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## **The impact of international spillovers on inflation dynamics and independent monetary policy: the Swiss experience**

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## I. Introduction

Globalisation has intensified dramatically in recent decades. Technological progress and the removal of barriers to trade and capital flows are just two of the many factors driving this trend. Closer economic integration goes hand-in-hand with potentially major spillovers between regions or currency areas. The financial and economic crisis of 2008 and 2009 and the ensuing European sovereign debt crisis have made this painfully clear for many countries. For instance, in the aftermath of the bankruptcy of the US investment bank Lehman Brothers international trade flows collapsed and global financial markets tumbled as uncertainty among investors increased. However, international spillovers are not limited to the cross-border transmission of economic and financial shocks. Policy responses to such shocks or, more generally, economic policy actions can potentially also create spillover effects.

The transmission of international spillovers to consumer prices is of particular interest from a monetary policy perspective. In this context, the key question is whether a central bank – especially in a small open economy like Switzerland – can still independently control inflation given ever-closer economic interrelations. Switzerland has strong international ties and is therefore exposed to international spillover effects. While trade openness and open capital accounts are features of many small open economies, the Swiss currency is far more important in the international financial system than the country's size alone would suggest. International spillover effects transmitting through the exchange rate consequently play a significant role for Switzerland – especially, but not exclusively, with respect to inflation dynamics. An analysis of international spillover effects on Swiss inflation may thus yield some useful general insights for monetary policy, especially in small open economies.

Several recent studies have explored the impact of international drivers on country-specific inflation rates from a variety of angles. Ciccarelli and Mojon (2010) analyse the comovement between global inflation and Consumer Price Index (CPI) inflation rates in OECD countries.<sup>1</sup> Based on their time-series evidence, the authors argue that country-specific inflation rates are mostly a global phenomenon, i.e. that individual countries tend to inherit global inflationary pressures. More specifically, global inflation is likely to reflect global trends such as commodity prices or business cycles. Some studies therefore focus on the impact of particular drivers of global inflation on country-specific price developments. For example, Borio and Filardo (2007) conclude that global output slack is a key determinant of domestic inflation.

According to the theoretical model developed by Woodford (2007), however, national central banks' ability to control inflation is unlikely to be threatened by increasing global integration of markets *per se*; in this regard it is important that exchange rates adjust flexibly to changes in economic conditions. Nonetheless, as the author points out, the way an economy behaves is influenced by its degree of openness. This must be taken into account by monetary policy and may complicate its task. These findings are in line with observations by Mishkin (2009) and Bernanke (2007), among others.

Rey (2015) focuses on the extent to which international capital flows influence central banks' ability to conduct independent monetary policy. She finds that independent monetary policy in small economies with open capital accounts faces a 'dilemma' instead of the familiar 'trilemma' (Mundell 1963): even with flexible exchange rates, the capital flows and monetary conditions of these countries are influenced by a global financial cycle which is heavily determined by the monetary policy of large economies.

In the following remarks, I analyse international spillovers to inflation in Switzerland since the break-up of the Bretton Woods system. The end of Bretton Woods was synonymous with the introduction of flexible exchange rates and a renewed emphasis on free movement of capital. In this study, I focus on the transmission of movements in global inflation and the exchange rate to Swiss consumer prices. I shall identify conditions under which the exchange rate transmits, rather than absorbs, international spillover effects. I shall also examine under what circumstances Swiss monetary policy can counteract spillover effects from global inflation and the exchange rate.

Since the onset of the recent financial crisis, monetary policy has had to grapple with multiple – new and major – challenges. Central banks worldwide continue to face an exceptionally complex situation on international financial markets as well as fragile and subdued economic conditions. In order to mitigate the consequences of the crisis, many central banks have cut interest rates to near zero. As a result, their room for manoeuvre in using conventional monetary policy to react to large capital flows has narrowed. In such circumstances, flexible exchange rates may no longer act as absorbers of spillover effects.

The following key points emerge from the analysis: over the past three decades, Swiss inflation has been markedly lower than global inflation. The SNB has been able to control medium-run inflation dynamics in Switzerland, despite the country's openness and safe haven currency. While Swiss monetary policy can independently control inflation, it can never be conducted entirely in isolation; if it to be effective, monetary policy in a small open economy must take global factors into account. Given the multitude of international spillovers, monetary policy should never be used to fine-tune inflation.

Switzerland's experience since the onset of the financial crisis has also shown that small open economies may occasionally find it more difficult to control inflation. In circumstances where conventional monetary policy is constrained and a currency is overvalued due to large safe haven capital flows, temporary adverse spillover effects to inflation – which are often associated with lower imported goods prices – cannot be completely offset. For instance, most of the negative inflation Switzerland has experienced in recent years has been linked to lower prices for imported goods.

In such situations, a central bank can mitigate the adverse effects of spillovers to inflation by using unconventional policies. However, these measures must be deemed sustainable at the time they are introduced and must be adjusted if they become unsustainable due to changes in the international environment.

Furthermore, the assertion that inflation should not be fine-tuned in small open economies turns out to be even more pertinent in the context of unconventional policies. When facing major international spillovers, small open economies sometimes have to live with temporarily suboptimal inflation. This is currently the case in Switzerland due to falling imported goods prices. Inflation expectations have remained well-anchored, however, suggesting that the SNB's commitment to ensuring medium-term price stability remains credible even under these difficult conditions.

When adverse spillovers occur, firms must adjust quickly and flexibly to changing conditions at home and abroad. In Switzerland, institutional arrangements and good labour-management relations allow relatively high price and wage flexibility; ongoing innovation drives also play a key role in ensuring that firms remain competitive by international standards.<sup>2</sup> Notwithstanding this flexibility, the SNB's monetary policy is expected to weaken the Swiss franc over time and the central bank has also made clear that it will remain active in the foreign exchange market, if necessary.

## **II. A small open economy – Switzerland in a nutshell**

Before going into more detail, let me mention some key facts about Switzerland. The SNB pursues a price stability-oriented monetary policy within the framework of free movement of capital and flexible exchange rates. As a small open economy, Switzerland is highly integrated into international markets.<sup>3</sup> Consequently, both real and financial linkages are relevant for inflation dynamics in Switzerland and thus for monetary policy.

First, the country maintains numerous and deep trade links throughout the world. Overall, the goods and services Switzerland exports account for around half of its gross domestic product (GDP). Switzerland's export intensity is thus significantly higher than that of the US and the average OECD country and is comparable to that of other export-oriented economies such as Germany (see Chart 1, left panel). The Swiss export sector has undergone profound structural change during recent decades in order to maintain its competitiveness. Exporters have not only made significant efforts to accommodate changes to the composition of the export sector but they have initiated major innovation drives and entered new markets. The share of total exports to emerging markets rose from 15% in 1990 to 27% in 2014, for instance. Swiss exporters have also increasingly focused on the US (see Chart 2). Trade openness, however, is not just reflected in the ratio of exports to GDP; the ratio of imports to GDP is high too, at around 40% (see Chart 1, right panel). As a result, about one-quarter of the Swiss CPI originates abroad. Inflation of imported goods is therefore an important determinant of Swiss price developments.<sup>4</sup> Moreover, price changes in imported goods and services may affect domestic price-setting through import competition (Chen, Imbs and Scott 2009; Melitz and Ottaviano 2008).

