exchange rate response to a policy rate cut is likely to be very different in the short run and the long run. Kearns and Manners (2006), for example, study US dollar exchange rates and find that an unexpected 1 pp policy rate cut is associated with a 1.4% depreciation in the first hour after the announcement. Similarly, Rinaldo and Rossi (2010) focus on the effect of Swiss interest rate changes on the Swiss franc in the first 20 minutes after SNB monetary policy announcements. They find that the Swiss franc depreciates by 0.7% in response to a 1 pp decrease in the Swiss franc three-month Libor.⁸ Kugler (2020) estimates that a 1 pp decrease in Swiss franc three-month Libor is associated with a 4% depreciation of the Swiss franc against the euro and the US dollar on the same day. Papers that study the long-run impact, such as Eichenbaum and Evans (1995), Scholl and Uhlig (2008), and Kim et al. (2017), often find that when monetary policy is loosened, the exchange rate depreciates not just in the short run but persistently, with a maximum exchange rate response reached only after about one to two years.⁹ Lenz and Savioz (2009) find that a 1 pp drop in the Swiss franc three-month Libor driven by more expansionary SNB monetary policy permanently weakens the Swiss franc against the euro by more than 25%.

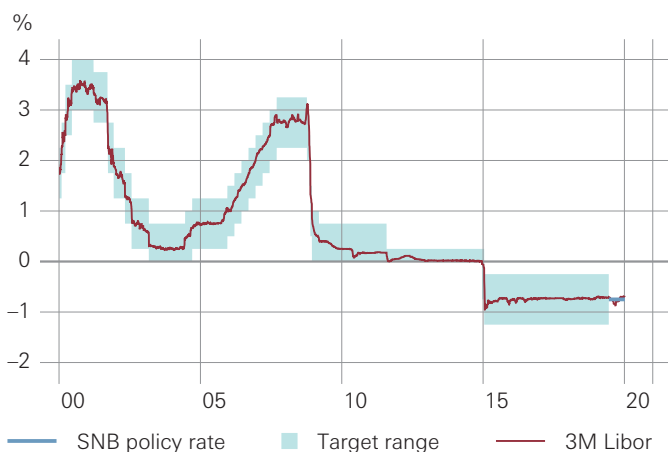
⁷ Papers were selected to cover a variety of estimation approaches, data frequencies, and currency pairs.

⁸ The estimate reported in Ferrari et al. (2017) for the Swiss franc response to Swiss interest rates, which is also based on intraday data, is much higher, at 25% for a 1 pp interest rate change. This estimate should be interpreted with care, however, since it is based on the period where the minimum exchange rate of Swiss franc 1.20 per euro was in effect.

⁹ There is no consensus on this so-called 'delayed overshooting puzzle' in the empirical literature. For example, Bjørnland (2009), Rogers et al. (2018), and Inoue and Rossi (2019) find that the exchange rate depreciates on impact when the central bank eases policy, typically begins to appreciate shortly thereafter, but remains weaker than before the monetary policy easing in the long run. This is in line with the theory-implied adjustment shown in chart 1.

Chart 3

TARGET RANGE FOR 3-MONTH LIBOR, SNB POLICY RATE, AND MONEY MARKET RATES



Sources: Bloomberg, SIX Swiss Exchange Ltd, SNB

Two recent studies by SNB staff, Fink et al. (2020) and Grisse (2020), confirm this finding using data on the Swiss franc three-month Libor and the Swiss franc exchange rate between January 2000 and August 2011. As chart 3 shows, two full SNB policy rate cycles occurred during this period, providing the variation in policy rates needed to estimate their effects on the Swiss franc.¹⁰

The studies do not use more recent data because, between September 2011 and January 2015, the minimum exchange rate of Swiss franc 1.20 per euro was in place. The SNB stood ready to enforce this minimum exchange rate with unlimited foreign exchange interventions, if necessary. Since the minimum exchange rate was discontinued in early 2015, the SNB has regularly emphasised its willingness to remain active on the foreign exchange market. Actual and expected interventions make it difficult to interpret Swiss franc movements in relation to changes in the interest rate differential over the entire period from 2000 until today.¹¹ Moreover, since September 2011, the SNB has effectively changed its policy rate only once, compared with 26 changes between January 2000 and August 2011.¹²

