



# The fear of float of the Swiss National Bank

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## Abstract

We theoretically examine under which assumptions the impossible trinity holds. We also focus on the most recent Swiss experience and ask, if the SNB gained monetary independence by switching from a fixed to a floating exchange rate system in January 2015. The theoretical examination shows that the impossible trinity holds under the following assumptions: Equality of domestic and foreign real interest rates, the quantity theory of money holds, and that the relative PPP is fulfilled. The empirical analysis reveals that relative PPP does not hold for the Swiss case and it was necessary for the SNB to adopt its monetary policy in accordance with the ECB's expansive monetary policy. The paper shows that for a small open economy, such as Switzerland, it does not play a role for its monetary policy independence whether the central bank implements a fixed or a floating exchange rate system.

Keywords: Foreign exchange market, Swiss crisis, impossible trinity, monetary policy independence

JEL Classification: E52, E58, E42

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## **Abstract**

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# 1 Introduction

The main insight of the impossible trinity is, that a small open economy can not have an independent monetary policy, complete capital mobility, and a fixed exchange rate system – at the same time. One might think that by switching from a fixed to a floating exchange rate system, a central bank will gain some degrees of independence for its monetary policy.

The literature on exchange rate systems documents a development which is called *corner solution*. Given a spectrum from pure floating exchange rate systems and super fixed exchange rate systems (like currency boards) it has been described that countries move from the middle to the two extreme positions. However, this result depends on whether *de jure* or *de facto* exchange rate regimes are analyzed. A lot of countries just claim that they have a (pure) floating exchange rate in place but *de facto* – actual changes in the reserves of the central bank’s balance sheet reveal that is a dirty float. This phenomenon is discussed under the label *fear of floating* (Calvo/Reinhart, 2002; Lahiri/Végh, 2001). Under these conditions, central bank interventions in the foreign exchange market might influence also money supply and interest rates so that monetary policy is not fully independent from fluctuations on the foreign exchange market. One recent twist in the *fear of floating* literature is the finding of an asymmetric intervention behavior: Appreciations and depreciations of the domestic currency are not treated by an equal response which is discussed under the label *fear of appreciation* (Levy-Yeyati/Sturzenegger/Gluzmann, 2013).

In this paper we shed light on the case of Switzerland and analyze their most recent experience with their fx-rate system: The Swiss National Bank (SNB) introduced a lower floor of 1.20 SFR/EUR in 2011, but switched back to a floating system in January 2015 (SNB, 2015a).

Under consideration of the impossible trinity, one might think that by switching from a quasi fixed to a floating exchange rate system, the SNB gained some degrees of independency with respect to their monetary policy (Frankel, 1999, p. 7). In contrast to this, the empirical evidence reveals that the SNB intervened more heavily in the fx-market and acquired more reserves under the most recent floating era compared to the era where the lower floor was in place. On top, also the interest rate policy points into the direction that the Swiss monetary policy is still highly influenced by the monetary policy of the European Central Bank (ECB).

In this paper, we discuss the assumptions under which the main message of the impossible trinity is derived. We also highlight the most recent experience of the SNB and claim, that the Swiss monetary policy is still highly influenced by the monetary policy of the ECB. The intervention behavior of the SNB can be interpreted as another sign for the fear of floating – or to be more precise – the fear of appreciation.

## 2 Theoretical Examination of the Impossible Trinity

The main message of the impossible trinity is, that a small open economy can not have simultaneously

- an independent monetary policy,
- complete capital mobility, and
- a fixed exchange rate system

in place. In this section, we highlight under which assumptions this main message of the impossible trinity holds.

Free capital movement will lead to an equalization of real interest rates in the domestic and foreign economy ( $R = R^*$ ). The real interest rate is the difference between the nominal interest rate ( $i$ ) and the inflation rate ( $\hat{p}$ ). Hence it follows that

$$i - \hat{p} = i^* - \hat{p}^* \quad \text{as well as} \quad i = i^* + \hat{p} - \hat{p}^* \quad (1)$$

