

Embargo

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Ten years after the crisis: evolving markets and the challenges for the SNB

Money Market Event

Andréa M. Maechler and Thomas Moser

Member of the Governing Board / Alternate Member of the Governing Board*

Swiss National Bank

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Ladies and Gentlemen, I wish you a warm welcome to the Swiss National Bank's Money Market Event in Geneva.

Ten years ago, back in the autumn of 2008, none of us knew when or how the crisis would end. At the time, central banks adopted a raft of measures to tackle multiple challenges in quick succession. Having exhausted the conventional monetary policy toolkit, they turned to more innovative approaches, cutting their short-term interest rates to unprecedented levels and substantially expanding their balance sheets.

Today, a decade later, the worst fears have evaporated, economic growth has returned to a robust level in many parts of the world, and some central banks have started to gradually tighten their monetary policy. For the SNB, though, it is still too early to contemplate taking such action. At our last monetary policy assessment in September, we decided to maintain our expansionary monetary policy stance. Although economic developments are favourable, inflationary pressures remain low. Moreover, the Swiss franc remains highly valued and the situation on the foreign exchange market is still fragile.

Against this backdrop, the contours of a 'new normal' are emerging for central banks. While there are still many significant unknowns in the political, geopolitical and economic arenas, one thing is certain: the environment in which the central banks operate has evolved considerably, mainly due to structural changes. Some of these changes had already begun well before the crisis, but they have accelerated in the intervening period. I am thinking here of the digitalisation of the economy, for example, as well as the emergence of new technologies on the financial markets.

In this speech, I would like to outline how the SNB has had to adapt – and continues to adapt – to make sure it is always in a position to fulfil its mandate. To illustrate this point, I want to focus on three key markets for the SNB that have experienced major changes: the goods and services market, where digitalisation may be influencing pricing and where we, in turn, must remain alert if we are to fully grasp the associated dynamics; the foreign exchange market, where the emergence of new technologies and players has led us to expand our in-house capabilities and redouble our efforts to stay at the cutting edge of technological progress (Thomas Moser, Deputy Head of Department III since 1 September, will give you more detail on this topic); and finally, the money market, where structural changes are prompting us to work on modernising infrastructure and maintaining appropriate framework conditions in order to ensure effective implementation of monetary policy.

Evolution of the goods and services market and weak inflation

So let me start with the goods and services market and inflation developments. This market is presenting central banks with an important conundrum: why, given that the economy has firmed significantly since 2017, has inflation remained low in most advanced economies?

Two major reasons stand out: on the one hand, monetary policy geared to price stability has firmly anchored inflation expectations; on the other, various structural factors linked to globalisation may have had a moderating effect on prices.

As **chart 1** shows, in Switzerland inflation remained low in the early post-crisis years, due in particular to the fall in energy prices and strong appreciation of the Swiss franc in the aftermath of the euro area debt crisis. Today, thanks in part to the monetary policy measures taken by the SNB to combat the strong appreciation of the Swiss franc, inflation for imported goods and services has returned to positive territory (cf. red bars). Furthermore, the price of oil is trending upwards. And finally, the consumer price index in Switzerland has been rising again since the beginning of 2017 and currently stands at 1.1% year-on-year. Nonetheless, inflation for domestic goods and services remains moderate despite robust economic momentum and a steadily improving labour market (cf. blue bars).

Besides these factors, monetary policymakers may increasingly find themselves grappling with another issue: digitalisation and its impact on the level and dynamics of prices.¹ Digitalisation is affecting almost all sectors of the economy, but its effects are particularly pronounced in retail. In Switzerland, retail trade via online platforms has been experiencing double-digit growth for some years now, while traditional retail has been declining. Last year, online trade already accounted for some 8.5% of all Swiss retail trade.²

Digitalisation can affect price developments in a variety of ways. On the one hand, the increased competition and greater transparency for consumers that online trade enables may erode the pricing power of traditional retailers. This phenomenon, sometimes called the ‘Amazon effect’,³ can lower inflation, at least temporarily.