Second, Switzerland is an important player in the global financial system. This is reflected in large cross-border flows and in the size of its financial sector. For instance, relative to the size

of its economy, Switzerland was one of the largest foreign direct investors worldwide in 2013, when its outward stock of foreign direct investment (FDI) reached almost 200% of GDP. Even the US, whose population is 40 times larger, is a major beneficiary of Swiss FDI. Switzerland was the sixth largest FDI investor in the US in 2013.<sup>5</sup> The long tradition of free movement of capital has also helped the financial sector in Switzerland to gain global importance. With a market share of approximately 25%,<sup>6</sup> Swiss banks are global leaders in managing cross-border assets.

Against this backdrop, the Swiss franc's relevance in the international financial system is far greater than the country's size alone would suggest. Measured by foreign exchange turnover, the Swiss franc was the sixth most important currency worldwide in 2013.<sup>7</sup> Furthermore, the Swiss franc has a long track record as both a strong and safe haven currency, as documented by Baltensperger and Kugler (2015).<sup>8</sup> Its attractiveness reflects the stability of the country's institutions as well as the importance of the Swiss financial sector. While the Swiss franc is an asset to the Swiss economy, its strength has repeatedly put pressure on the export sector and the consumer price level.

### **III. Global spillovers to Swiss inflation – an analysis of three periods**

In the aftermath of the Bretton Woods era, global inflation was high in the 1970s and early 1980s. This state of affairs was driven by rising oil prices and by accommodative monetary policy in many countries. Subsequently, the focus of most central banks on price stability resulted in considerably lower inflation and well-anchored inflation expectations. Albeit with a time lag, this development was associated with lower interest rates and a very stable real economy, by historical standards. Since mid-2008, though, a series of adverse shocks has caused severe global contagion on financial markets, in the real economy and in price developments. Consequently, monetary policy around the world has been very expansionary for quite some time, and some central banks have even resorted to deploying unconventional measures.

In the empirical analysis, I look at how international spillovers have transmitted through global inflation and the exchange rate to Swiss CPI inflation and I review how the SNB has responded to these spillover effects. Special attention is devoted to the exchange rate's role in transmitting or absorbing spillover effects to price developments in Switzerland. I compare the recent 'Crisis Period' starting in mid-2008 with two earlier time periods: the so-called 'High Inflation Period' from 1975 to 1993 and the 'Low Inflation Period' from 1994 to mid-2008. Chart 3 shows import-weighted global and Swiss inflation during all three periods. Import-weighted global inflation is defined as the import-weighted average of CPI inflation in 28 OECD countries, covering on average around 90% of Swiss imports.

### **III.A. ‘High Inflation Period’ – the aftermath of Bretton Woods**

After the transition to flexible exchange rates, the SNB turned to monetary targeting. From 1974 – with a brief interlude – until 1999, the SNB targeted annual growth of the money supply to control inflation (Rich 1997; Jordan, Peytrignet and Rossi 2010).

The SNB’s commitment to price stability as the ultimate objective of monetary policy was stronger than in most other countries at that time. This resulted in lower average inflation in Switzerland than abroad during the ‘High Inflation Period’. As shown in Chart 4, from 1975 to 1993, Swiss CPI inflation averaged 3.5%, whereas import-weighted global inflation averaged 6.4%. The substantial nominal effective exchange rate appreciation of 4.1% – shown in Charts 4 and 5 – absorbed a sizeable share of the global inflationary pressure being transmitted to imported goods inflation in Switzerland. In real terms, the exchange rate remained relatively stable over the medium term since the difference between global and Swiss inflation was roughly equivalent to the appreciation of the nominal effective exchange rate (see Chart 5). As it reflected the lower inflation trend in Switzerland, the SNB welcomed this appreciation.

My analysis of the comovement between global and Swiss inflation follows Ciccarelli and Mojon (2010). It is worth mentioning that the comovement is independent of the respective global and Swiss inflation rate levels. The results of the comovement analysis are presented in Table 1, while differences in the inflation levels are shown in Charts 3 and 4. It is important to note that inflation in different regions or currency areas can move in parallel in the short run as well as in the medium to longer run. Comovement between short-run global and Swiss inflation does not necessarily imply that the trends of those inflation rates are also moving in parallel, however. For instance, Swiss price dynamics could be driven by short-run changes in global inflation associated with shifting oil prices; or they could be driven by longer-lasting effects related to global economic slack. The global inflation trend may also impact the Swiss inflation trend, of course. Related to this, certain components of CPI inflation, such as domestic goods and imported goods inflation, are likely to be affected differently by global inflation. The comovement between global inflation and (i) overall CPI inflation, (ii) domestic goods inflation and (iii) imported goods inflation in Switzerland is thus evaluated separately. Unless stated otherwise, my analysis focuses on the overall comovement between global and Swiss inflation. However, as discussed in Chapter III.B., distinguishing between the comovement of shorter and longer-run price fluctuations can sometimes be crucial for monetary policy.

Overall, global inflation movements explain only a small fraction of Swiss price fluctuations in the ‘High Inflation Period’. Table 1 reports the share of Swiss CPI inflation variation explained by global inflation variation during the ‘High Inflation Period’. The table also shows the explanatory power of global inflation movements for the variation of domestic and imported goods inflation in Switzerland. In addition to the import-weighted global inflation measure, the first principal component of a simple common factor analysis is used as an alternative measure for global inflation (similar to Ciccarelli and Mojon 2010). The common

factor is based on a sample of CPIs from 28 OECD countries and a set of commodity price indices. This common factor explains 15% of CPI inflation in Switzerland; the import-weighted global inflation measure explains slightly more (18%).<sup>9</sup> While movements in global inflation affected movements in imported goods inflation more than domestic goods inflation, the share of variation in imported goods inflation explained by global inflation was still low. These results suggest that the variation of Swiss inflation observed between 1975 and 1993 was only marginally linked to global inflation.

Domestic factors driving domestic goods inflation seem to have played a more important role than imported goods inflation in explaining overall CPI inflation at that time. Indeed, domestic goods inflation averaged a relatively high 3.8% (see Chart 4) and was not only very persistent, but also volatile (see Table 2).

### **III.B. An ideal world for central banks during the ‘Low Inflation Period’**

The ‘Low Inflation Period’ from 1994 to mid-2008 is marked by a considerable decline in global inflation due in no small part to a successful focus on price stability by many central banks around the world (see Charts 3 and 4). From the 1990s onwards, several central banks introduced inflation targeting as the cornerstone of their monetary policy strategy. Given the various challenges associated with monetary targeting that emerged during the second half of the 1990s, the SNB introduced its current monetary policy strategy in December 1999. It consists of the following three elements: a definition of price stability, a conditional inflation forecast for the upcoming 12 quarters, and a target range for the reference interest rate, the three-month Swiss franc Libor.