A second assumption of the impossible trinity is that the quantity theory of money holds. Hence, the inflation rate is equal to the growth rate of money supply – adjusted for the growth rate of real GDP and long term trends in the velocity of money. Assuming that the last two factors are equal to zero leads to a situation where the growth rate of money supply determines the level of inflation in the domestic and foreign economy:

$$\hat{p} = \hat{m} \quad \text{and} \quad \hat{p}^* = \hat{m}^* \quad (2)$$

The third assumption is that real Purchasing Power Parity (PPP) holds, so that the real exchange rate is constant. The change in the nominal exchange rate ( $\hat{\epsilon}$ ) is therefore equal to the inflation differential:

$$\hat{e} = \hat{p} - \hat{p}^* \quad (3)$$

In case that these assumptions are fulfilled it is obvious that a small open economy with complete capital mobility and a fixed exchange rate system has no degree of freedom with respect to its monetary policy: In case that the foreign economy has implemented its monetary policy ( $\hat{m}^*$ ), the foreign inflation rate ( $\hat{p}^*$ ) is given. Since the nominal exchange rate is not allowed to fluctuate ( $\hat{e} = 0$ ), it follows from equation (3) that the domestic inflation rate has to match the foreign inflation rate ( $\hat{p} = \hat{p}^*$ ). Since inflation rates have to be equal it follows from equation (2) that money growth rates in the domestic and foreign economy have to be equal ( $\hat{m} = \hat{m}^*$ ), too. From equation (1) it also follows that  $i = i^*$ . As a consequence, it becomes clear that there is no space for an independent monetary policy of the domestic central bank: The domestic central bank just has to mimic the monetary policy decisions of the foreign central bank.

This is different in a floating exchange rate system: The nominal exchange rate is allowed to change ( $\hat{e} \neq 0$ ), so that according to equation (3), the inflation rates do not have to be the same. When the foreign economy has opted for ( $\hat{m}^*$ ), so that ( $\hat{p}^*$ ) is realized, the domestic economy can still independently opt for ( $\hat{m}$ ) in order to determine  $\hat{p}$ . By determining  $\hat{p}$  the domestic economy also determines  $\hat{e}$ . A numerical example illustrates the different relationships: In case that the foreign economy opts for an inflation rate of 2 % and the domestic central bank opts for an inflation rate of 5 %, the exchange rate has to increase by 3 % each year – a nominal depreciation of the domestic currency. It is important to stress that this steady increase of the nominal exchange rate has no effect on the real exchange rate. The real exchange rate is constant and does not affect the real economy at all.

This example highlights that the central bank might gain some degrees of independence for the monetary policy when it switches from a fixed to a floating exchange rate system. These insights of the impossible trinity are of course derived under the assumptions made above. Especially, since it is assumed that relative PPP holds, the real exchange rate is assumed to be constant.

It is very important to understand, that relative PPP does not seem to hold in the real world – at least in the short run! As a consequence, even in a floating exchange rate system the monetary policy of the domestic central bank might not be independent from the monetary policy of the foreign central

bank. In case that an expansionary monetary policy of the foreign central bank ( $\hat{m}^* \uparrow$ ) also leads to a situation where the agents at the foreign exchange market expect also a loose monetary policy in the future  $E(\hat{m}^*) \uparrow$  this could lead to a sharp appreciation of the domestic currency. In case that good prices are sticky, the change in the nominal exchange rate will also influence the real exchange rate and thereby, the real economy: The domestic inflation rate might be affected via the depreciation-inflation- or appreciation-deflation-spiral *and* A real appreciation also affects the export sector of the domestic economy in a negative way which could also lead to a recession.

As a consequence, even in a floating exchange rate system a sharp real appreciations can make it necessary

- to adjust also the domestic monetary policy: The domestic central bank might also opt for a more expansionary monetary policy by lowering the interest rates or increasing money supply.
- to intervene in the foreign exchange market to counter the appreciation. The domestic central bank has to built up foreign reserves. In case that these interventions are not sterilized, it will also lead to an increase of domestic monetary base via the reserve component.

### 3 Empirical Examination of the Swiss Case

#### 3.1 Fx-Reserves Development

Since the outbreak of the financial crisis in 2008, the Swiss franc has always been under appreciation pressure. Figure 1 highlights the development of the exchange rate vis-a-vis the Euro: From 01/2008 to 09/2011 the nominal exchange rate decreased sharply by about 30 % (1.60 CHF/EUR to 1.12 CHF/EUR).