On the other hand, some evidence appears to suggest that digitalisation in the retail trade leads to faster pass-through – that is to say, it increases the responsiveness of prices to shocks affecting the economy, such as the strong appreciation of a nation’s currency. Studies show that the growth of online trade in recent years may have helped to almost double the speed of price adjustments in the US retail industry.⁴ Switzerland too has seen a trend towards faster price adjustments over the last few years.⁵ Thus, shocks such as strong appreciation or depreciation of the Swiss franc could feed through to inflation more rapidly in the future. The SNB is therefore analysing the repercussions of digitalisation in depth, in order to understand the impact on inflation as thoroughly as possible and ensure that it is able to take action where necessary.

1 For a discussion about the causes and implications of low inflation, cf. Constâncio, Vítor (2017) ‘Understanding and overcoming low inflation’; remarks at conference on *Understanding inflation: lessons from the past, lessons for the future?* Frankfurt am Main, 21–22 September.

2 BAK Economics AG and Swiss Association of Distance Selling.

3 This term describes the impact of booming online trade on the traditional retail trade as well as on economic growth and inflation.

4 The costs to companies of price changes (‘menu costs’) are generally lower for online traders as they only have to modify their prices online; traditional traders on the other hand have to produce new labels, brochures, etc. Cf. Cavallo, Alberto (2018) ‘More Amazon effects: online competition and pricing behaviors’, Harvard Business School & NBER, 7 September.

5 Swiss Federal Statistical Office data, for example, show that the share of goods and services subject to price adjustments rose from some 20% per month in 2011 to just over 25% in 2017.

As its responses both during and after the crisis have shown, the SNB has a monetary policy strategy that has proved its worth in highly volatile circumstances. Robust and appropriate, this framework offers the required room for manoeuvre, allowing the SNB to tolerate inflation temporarily moving outside the range it equates with price stability, provided inflation expectations remain well anchored.

Innovations on the foreign exchange market

As I have explained, the SNB must adapt its analysis continuously in order to understand and anticipate changes in the goods and services market. However, the latter is not the only market to have undergone profound changes. The foreign exchange market, too – a key market for the SNB – has also evolved considerably since the crisis. It is here that we conduct interventions, as required, and it is here that we actively manage our foreign exchange reserves. The SNB has had to adapt to ongoing changes taking place on this market as well to ensure that it is able to implement its monetary policy effectively at all times.

For the last six years, the foreign exchange market has undergone profound change in three different but linked areas: the technology being used, the fragmentation of trading activity and the emergence of new players.

As regards technology, the most notable development has been the shift towards pure e-trading. Algorithmic trading, high-frequency trading, artificial intelligence and machine learning are just some of the commonly used terms in e-trading. Over 70% of the transaction volume in the foreign exchange spot market now takes place electronically. The shift to e-trading has also increased the frequency of trades. As a result, information flows have risen considerably. Close monitoring of these markets thus requires greater data processing capabilities.

The shift to e-trading has also led to the fragmentation of trading. With new forms of organised markets beginning to compete for the distribution of liquidity to end-users, transaction volumes on the primary interbank market have declined, in favour of new secondary market sites. Examples include secondary electronic communication networks, individual banks' proprietary trading platforms and multi-bank platforms. Monitoring market activity has become increasingly complex as the number of sites has proliferated.

Finally, the market participants themselves have changed. On the one hand, the share of transactions being executed by traditional bank dealers has steadily declined and this activity is being concentrated at the largest banks. On the other hand, new players have entered the market. In particular, companies specialising in high-frequency trading have become non-bank market makers and have started providing liquidity to end-users on a direct and open basis. It is necessary to monitor these trends in order to understand their potential impact on market dynamics.

What, practically speaking, do these changes mean for the SNB? Since the financial crisis and the decline of interest rates to very low levels, foreign exchange market intervention has

become an important tool in the implementation of the SNB's monetary policy. It is thus vital that we closely monitor structural and technological developments on this fast-paced market, and ensure that both our resources and our skillset are up to speed. In so doing, we stay on level pegging with market participants and optimise the desired effect when we intervene in the market. A thorough analysis of the market allows us to achieve the best possible trading conditions.

I would now like to hand over to my colleague Thomas Moser. He will explain in greater depth how the SNB performs real-time monitoring of this fast-paced market.

I would like to show you in more detail how the SNB uses high-frequency data to monitor the foreign exchange market in real time.