The SNB’s definition of price stability – annual inflation of below 2% – is more conservative than the inflation targets of most other countries; in fact, Swiss inflation averaged 1% in the ‘Low Inflation Period’ (see Chart 4). The nominal effective exchange rate strengthened during this time, too. In contrast to the earlier period, however, a relatively minor appreciation was sufficient to absorb the reduced global inflationary pressures. During this period, which falls within the so-called ‘Great Moderation’, Switzerland was relatively unaffected by major adverse spillover effects.

As shown in Table 1, global inflation variation explains about half of the variation of Swiss CPI inflation during this period. The share of Swiss price changes explained by global inflation thus increased substantially compared to the ‘High Inflation Period’.

The reasons for this increase are twofold: first, the share of the variation in Swiss domestic goods inflation explained by global inflation rose. The rise is particularly evident for the import-weighted global inflation measure. Focusing exclusively on the comovement in the longer run indicates that this can be traced back to the comovement of trend inflation. The decline in global trend inflation is likely to have spilled over to some extent to the Swiss domestic goods inflation trend, and therefore to the CPI. As such, there was no need for Swiss

monetary policy to counter these spillover effects as they did not work against its aim of stabilising domestic goods inflation (see Charts 3 and 4). This result is in line with the fact that the variance of both Swiss domestic goods inflation (from 4.17 to 0.38) and import-weighted global inflation (from 8.61 to 0.26) fell to very low levels following central banks' increased focus on price stability.

Second, the share of the variation of Swiss imported goods inflation explained by global inflation, as measured by the principal component analysis, increased. In contrast to Swiss domestic goods inflation, however, imported goods inflation remained fairly volatile but became significantly less persistent (see Table 2). In other words, imported goods inflation was characterised by larger but shorter-lived fluctuations. Indeed, the stronger comovement between Swiss imported goods inflation and global inflation measured by the first principal component was mainly the result of short-run fluctuations such as commodity price movements. This result is confirmed by looking at the comovement between Swiss imported goods inflation and import-weighted global inflation. While the comovement is somewhat less pronounced if overall comovement is considered, these two variables move much more strongly in parallel if the focus is narrowed to the comovement of short-run price fluctuations.

The analysis of the first two periods covering 1975 to mid-2008 shows that the comovement between global and Swiss inflation was initially low, then it became more pronounced from the early post-Bretton Woods years to the period of the Great Moderation. However, the increased spillover effects did not work against the SNB's goal of stabilising inflation in the 'Low Inflation Period' at a lower level compared to the 'High Inflation Period'. The SNB was thus able to keep a firm hold on medium-run inflation dynamics in Switzerland during both periods and Swiss inflation was markedly lower than global inflation in the medium run. Because average inflation in Switzerland was lower than it was abroad, nominal effective exchange rate appreciation did not translate into significant real appreciation.

My analysis of the two periods indicates that monetary policy can insulate countries from the effects of global inflation spillovers in the medium to long term. Naturally, such countries must take the impact of the global economy into account, however (Kohn 2006). This is done in the monetary policy decision process at the SNB where economic analysis, inflation forecasting and monetary policy decisions are explicitly based on a scenario for the world economy.

Moreover, if central banks are to be successful in influencing monetary conditions, it is important that they are not overly restricted and have sufficient latitude to deploy the instruments at their disposal. Between 1975 and 1993, conventional monetary policy in Switzerland was unencumbered by any such restrictions for long periods of time. In recent years, however, the SNB has had less latitude when it comes to using conventional monetary policy to counter international spillovers.

### **III.C. The ‘Crisis Period’: SNB deploys unconventional measures in response to challenging international environment**

The ‘Crisis Period’ starting in mid-2008 marked the beginning of the global economic downturn. GDP growth and inflation fell dramatically and, as a result, monetary policy was loosened substantially around the world. In my analysis, the ‘Crisis Period’ ends in April 2015 due to data availability.

As in the ‘High Inflation Period’, the value of the Swiss franc soared in the aftermath of the financial and economic crisis, particularly in response to the ensuing European sovereign debt crisis (see Charts 4 and 5). But in stark contrast to the past, the sharp nominal effective exchange rate appreciation in the ‘Crisis Period’ has been driven by large safe haven capital flows, leading to a significantly overvalued Swiss franc. Moreover, increasingly expansionary monetary policy worldwide has narrowed interest rate differentials as rates have approached zero. Consequently, the historically positive differentials between Swiss interest rates and rates abroad have vanished (see Chart 6), increasing the attractiveness of holding Swiss assets considerably; this has put further pressure on the Swiss franc. As detailed in Chart 5, the appreciation of the nominal effective exchange rate within a few years has been historically unprecedented. The pass-through of the exchange rate shifts has been the principal cause of the significant decline in imported goods inflation during this ‘Crisis Period’.<sup>10</sup> Moreover, there is significant empirical evidence for time-variation in the exchange rate pass-through (i.e. the responsiveness of prices to changes in the exchange rate varies over time). Indeed, the degree of exchange rate pass-through rose significantly in the aftermath of the appreciation of the Swiss franc against the euro in 2010 and 2011 (Fleer, Rudolf and Zurlinden 2015).

Furthermore, lower global inflation due to stalling economic growth around the world has put additional downward pressure on inflation in Switzerland. On average, prices of imported goods and services have fallen by 1.6% per year since mid-2008 (see Chart 4). In addition, import competition has led to a dampening of domestic goods inflation, and overall CPI inflation has averaged 0%. In a situation where the currency is overvalued, the Swiss economy’s price competitiveness can be restored via nominal depreciation of the Swiss franc, temporarily lower inflation in Switzerland than abroad, or a combination of both. This is discussed in more detail in Section IV.

During the ‘Crisis Period’, the volatility and persistence of Swiss CPI inflation have not changed significantly to date (see Table 2). However, the strength of the comovement between Swiss CPI inflation and global inflation has been diminishing again, having increased strongly from the ‘High Inflation Period’ to the ‘Low Inflation Period’ (see Table 1). In particular, the variation in domestic goods inflation has not yet been affected by global inflation variation. However, variation in global inflation has remained an important determinant of imported goods inflation.

As noted, Switzerland has faced deflationary pressures in recent years, but these pressures and those experienced by other countries, such as Japan, have different origins. When global

financial markets were in turmoil after the Lehman bankruptcy, Switzerland managed to prevent a serious domestic banking and economic crisis. And critically, private domestic demand has remained robust in recent years, which has supported economic growth; these positive developments have been reinforced by sound household balance sheets and sustained immigration. Deflationary pressures in Switzerland have principally been induced by very sharp exchange rate appreciation and muted inflation of imported goods against a backdrop of historically low global inflation. Importantly, there are no signs that the Swiss CPI is trending downwards.

After the onset of the financial crisis in 2008, the SNB cut interest rates to very low levels in order to adjust monetary conditions (see Chart 7). Ultimately, faced with near-zero interest rates, an appreciating Swiss franc and a deteriorating economic outlook, the SNB had to resort to unconventional measures. Most prominently, the SNB introduced a minimum exchange rate of CHF 1.20 per euro on 6 September 2011, which partially corrected the massive overvaluation of the Swiss franc. This decision enabled the SNB to counter an acute threat to the Swiss economy and ward off the risk of a deflationary development.