Figure 2 displays the development of the real exchange rate vis-a-vis the Euro (against the left axis) and contains information about the fx-reserves of the SNB in billions of CHF (against the right axis). Since the real exchange rate is based on price indices, it takes the value of 100 in the beginning of 2015. As can be seen, the nominal appreciation which took place during 01/2008 – 09/2011 also led to a real appreciation. Such a sharp real appreciation in a very short time period can not be countered by, for example, productivity gains. As a consequence, this development has to have negative consequences for the real economy, especially the for Swiss export sector. After 2009, the Swiss inflation rate – displayed in Figure 4 – was always lower than the target inflation rate

of 2 %. On September the 6<sup>th</sup>, 2011, the SNB informed the public via a press statement about the introduction of a lower floor at 1.20 CHF/EUR. This level was about 10 % higher than the prevailing level one day before. The SNB (2011) came up with following official reasons: *"The current massive overvaluation of the Swiss franc poses an acute threat to the Swiss economy and carries the risk of a deflationary development."*

– Insert Figure 1 and 2 here –

During 2012, the nominal exchange rate was trading only slightly above 1.20 CHF/EUR. In May – July 2012, the SNB had to intervene heavily in the foreign exchange market to defend the lower floor. However, after the famous *"whatever it takes"* speech of ECB president Mario Draghi (on July the 26<sup>th</sup>, 2012)<sup>1</sup> appreciation pressure diminished and the exchange rate fluctuated in a band between 1.20 and 1.24 CHF/EUR. Since the appreciation pressure disappeared, the SNB did not intervene as much as before and reserves were more or less constant.

The situation at the foreign exchange market changed in 2014: As highlighted by Figure 3, the ECB cut its interest rate for the main refinancing operations several times while the SNB did not touch its interest rates at all. The interest rate spread between the Euro area and Switzerland decreased and became even positive in June 2014. However, a lower interest rate in the Euro area compared to Switzerland is completely unsustainable with the prevailing appreciation pressure for the Swiss franc. As a consequence, the appreciation pressure increased tremendously in the fourth quarter of 2014, which led the SNB to intervene heavily in the fx-market again (Figure 2).

– Insert Figure 3 here –

On January the 15<sup>th</sup>, 2015, the SNB denied to defend the lower floor any further and switched back to a floating exchange rate system (SNB, 2015a). Berthold/Stadtmann (2018) highlight two main reasons for this shift:

- The accumulation of fx-reserves created an exchange rate exposure in the balance sheet of the SNB.

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<sup>1</sup> The speech was delivered during the Global Investment Conference in London on 26.07.2012. Literally Mario Draghi said: *"Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough."* (ECB 2012).



- Another reason is, that the ECB cut its key interest rate to the level of zero and with appreciations for the CHF, the SNB would have to lower its own interest rates into the negative range.

When the SNB switched to the floating exchange rate system, the CHF appreciated sharply and traded – at least for a few days – below the level of 1.00 CHF/EUR. This nominal appreciation caused once more a very sharp real appreciation (Figure 2). Despite the fact that the SNB had abolished the peg, it intervened more intensively in the foreign exchange market by acquiring even more reserves during the 'floating era' compared to the 'lower floor era'. This is very astonishing, because according to the impossible trinity, one would have believed that the SNB gained some independence for the monetary policy.

However, this is just the case if the assumption of the relative PPP also holds – so that the real exchange rate is constant. This would be the case, if the nominal appreciation of the CHF is compensated by a respective inflation differential. As Figure 4 reveals this was definitely not the case since even a positive inflation differential can be seen after the abolishment of the peg in January 2015. Therefore, the relative PPP was not fulfilled and the exchange rate was also appreciated in real terms.

– Insert Figure 4 here –

A real appreciation of the CHF also could affect the export sector of the Swiss economy in a negative way which could also lead to a recession. An economic survey of the Swiss corporate sector shows that 70 % of the companies reported to have been negative affected by the appreciation of the CHF after the abolishment of the peg (SNB, 2015b). This is also supported by the analysis of Kaufmann/Renkin (2017). They conclude that employment in the manufacturing sector has been significantly reduced due to the appreciation of the CHF in 2015.

In consequence, the Swiss inflation rate also declined via the appreciation-deflation-spiral. As Figure 4 reveals, the inflation rate in the Euro area as well as in Switzerland were both far away from the target rate of 2 %.