Fink et al. (2020) focus on days around SNB monetary policy assessment meetings. Their approach assumes that news about monetary policy is relatively more important on the days of an SNB monetary policy assessment meeting than on other days. This allows causal effects of policy rate changes on Swiss franc exchange rates to be estimated using daily data. The authors find that the Swiss franc depreciates against both the euro and the US dollar in response to decreases in the Swiss franc three-month Libor. A 1 pp decline yields a Swiss franc depreciation of approximately 2% on the same day.¹³

Grisse (2020) looks at weekly data for the Swiss franc, interest rates and stock prices over the entire 2000–2011 sample. Under plausible assumptions about the co-movement of stock prices and interest rates, the influence of monetary policy can be distinguished from that of other drivers, and monetary policy's effect on the exchange rate estimated.¹⁴ He finds that after a decrease in the Swiss franc three-month Libor, the Swiss franc depreciates immediately and remains permanently weaker than before the interest rate change. A 1 pp decline in Swiss franc three-month Libor is estimated to lead to a Swiss franc depreciation of about 4% against the euro and 3% against the US dollar within the first week. The Swiss franc remains weaker against both the euro and the US dollar in the long run.

5. IMPLICATIONS FOR MONETARY POLICY

With central banks around the world cutting their policy rates more strongly than the SNB in the aftermath of the global financial crisis, the traditional interest rate differential versus the Swiss franc has narrowed. Swiss interest rates have historically been lower than those abroad, in part because inflation has been lower in Switzerland, but also because investors value the Swiss franc as a safe-haven currency, particularly in times of high uncertainty. The SNB's decision to introduce a negative interest rate has helped to restore, at least in part, the historical interest rate differential versus other currencies, thereby reducing the attractiveness of holding Swiss franc investments.

¹⁰ In the SNB's monetary policy strategy, the target range for the three-month Libor was replaced by the SNB policy rate in June 2019. This change does not affect the conclusions regarding the response of the Swiss franc to an SNB interest rate change.

¹¹ The SNB also intervened in the foreign exchange market in 2009 and 2010. This does not affect the analysis in Fink et al. (2020), however, because they focus on the effect of interest rates on the Swiss franc around the time of SNB monetary policy assessment meetings. The analysis in Grisse (2020) is robust to using a shorter sample ending in 2007.

¹² The SNB announced a negative interest rate of -0.25% on 18 December 2014, effective 22 January 2015. This interest rate was reduced further to -0.75% on 15 January 2015 (again effective 22 January 2015).

¹³ Many empirical studies suggest that the strongest exchange rate response to an interest rate change occurs after a certain time lag.

¹⁴ For instance, tighter monetary policy – or the market expectation of monetary policy tightening – is associated with higher interest rates and lower stock prices. Disappointing economic news is associated with lower stock prices as well, but also with lower interest rates as central banks are expected to loosen monetary policy in a downturn.

The analysis presented in this article shows that SNB rate cuts weaken the Swiss franc. According to economic theory, this mechanism continues to work when policy rates are taken into negative territory. Moreover, globally, the impact of monetary policy on the exchange rate is found to have strengthened in recent years (Ferrari et al. (2017)).¹⁵ Thus, the impact of a change in the policy rate on the exchange rate is likely to be at least as strong today as it was in the past. Empirical studies also show that the more surprised markets are, the greater the effect of policy rate changes on the exchange rate.¹⁶ Hence, if the SNB were to raise its policy rate unexpectedly, the Swiss franc would appreciate markedly.

¹⁵ Ferrari et al. (2017) argue that as interest rates have declined globally, the effective lower bound on nominal interest rates has become increasingly binding so that the exchange rate bears a larger share of the adjustment to policy rate changes.

¹⁶ Cf., for example, Ferrari et al. (2017), Kearns and Manners (2006), and Ranaldo and Rossi (2010).

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Published by

Swiss National Bank
Economic Affairs
Börsenstrasse 15
P.O. Box
CH-8022 Zurich

Design

Interbrand Ltd, Zurich

Typeset by

Neidhart + Schön Group AG, Zurich

Language versions:

The *Quarterly Bulletin* is available in printed form in German (ISSN 1423-3789), French (ISSN 1423-3797) and Italian (ISSN 2504-3544), either as single copies or on subscription, from: Swiss National Bank, Library
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French: www.snb.ch, *Publications, Publications économiques, Bulletin trimestriel* (ISSN 1662-2596)

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