Early in 2015, the minimum exchange rate of CHF 1.20 per euro became unsustainable. Not only were there signs that a US exit from a highly expansionary monetary policy was drawing closer, but there was mounting evidence that monetary policy in the euro area would be eased further. Against this backdrop, the euro depreciated considerably against the US dollar. At the same time, demand for assets denominated in Swiss francs rose sharply due to geopolitical tensions. In the wake of these international spillovers, pressure on the minimum exchange rate increased enormously. By ignoring this fact and upholding this policy, the SNB would have risked losing control of its balance sheet and, as a result, of monetary conditions. This, in turn, would have hampered its stability-oriented policy in the future. On 15 January 2015, the SNB therefore decided to discontinue the minimum exchange rate. Simultaneously, it lowered the interest rate on sight deposits to  $-0.75\%$ . The SNB also made clear that it would remain active in the foreign exchange market, if necessary. The goal of this two-pronged approach was – and is – to make holding Swiss francs less attractive and thus to weaken the significantly overvalued currency.

Although even temporarily negative inflation rates are undesirable, they cannot always be avoided, particularly during phases of strong exchange rate appreciation. However, adverse effects of international spillovers on the Swiss CPI have so far been kept at bay through the use of unconventional measures. The CPI is now at the same level as it was seven years ago. From the SNB's point of view, what matters is that medium-term inflation expectations remain anchored in positive territory and monetary policy is able to ensure medium-term price stability.

### **III.D. International spillover effects to Swiss inflation: pre-crisis periods versus ‘Crisis Period’**

During the two pre-crisis periods (1975 to mid-2008) spillovers to Swiss consumer prices from movements in global inflation did not have significant adverse effects; over the medium term, the bulk of these spillover effects was absorbed by the exchange rate. On average, nominal effective exchange rate appreciation was broadly in line with the inflation rate differential during the ‘High Inflation Period’ and ‘Low Inflation Period’, resulting in a fairly stable real exchange rate (see Chart 5). Swiss monetary policy was never constrained for a lengthy period during this time. The SNB was able to use its preferred operational target – nowadays the short-term interest rate – to influence monetary conditions and thereby counter adverse international spillover effects. Consequently, the SNB was able to keep inflation stable at a lower level than abroad.

During the ‘Crisis Period’, global inflation has fallen to historically low levels and, in contrast to previous periods, the exchange rate has transmitted, rather than absorbed, adverse spillover effects to Swiss inflation. As a result, Swiss inflation has been hovering around zero and has even turned negative at times in recent years. During the ‘Crisis Period’, expansionary monetary policy around the world has progressively narrowed the SNB’s scope for steering monetary conditions via interest rates. The historical differentials between foreign and Swiss interest rates have essentially vanished (see Chart 6). In such an environment, large safe haven capital flows have led to a massive appreciation of the Swiss franc.

To date, the use of unconventional monetary policy measures has mitigated international spillover effects on inflation during the ‘Crisis Period’ and medium-term price stability seems assured. Nonetheless, given negative inflation and limited conventional monetary policy options, one might justifiably ask: can monetary policy always independently control inflation?

## **IV. On the viability of independent monetary policy in small open economies**

What conclusions can be drawn from the Swiss experience of international spillovers to inflation? More specifically, can monetary policy in a small open economy independently control inflation?

### **1. Independent monetary policy is generally viable for small open economies ...**

The empirical analysis for Switzerland in Section III indicates that an independent monetary policy is typically viable for small open economies – even if the country in question has a safe haven currency. However, independence is not synonymous with ignoring the international environment. The international economic situation usually has major implications for the

inflation dynamics of small open economies. Central banks in such countries must take this fact into account if they are to achieve their objective of price stability.

The Swiss experience also shows that, given the multitude of international spillovers, monetary policy should not attempt to fine-tune the inflation rate, even under ‘normal’ conditions. Central banks should resist the temptation to be overambitious and should exercise caution in trying to stabilise price developments in the short run. They should focus on the medium-term horizon and accept some short-run inflation volatility, provided it does not undermine inflation expectations. Where spillovers have only short-lived effects on price dynamics, as was the case during the ‘Low Inflation Period’, monetary policy in small open economies can dispense with stabilising the volatile part of imported goods inflation; indeed, due to the long and variable lags of policy actions, any such stabilisation attempts may even be counterproductive. Well-anchored inflation expectations enable the pass-through of temporary inflation swings from abroad while avoiding harmful long-run effects (Jordan, Peytrignet and Rossi 2010; Bernanke 2007). We may conclude that monetary policy in small open economies is able to determine the long-run inflation level, and that short-term interest rate steering is generally sufficient to conduct independent, medium term-oriented monetary policy.

## **2. ... but monetary policy implementation in small open economies may occasionally be hampered by international developments.**

Switzerland’s experience during the recent ‘Crisis Period’ shows that controlling inflation may occasionally become more difficult for small open economies. This is especially true when a country’s currency is appreciating and scope for using conventional monetary policy instruments is limited. Under such circumstances, temporary adverse spillover effects to inflation cannot be completely ruled out – particularly when international monetary policy has been extremely expansionary for an extended period. Ultimately, most of the negative inflation Switzerland has experienced in recent years has been linked to lower imported goods prices.

## **3. Unconventional policy measures can be beneficial but their use must be considered carefully**

Having exhausted other policy options, a central bank may turn to unconventional policies to create appropriate monetary conditions and thus mitigate the adverse effects of spillovers to inflation.

The Swiss experience yields the following insights on this front: first, unconventional policy measures must be deemed sustainable at the time they are introduced, especially if they call for large interventions or balance sheet expansions. Since such policies involve risks, their pros and cons must be regularly reassessed. Importantly, these policies must also be adjusted at the right moment if they become unsustainable due to changes in the international environment. Inevitably, an adjustment means the central bank will then be pursuing its objective using an amended policy, which must, in turn, be deemed sustainable under the new circum-

stances. For instance, as explained in Section III.C., the risks of adhering to the minimum exchange rate of CHF 1.20 per euro would, over time, have been out of all proportion to the benefits given the divergent policy paths of the major currency areas. In addition to discontinuing the minimum exchange rate, the SNB therefore lowered the interest rate on sight deposits into negative territory and made clear that it would remain active in the foreign exchange market, if necessary.

Second, the inadvisability of fine-tuning inflation in small open economies mentioned earlier becomes even more relevant in the context of unconventional policies. Such policies should be geared towards medium-term price stability and to shielding the economy against large risks. Monetary policymakers should pay close attention to the costs of any such unconventional efforts, particularly if there is a trade-off between the benefits of a certain policy in the short run and potential costs in the long run. Occasionally, temporary suboptimal inflation is inevitable in the short run. This is currently the case in Switzerland due to falling imported goods prices. But critically, medium-term price stability has not been threatened, and so far unconventional monetary policy measures, such as negative interest rates (see Chart 7), have prevented adverse spillover effects from becoming persistent. Inflation expectations have remained anchored in positive territory and there are no signs that the Swiss CPI is trending downwards.