Therefore, the SNB intervened in the fx-market not only because of a *fear of appreciation*, but also because of a *fear of deflation*.

In order to defend the deflation within the Euro area the ECB opted for a more expansionary monetary policy. In consequence, it was necessary for the SNB also to adjust their domestic monetary policy as well. However, as Figure 4 reveals the Swiss inflation rate was almost always lower than the inflation rate of the Euro area and reached even a negative level of about  $-1.5\%$  in 2016. Hence, the SNB had to be even more expansive than the ECB, because Switzerland was much further away from their inflation target than the ECB. In order to prove this, the following subsection deals with a comparison of SNB's and ECB's monetary policy, after the minimum exchange rate was in place.

### **3.2 Comparison of ECB's and SNB's Monetary Policy since 2015**

Both central banks' implemented a low interest rate policy as Figure 3 reveals. The ECB lowered its key interest rate to a level of zero in 2016. The SNB lowered its key interest rates into the negative area in order to avoid even more capital imports and thus to defend a further appreciation of the CHF. First, just one month before the abolishment of the peg, the SNB decreased its lower bound into the negative area. Second, with implementation of a floating exchange rate system, the SNB also decreased its upper bound into the negative territory. Since this reduction, the SNB did not change their key interest rates and kept them negative.

Therefore, the SNB used this instrument more intensively than the ECB. Negative interest rates have also consequences for an economy. For instance, it could reduce the profitability of the commercial banking sector. Furthermore, central banks' have little experience with negative interest rates. Gros (2016) argues, that a negative interest rate change central banks' business model, because it has to expect a negative seignorage.

On top, the ECB introduced a large-scale asset purchase program, the so-called *quantitative easing*. The program's aim was to lessen the financial conditions, in order to create monetary incentives for the economy to ultimately defend a risk of a deflation within the Euro area (ECB, 2018). This also raised expectations of fx-market agents towards future expansionary policy within the Euro area. As a consequence, it led to an exogenous shock in form of larger capital imports into Switzerland, which implied an appreciation pressure of the CHF.

The ECB mainly purchased sovereign bonds from secondary markets within the Euro area and the total purchases of assets amounted to about 2,485 billion Euros in July 2018. Even though the Swiss key interest rates are negative, the interest spread is not enough to compensate such an exogenous shock. This is also supported by the empirical analysis of Hameed/Rose (2017) in which, particular the Swiss negative nominal interest rates have just a little impact on the exchange rate (CHF/EUR) level. Therefore, on top the SNB purchased fx-reserves in order to defend the appreciation pressure of the CHF.

Both, the ECB's large scale asset purchase program as well as SNB's fx-reserves purchases were not sterilized in order to influence the respective consumer price level. This implies a rise of the respective monetary base thus the respective balance sheet becomes longer.

– Insert Figure 5 here –

Figure 5 compares ECB's and SNB's total sum of the respective balance sheet in relation to the respective GDP of 2017. It is noticeable that both central banks' were more expansionary after 2015. Particular the SNB increased its balance sheet: From 01/2015 to 12/2017, from a level of about 80 % to a level of about 130 % of the Swiss GDP. The sharp rise of the total sum of the balance sheet by fx-purchases also increases the exchange rate exposures, which was actually one reason why the SNB switched to a floating exchange rate system in January 2015 (Berthold/Stadtman, 2018). In contrast, the ECB increased the sum of their balance sheet in relation to their GDP to a level of almost 40 %. Hence, the SNB was much more expansionary with its fx-reserve purchases than the ECB with its asset purchases.

Therefore, the SNB not just mimic ECB's monetary policy, rather they are more expansive than the ECB. On the one hand, by setting and keeping their key interest rates into the negative territory. On the other hand, by extending their total sum of their balance sheet with their fx-reserve purchases. The SNB used its instruments much more intensively than the ECB.

## 4 Conclusion

According to the impossible trinity a small open economy can not have simultaneously an independent monetary policy, complete capital mobility, and a

fixed exchange rate system in place. In this paper we analyze under which assumptions the impossible trinity holds. It holds under the assumptions of:

- free capital movements ensure the equality of domestic and foreign real interest rates,
- the quantity theory of money holds, and that
- the relative PPP is fulfilled.