We first had to refine our tools and skillset to keep pace with high-speed markets. The fragmentation of trading activity has caused a huge increase in the volume of data that needs to be collected, recorded and processed. To perform this task, we have invested in internal resources, especially for the analysis of high-frequency data. This gives us a better understanding of the microstructure of the markets that we use to implement our monetary policy.⁶

Let me give you a concrete example of such an analysis. On 8 February 2018, the Swiss franc appreciated significantly against the euro in a matter of minutes. **Chart 2** shows the limit order book for EURCHF on the interbank market between 17:00 and 17:45. The red bars represent the bid volume, and the blue bars the ask volume. The triangles denote the transactions carried out at the bid price (in red) and ask price (in blue), respectively. For each tick, the system records the volume on the bid and ask sides. The dark colours indicate more volume for a given price level.

We can see that prior to 17:15, there was a liquid order book on both sides. Thereafter, a large number of EUR sell orders were executed; this was accompanied by a drop in bid volume and a downward revision of bid and ask prices. Price levels with high volume – as denoted by the darker red bars on the bid side – steadily declined to end up at CHF 1.1448 per euro. After this short-lived episode, the euro gradually recovered in the minutes that followed.

Now let's look at the trading activity and market liquidity on that day. In the two panels of **slide 3**, the green curve represents the spot rate for EURCHF on 8 February 2018. The red curve represents two different variables: in the left-hand panel it denotes the intraday turnover for EURCHF, while in the right-hand panel it shows the bid-ask spread, which is an indicator of transaction costs. Finally, the salmon-coloured area shows the historical average. We can see that trading activity between 17:00 and 17:30 was above the historical

⁶ I should also add that knowledge-sharing between central banks has been stepped up at international level. Cf., for example, the report by the Bank for International Settlements, *Monitoring of fast-paced electronic markets*, 17 September 2018.

average. By contrast, the bid-ask spread widened only slightly, before swiftly returning to normal levels. As a result, despite the strong Swiss franc appreciation, market liquidity remained strong.

If we combine the information in these three charts, we can see that the Swiss franc appreciation recorded on 8 February was accompanied by high transaction volumes, but this was absorbed comparatively easily by the market. This example shows how we analyse the microstructure of the market in real time.

But capturing micro-changes in real time is not enough to allow an understanding of the underlying market dynamics of the Swiss franc. Rather, we need to be able to tie them to longer-term trends, in other words a period spanning several weeks or months. Since the beginning of the year, for instance, we have observed three risk-off events that put upward pressure on the Swiss franc, as illustrated by the red curve in **chart 4**.

First, last February, concerns surrounding a faster-than-expected tightening of monetary policy in the US triggered a major stock market sell-off and a corresponding volatility spike (green curve). Then, in May, political uncertainty in Italy led to a considerable widening of the yield spread between German and Italian 10-year bonds (blue curve). Demand for various asset classes regarded as safe havens, such as the Swiss franc, increased. Finally, in August, we witnessed a huge sell-off of certain emerging market currencies and an increase in their volatility (yellow curve). Fears of global contagion resulted in the franc appreciating strongly. It remains a safe-haven currency during periods of high uncertainty.

Indeed, an analysis of the options market confirms that the Swiss franc was in demand as a safe-haven currency during the three events described above. Risk reversal shows that during these events, participants were prepared to pay a higher premium to hedge against losses resulting from a steep appreciation of the Swiss franc vis-à-vis the euro than against a depreciation. As we can see from **chart 5**, three-month risk reversal for the EURCHF pair was significantly negative. Even today, risk reversal is still well below zero, indicating that the situation on the foreign exchange market remains generally fragile.

And now I would like to hand back to Andréa Maechler.

As we have just seen, without this kind of in-depth analysis as a supplement to traditional macroeconomic analysis, it would not be possible for us to capture the complexity of markets simply and comprehensibly. Today, our communication on the Swiss franc is centred around two key statements: the currency remains highly valued, and the situation on the foreign exchange market is still fragile. By communicating our knowledge of the financial markets in a clear and simple way, we bolster participants' confidence and contribute to the credibility of our monetary policy implementation.

A changing money market

Lastly, I'd like to take a look at another market that has seen profound change since the crisis: the money market. This market is particularly important for the SNB, especially with respect to the implementation and transmission of its monetary policy.

The money market has undergone two major changes, largely driven by external factors. First, the structure of the market has evolved, with the inexorable decline of the unsecured segment and concomitant rise of the secured segment; this structural change has meant that repos now take centre stage on the money market. Second – and this change is closely bound up with the first – we observe that the framework conditions within which the money market operates have been recast following the decline of the unsecured segment. I am alluding here to the replacement of the Libor as the reference interest rate for a variety of financial products, both in Switzerland and around the world.