Rey (2015) has recently pointed out that monetary policy in small open economies faces a ‘dilemma’ between independence on the one hand and open capital accounts on the other, even with flexible exchange rates. She finds that monetary conditions in small open countries are influenced by a global financial cycle. As the analysis in Section III shows, Rey’s findings are not generally borne out by the Swiss experience. Significant spillover effects from large safe haven capital flows have virtually never transpired, except during the ‘Crisis Period’, where the SNB’s leeway for deploying conventional monetary policy options has been limited. And even during the ‘Crisis Period’, the spillover effects have not had a lasting impact on the central bank’s ability to control medium to long-term inflation.

#### **4. A higher inflation target would generate substantial costs**

Given that Switzerland is confronting an overvalued currency and negative inflation, one might argue that a higher inflation target or a looser definition of price stability is beneficial. A prolonged period of Swiss franc overvaluation is usually linked to the fact that the central bank has limited scope to cut nominal interest rates. A higher inflation target that induces higher average nominal interest rates could increase the SNB’s room for manoeuvre in times of crisis.

However, a looser quantitative definition of price stability would not be in line with the SNB’s mandate of ensuring price stability. A higher level of inflation often goes hand-in-hand with large fluctuations in inflation rates, which lead to the misallocation of resources, as well as to random and undesirable income and asset redistributions. This, in turn, could undermine public confidence in the SNB. Furthermore, likely indexation, combined with a failure to anchor inflation expectations, would diminish the effectiveness of monetary policy and lead to greater fluctuations in interest rates, economic activity and employment. As a result, higher

inflation is likely to be associated with considerable costs in the longer run and thus does not seem to be a suitable solution (see Ascari and Sbordone 2014). It also seems highly unlikely that marginally more scope for cutting interest rates would, on its own, have been sufficient to significantly dampen Swiss franc appreciation during the ‘Crisis Period’.

## **5. With an overvalued currency occasional downward price adjustments are inevitable**

In the context of an overvalued Swiss currency, lower inflation in Switzerland than abroad, combined with a nominal weakening of the Swiss franc, leads to real exchange rate depreciation over time.

Global inflation has been muted in recent years. This, in turn, has reduced scope for lower – but still positive – inflation rates in Switzerland. Price cuts therefore play an important role in the process of restoring the economy’s price competitiveness over the medium term. Price flexibility, especially downwards, may help in this regard. Indeed, Egger and Kaufmann (2014) recently found that price cuts in Switzerland occurred about as frequently as price increases after inflation fell to zero. This finding accords with the prediction of Honoré, Kaufmann and Lein (2012). A firm’s price flexibility is closely linked to its ability to adjust rapidly to changing conditions at home and abroad – and wage flexibility is particularly crucial here. During downturns, institutional arrangements such as short-time working allow firms in Switzerland to cut costs, including wage costs, quickly. Wage negotiation schemes usually ensure that firm and industry specifics can be taken into account, thereby preserving firms’ competitiveness. Along with relatively high job turnover, these factors result in lower downward wage rigidity in Switzerland than in many other countries (see Dickens et al. 2007).

The Swiss economy has shown on several occasions in the past that it can adjust flexibly to changing economic conditions. Major innovation drives have also contributed to the international competitiveness of firms in Switzerland. Notwithstanding this, it is important to note that these kinds of adjustment processes present enormous challenges for the Swiss economy. This is especially true in the current environment where global inflation is muted and lower inflation in Switzerland than abroad may require occasional price cuts.

## **V. Summary and conclusions**

Over the past three decades, Swiss inflation has been markedly lower than global inflation in the longer run. The SNB has been able to control medium-run inflation dynamics in Switzerland, despite the country’s deep real and financial linkages abroad and despite having a safe haven currency.

From 1975 until mid-2008, the SNB was able to use its preferred operational target, which now takes the form of the short-term interest rate, to influence monetary conditions and conduct an independent, medium term-oriented monetary policy. During this time, the bulk of the international spillover effects were absorbed by the exchange rate. While Swiss monetary

policy can independently control inflation, it can never be conducted entirely in isolation. The international economic situation typically has major implications for the price dynamics of small open economies; to be effective, monetary policy in such countries must therefore take global factors into account. Spillover effects have often proved to be short-lived and have not typically worked against the SNB's aim of stabilising inflation. The Swiss experience confirms that, given the multitude of international spillovers, monetary policy should never be used to fine-tune the inflation rate.

Switzerland's experience since the onset of the financial crisis also confirms that controlling inflation may occasionally become more difficult for small open economies. The historical differentials between foreign and Swiss interest rates have essentially vanished in recent times as international monetary policy has been extremely expansionary for an extended period. Where conventional monetary policy options are limited and a currency is overvalued due to large safe haven capital flows, temporary adverse spillover effects to inflation cannot be completely offset. Ultimately, most of the negative inflation Switzerland has experienced in recent years has been linked to lower imported goods prices.

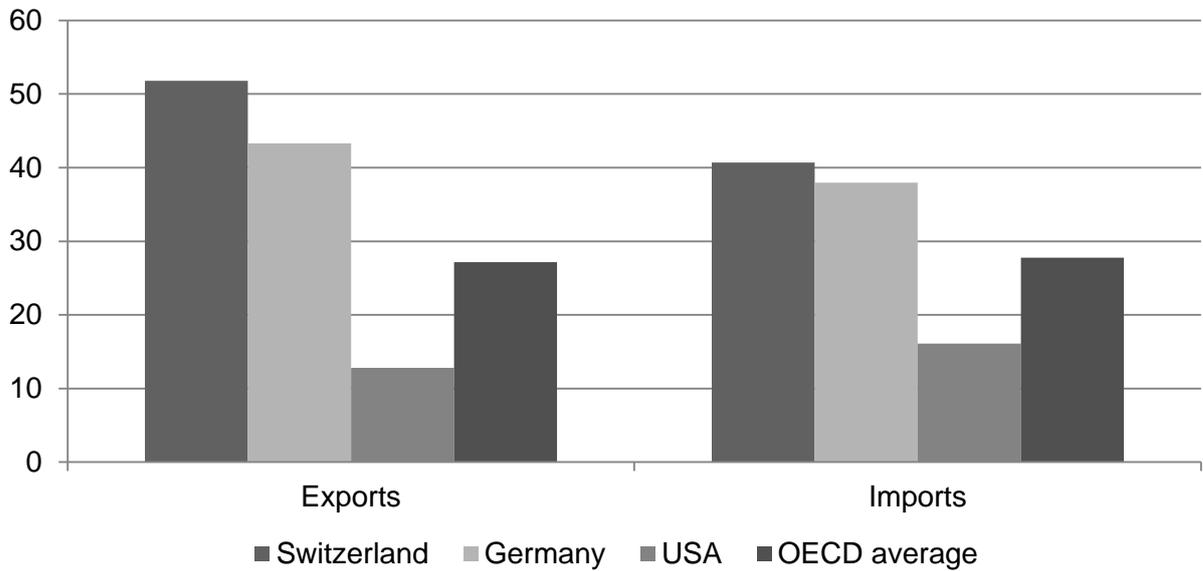
In such circumstances, central banks can mitigate the adverse effects of spillovers to inflation by deploying unconventional monetary policy. However, such measures must be deemed sustainable when introduced and must be adjusted at the right moment if they become unsustainable due to changes in the international environment. Moreover, an unconventional policy should be geared towards medium-term price stability and not towards fine-tuning inflation.