The empirical analysis reveals that the CHF appreciated in nominal as well as in real terms, after the abolishment of the peg in January 2015. The real appreciation of the CHF led to a negative impact for the Swiss export sector and caused negative consequences for the Swiss economy. It also led to a deflation through the appreciation-deflation-spiral. Although the SNB switched to back to a floating exchange rate system, the SNB continued to intervene in the fx-market. These interventions were motivated not only as initially claimed due to a *fear of appreciation* but also due to a *fear of deflation*.

Hence, the SNB did not gain monetary independence. The main reason is that real PPP does not hold in the short run, so that the real exchange rate was not constant. Therefore, it was necessary for the SNB to adapt its monetary policy in accordance with ECB's expansive monetary policy. The empirical analysis reveals that the SNB used its instruments more intensively than the ECB. The SNB set and kept their interest rates in the negative territory and fx-reserve purchases led to a rise of SNB's balance sheet to a level of about 130 % of the Swiss GDP.

Although the SNB had not implemented the Euro in order to be an independent central bank, the paper shows that nonetheless the SNB is still highly influenced by the monetary policy of the ECB.

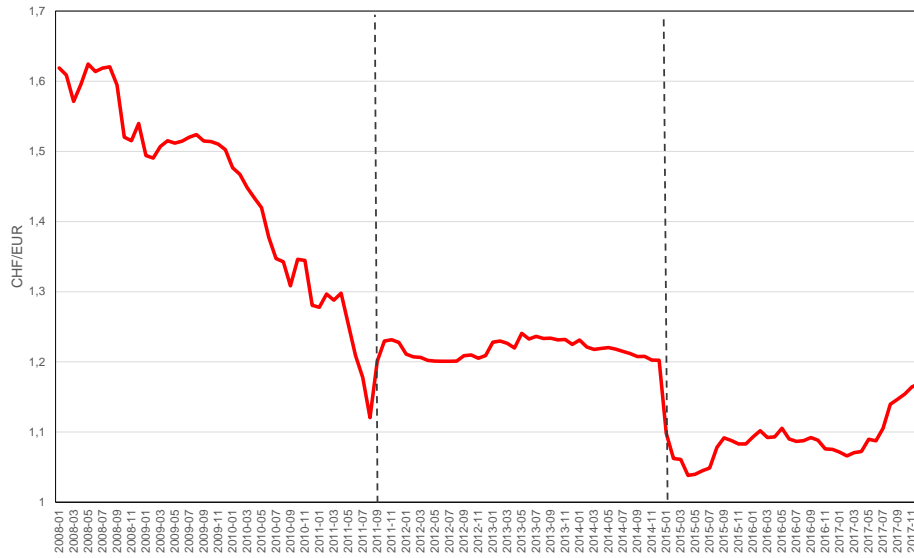
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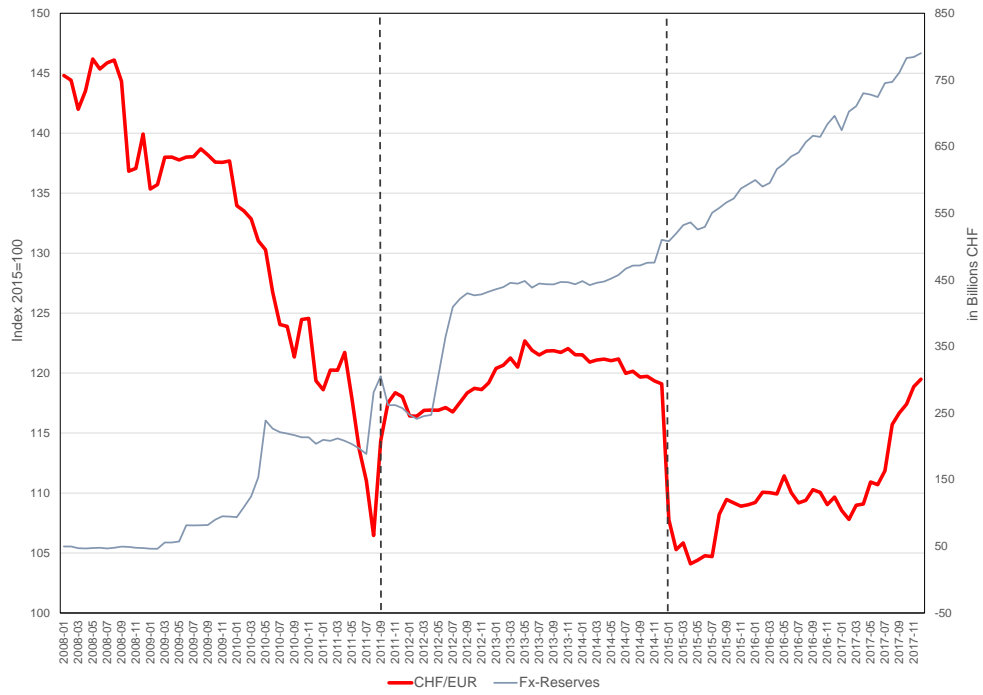
# Appendix