A higher inflation target, which could increase room for manoeuvre in times of crisis, is likely to generate considerable costs in the longer run and would not be in line with the SNB's mandate of ensuring price stability. In the context of major international spillovers, small open economies must sometimes live with temporarily suboptimal inflation. This is currently the case in Switzerland due to falling imported goods prices. Inflation expectations have remained well-anchored, however, suggesting that the SNB's commitment to ensuring medium-term price stability remains credible even under these difficult conditions.

When adverse spillovers occur, firms must adjust quickly and flexibly to changing conditions both at home and abroad. The Swiss economy has proved on several occasions in the past that it can master significant challenges. Institutional arrangements and good labour-management relations allow relatively high price and wage flexibility. Ongoing innovation drives also play a key role in ensuring that firms in Switzerland remain internationally competitive.

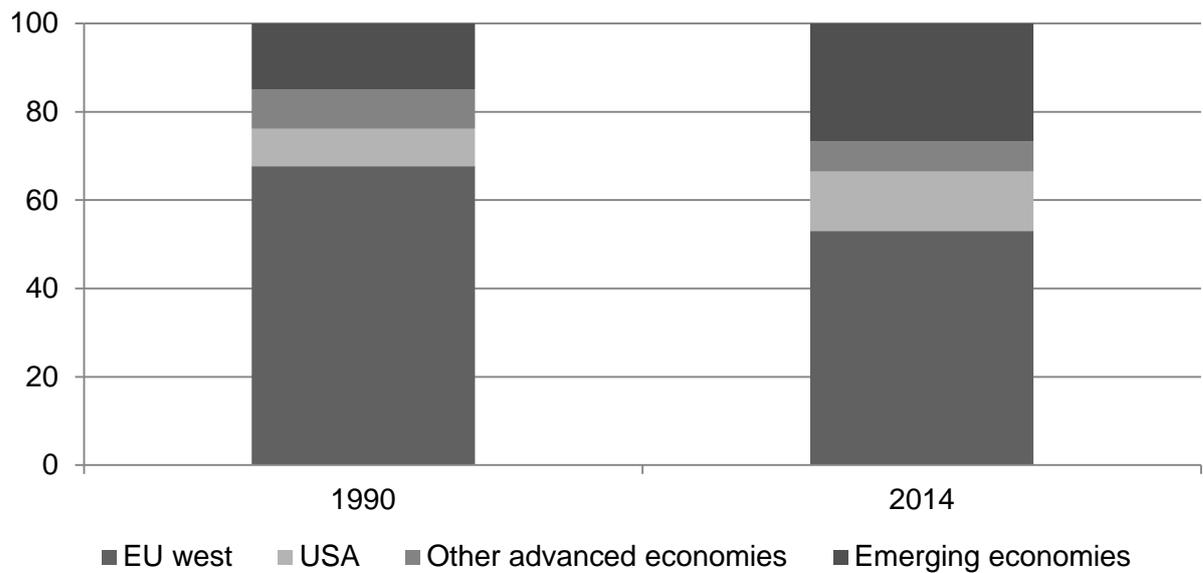
The SNB's current monetary policy factors in suboptimal inflation and the significantly overvalued Swiss franc. It is holding the interest rate on sight deposits at  $-0.75\%$  and has also made clear that it will remain active in the foreign exchange market, if necessary. The goal of this two-pronged approach is to make holding Swiss francs less attractive and thus to weaken the currency over time.

**Chart 1**  
**5-year average (2009-2014) of exports and imports as % of GDP**



Sources: OECD, SNB; author's calculations

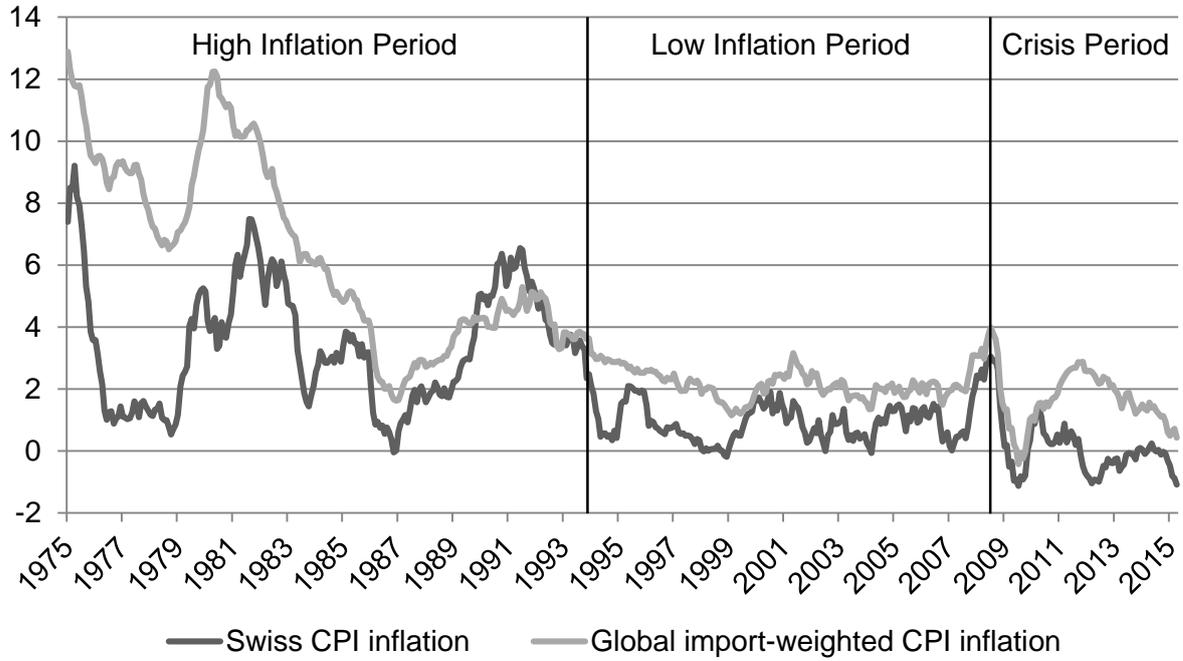
**Chart 2**  
**Swiss export shares by region in %**