Figure 1: Nominal Exchange Rate



The change of the exchange rate system are marked by the dashed lines.  
Source: Own elaboration with data from SNB (2018).

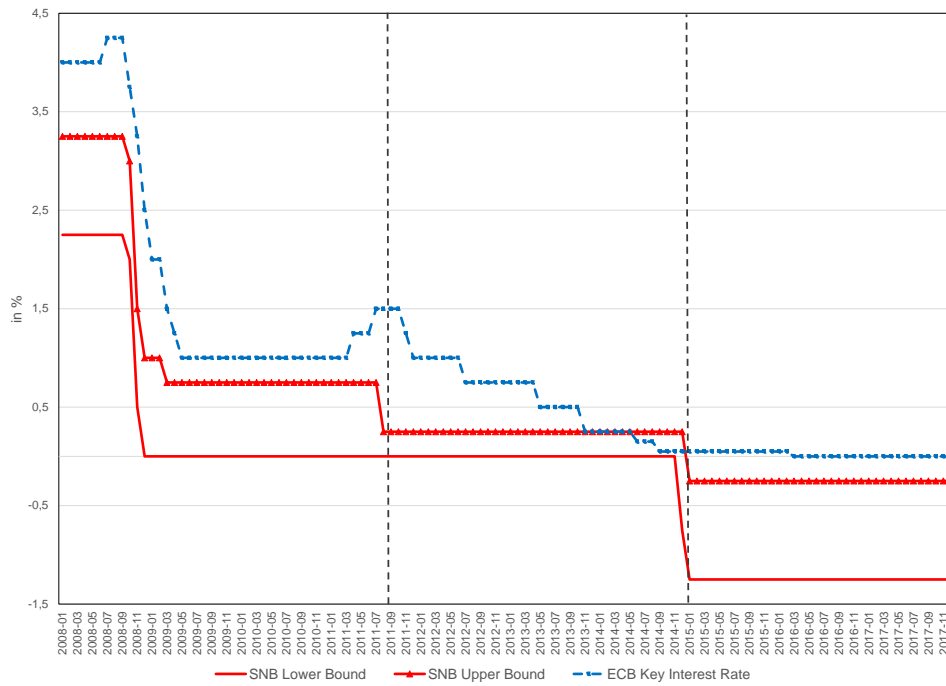
Figure 2: Real Exchange Rate Index and Fx-Reserves



The change of the exchange rate system are marked by the dashed lines.  
 Source: Own elaboration with data from SNB (2018) and Eurostat (2018).