Sources: OECD, SNB; author's calculations

**Chart 3**

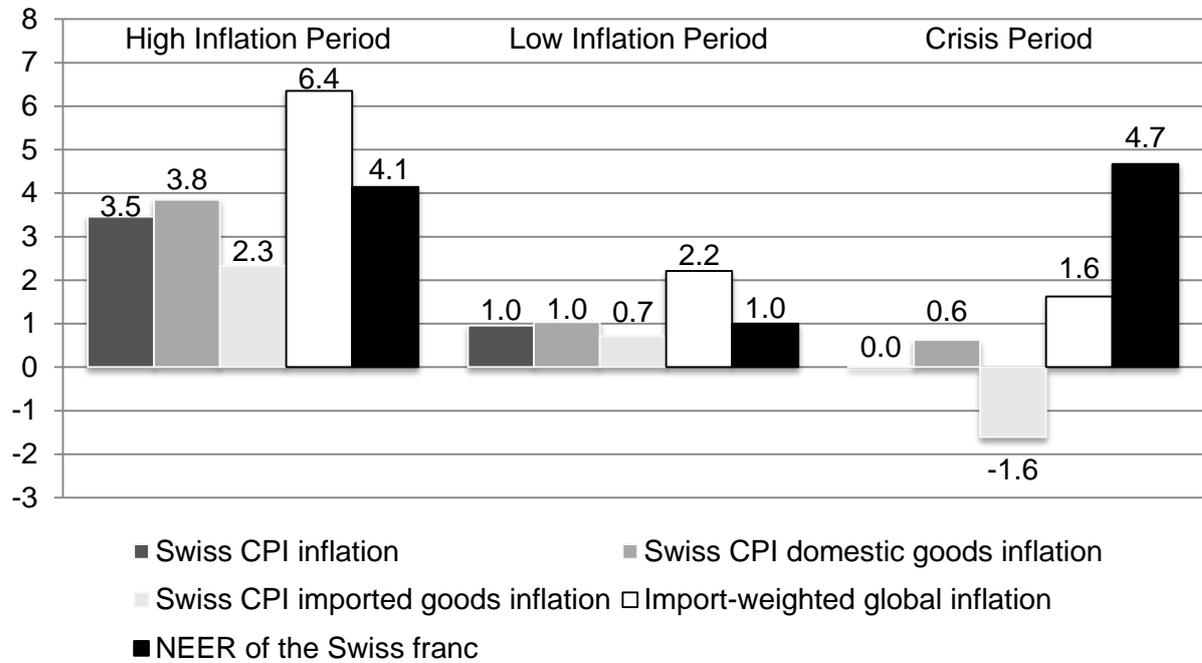
**Swiss CPI inflation and global import-weighted CPI inflation,  
year-on-year changes in %**



Sources: OECD, SNB; author's calculations

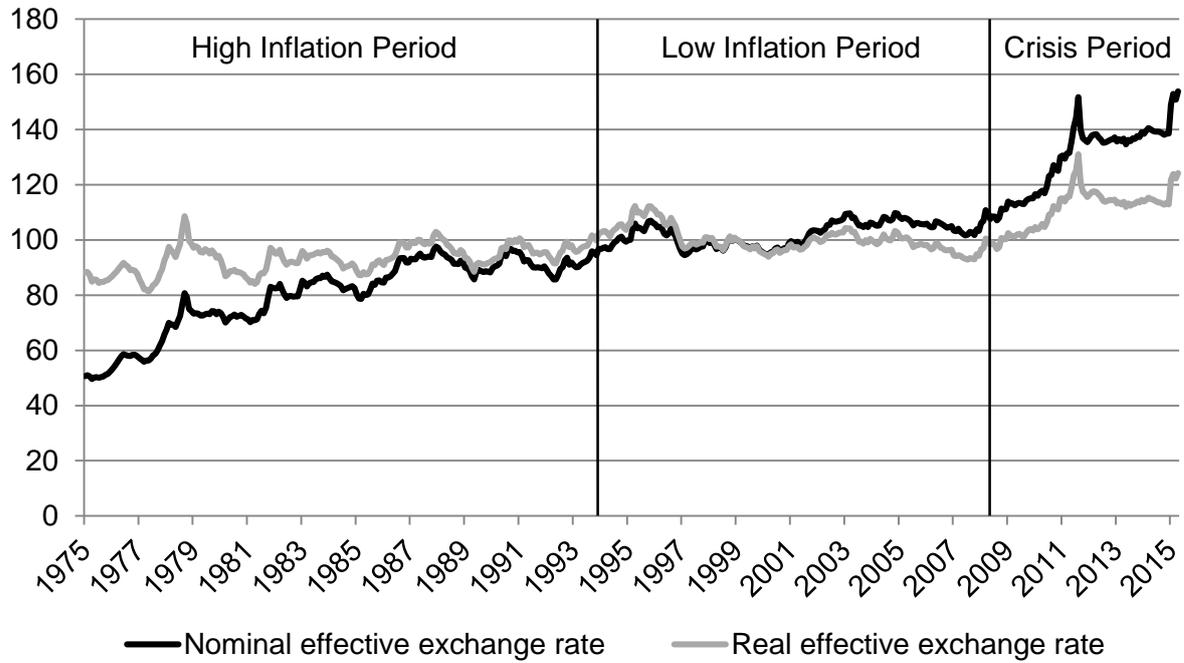
**Chart 4**

**Inflation measures and the Swiss franc nominal effective exchange rate by period, year-on-year changes in %**



Sources: OECD, SNB; author's calculations

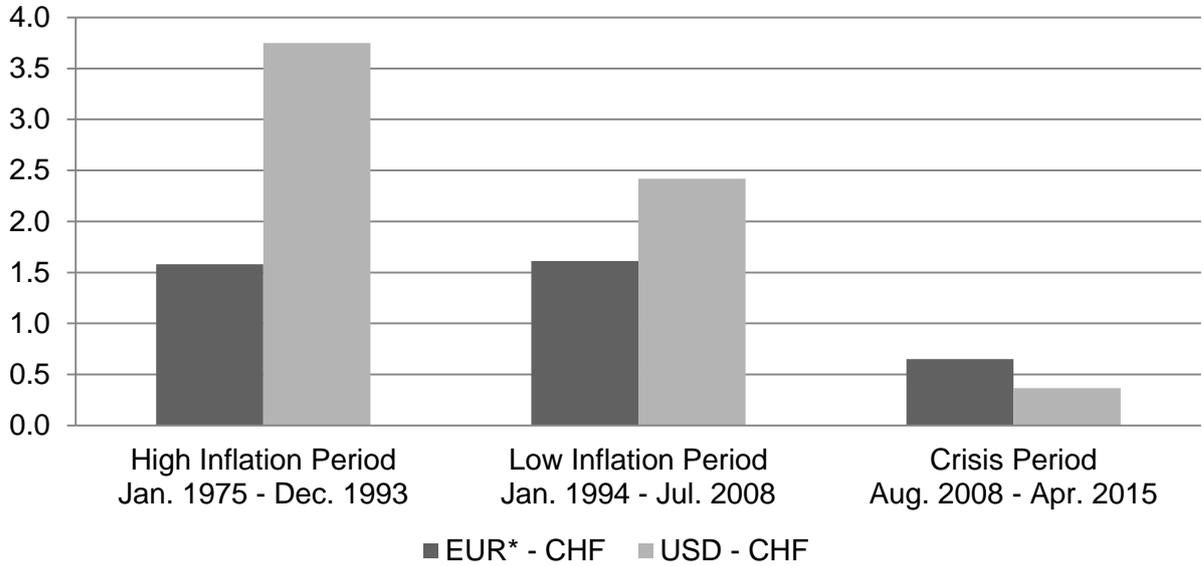
**Chart 5**  
**Nominal and real effective exchange rate**  
**of the Swiss franc versus 24 trading partners**