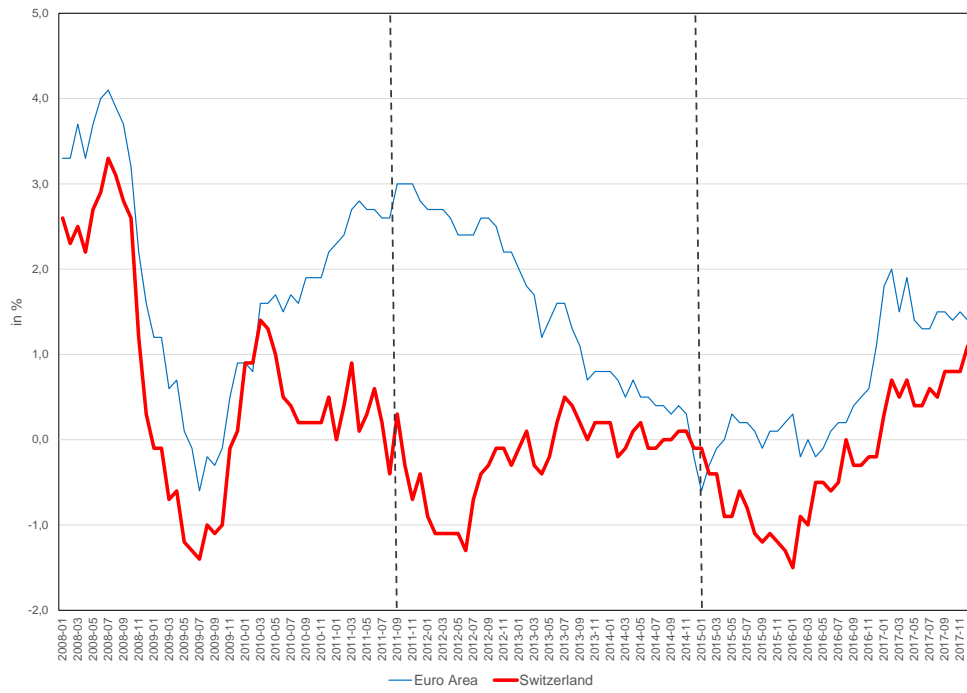


Figure 3: Key Interest Rates



The change of the exchange rate system are marked by the dashed lines.  
 Source: Own elaboration with data from SNB (2018) and Deutsche Bundesbank (2018).

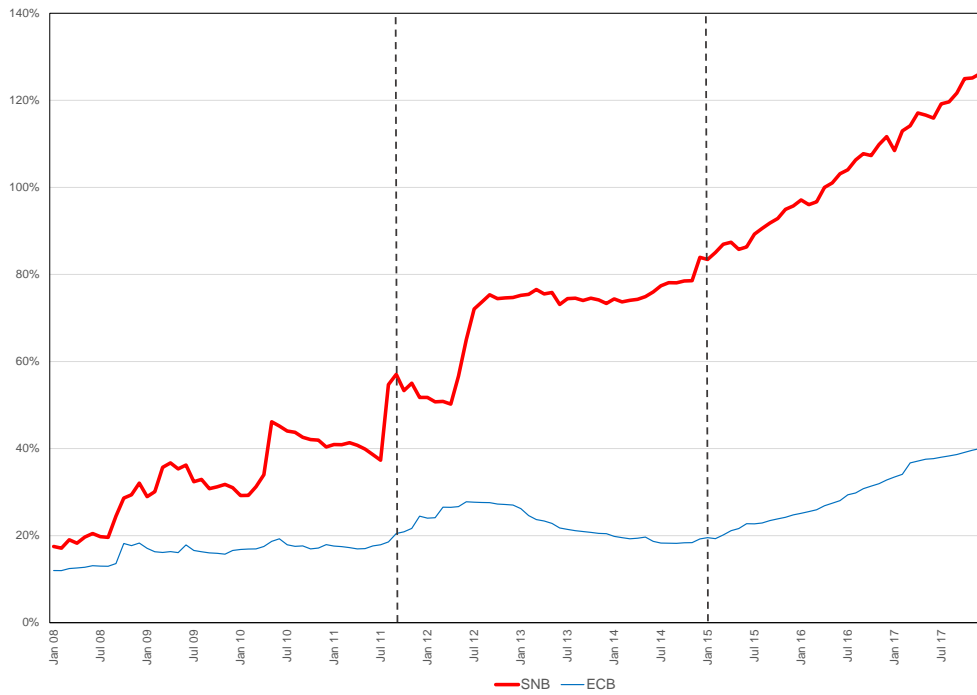
Figure 4: Inflation Rate in the Euro Area and Switzerland



The change of the exchange rate system are marked by the dashed lines. Harmonized Index of Consumer Prices (HCIP, 2015=100). Change from the corresponding month of the previous year in %.

Source: Own elaboration with data from SNB (2018) and Eurostat (2018).

Figure 5: Balance Sheet in Relation to the GDP



The change of the exchange rate system are marked by the dashed lines. Whereby the GDP of 2017 was chosen as basis for the respective sum of the balance sheet.

Source: Own elaboration with data from SNB (2018) and Eurostat (2018).