Source: SNB, both indices equal 100 in January 1999

**Chart 6**

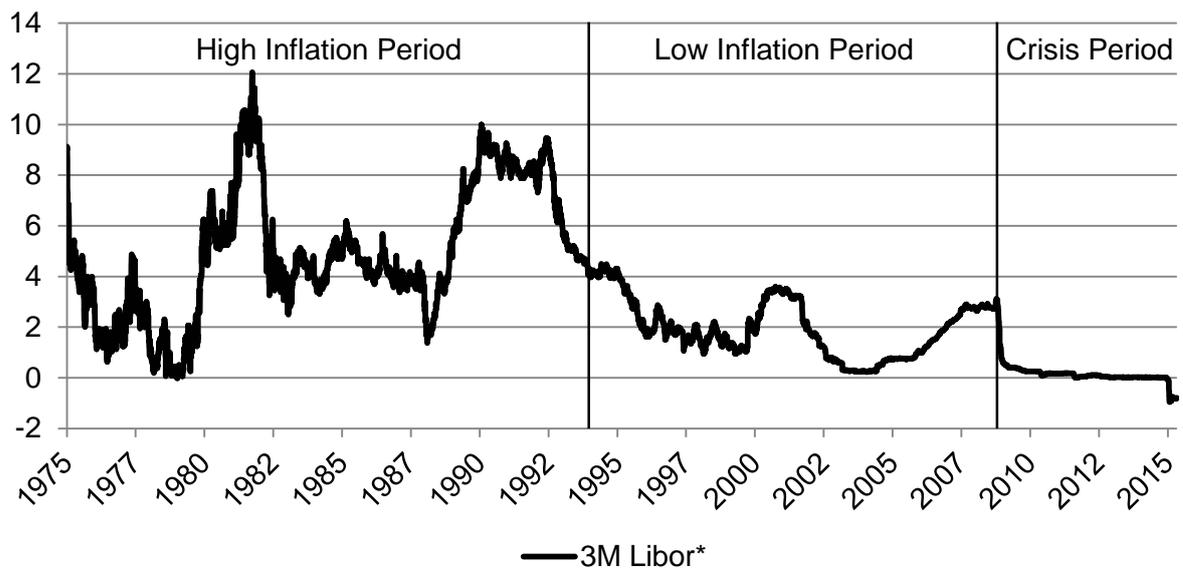
**Average 3M euro market interest rate differentials in percentage points**



Sources and notes: Thomson Reuters, SNB; author's calculations: \* German Mark (DEM) is used until 1998 and euro (EUR) from 1999.

**Chart 7**

**Short-term Swiss interest rate in %**



Sources and notes: Thomson Reuters, SNB; author's calculations: \* 3M euro market rate is used until 1988 and 3M Libor from 1989.

**Table 1**  
**Share of Swiss inflation explained by global inflation**

	High Inflation Period 1975-01 – 1993-12		Low Inflation Period 1994-01 - 2008-07		Crisis Period 2008-08 - 2015-04	
	Principal comp.	Import-weight.	Principal comp.	Import-weight.	Principal comp.	Import-weight.
CPI	0.15	0.18	0.65	0.36	0.31	0.20
Domestic	0.05	0.05	0.15	0.29	0.00	0.01
Imported	0.13	0.19	0.38	0.06	0.47	0.33

Sources: OECD, SNB. Author's calculations are based on Ciccarelli and Mojon (2010).

Global inflation measures:

Principal comp.: First principal component based on a sample of 28 OECD countries and a set of commodity price indices

Import-weight.: Import-weighted global inflation (weighted average of 28 OECD countries covering on average 90% of Swiss import origins)

CPI: Overall Swiss CPI inflation

Domestic: Swiss CPI domestic goods inflation

Imported: Swiss CPI imported goods inflation

**Table 2**  
**Variance and persistence of Swiss inflation**

	High Inflation Period 1975-01 - 1993-12		Low Inflation Period 1994-01 - 2008-07		Crisis Period 2008-08 - 2015-04	
	Variance	Root (90%-CI)	Variance	Root (90%-CI)	Variance	Root (90%-CI)
CPI	3.90	(0.98, 1.02)	0.42	(0.81, 0.97)	0.66	(0.55, 0.91)
Domestic	4.17	(0.98, 1.02)	0.38	(0.88, 1.02)	0.28	(0.59, 0.95)
Imported	13.50	(0.97, 1.02)	4.63	(0.80, 0.96)	5.75	(0.39, 0.77)

Sources: SNB. Root (90%-CI): The confidence intervals (CI) for the largest autoregressive root are calculated using the method proposed by Stock (1991). The smaller the lower and upper bound of the CI, the lower the persistence of the respective inflation series.

CPI: Overall Swiss CPI inflation

Domestic: Swiss CPI domestic goods inflation

Imported: Swiss CPI imported goods inflation

## Endnotes

<sup>1</sup> See also Mumtaz and Surico (2012), Neely and Rapach (2011) and the IMF (2006) for further empirical analysis of international inflation dynamics.

<sup>2</sup> More than 40% of Swiss small and medium-sized manufacturing firms undertake in-house research and development, a world record (Arvanitis et al. 2013). In 2014/2015, Switzerland leads the Global Competitiveness Index of the World Economic Forum (WEF).

<sup>3</sup> In several rankings of economic openness, Switzerland is among the top countries listed. See for example the “ICC Open Markets Index” (<http://www.iccwbo.org/global-influence/g20/reports-and-products/open-markets-index>), the “Index of Economic Freedom” (<http://www.heritage.org/index>) or the “KOF Index of Globalization” (<http://globalization.kof.ethz.ch>).

<sup>4</sup> Mishkin (2009) argues that the impact of globalisation on inflation should only be transitory (see also IMF 2006). Indeed, the IMF (2006) finds only modest direct effects of globalisation on inflation through import prices in advanced economies.

<sup>5</sup> Data on the outward FDI stock and nominal GDP of Switzerland are taken from the IMF.

<sup>6</sup> Data are from 2013 and taken from the Swiss Bankers Association.

<sup>7</sup> Data are taken from the BIS Triennial Central Bank Survey of 2013.

<sup>8</sup> See e.g. Grisse and Nitschka (2015), Hossfeld and MacDonald (2014) or Gubler (2014), among others, for empirical studies documenting the Swiss franc’s status as a safe haven currency.

<sup>9</sup> At first glance, Chart 3 suggests that the comovement between global and Swiss inflation was stronger for cycles lasting approximately two to six years. Indeed, focusing exclusively on these cycles significantly increases the comovement (principal component global inflation: 0.40; import-weighted global inflation: 0.54). Results based on the comovement between global and Swiss inflation that are dependent on the cycle length are not shown but can be supplied by the author upon request. The asymmetric filter developed by Christiano and Fitzgerald (2003) is used in order to extract specific cycles.

<sup>10</sup> There is a growing body of literature examining the effects of unconventional monetary policy, particularly the Fed’s quantitative easing (QE) programmes, on a wide range of developed and developing countries (see Chen et al. (2015) and references contained therein). Moreover, Baeurle and Kaufmann (2014) find that the effects of global uncertainty shocks on the Swiss exchange rate – and hence on Swiss inflation – strengthened with a binding zero lower bound.

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