Coming back to the first point: the drop in volume for unsecured transactions, particularly on long-dated operations (more than one month), is a global phenomenon. It reflects the banks' loss of confidence in conducting transactions on an unsecured basis since the beginning of the financial crisis. This trend has not been reversed, as we can see from **chart 6**. Activity on the money market has shifted towards the secured segment – in Switzerland towards the repo market (shown in blue). Following the substantial injection of liquidity in the wake of the SNB's interventions, activity in this segment has also declined. However, the sizeable liquidity surplus has not reduced volume to zero. In fact, the introduction of negative interest on sight deposit accounts at the SNB has prompted banks to arbitrage their exempted amounts. In addition, banks have continued to trade in repos, in order to exchange the corresponding collateral. Collateral management tends to gain in importance in response to ever-stricter regulation. Insurance companies are likewise active in the market, for liquidity management purposes.

In this changing context, the money market has performed its role as a monetary policy transmission channel to the fullest extent. Following the introduction of a -0.75% negative interest rate on sight deposit accounts at the SNB at the beginning of 2015, the various money market interest rates rapidly moved into negative territory, as **chart 7** shows. The decline also spread to yields on bond and credit markets.

To ensure the smooth functioning of the capital market and the effective transmission of monetary policy regardless of the circumstances, the quality of the money market infrastructure plays a key role. The existing money market infrastructure managed by SIX has many advantages: for instance, it has a wide range of participants, including the SNB, who make up a homogeneous market and interact on a shared platform. Moreover, that infrastructure is highly automated and standardised. It is in the process of being upgraded, to better respond to the changing needs of participants. A new repo trading platform, CO:RE, was launched in 2016. Moreover, a new triparty agent is being set up which will offer market participants a wide range of services and will enable a more efficient management of collateral through closer integration with pure trading activities.

Finally, a resilient and modern repo market infrastructure is essential to allow the SNB to deploy its entire monetary policy toolkit effectively and at any time. Indeed, the SNB uses the same SIX platform as private participants to implement its monetary policy, by auctioning/exchanging repos or reverse repos or even issuing SNB Bills. As you will recall, the latter were issued at the beginning of the crisis. They proved to be an efficient and flexible way to absorb liquidity.

I will now turn to the second point: the replacement of the Libor as the reference money market interest rate. It should be noted that the decline in transaction volumes for the unsecured segment of the money market involves not just the Swiss franc but all currencies. As a result of this decline, the Libor, which is supposed to reflect the major banks' unsecured refinancing costs, is now hardly ever based on effective transaction prices but instead relies almost exclusively on estimates. In response, the UK's Financial Conduct Authority has announced that it will no longer maintain the Libor after 2021. All market players will have to make careful preparation for this.

In Switzerland, work on replacing the Libor is already well advanced, but a complicating factor is the rate's widespread use. The national working group on Swiss franc reference rates (NWG), which is in charge of ensuring a smooth transition, has identified SARON as the preferred alternative solution to the Libor.

SARON has already established itself as a reference interest rate, and there is now an interest rate curve based on SARON. It is crucial to have a SARON-based curve capable of being used instead of the Libor curve, for price setting across the Swiss franc capital market. Amounts outstanding on the overnight swap market (OIS) based on SARON are currently low, but are likely to grow significantly in the future. In this connection, I would also like to mention that the first SARON-based futures contract was launched only around ten days ago, and traded on the Eurex platform. In the future, when products based on SARON (loans, mortgages, etc.) are brought to market, trading volumes for the associated collateral instruments will increase. These instruments, in turn, can be used for loan pricing.

One of the challenges involved in replacing the Libor with an overnight rate such as SARON is how to determine forward rates that would, for example, allow the calculation of quarterly payments on contracts. At the moment, the derivatives market is not liquid enough to provide a prospective forward rate (i.e. one that is known in advance). This is why the working group, at its meeting last week, opted for a backward-looking calculation method based on the average of daily SARON rates over the period concerned.

As co-chair of the NWG, the SNB is supporting the process by providing coordination at national level and encouraging dialogue at international level. Ultimately, though, only the market participants themselves can ensure a successful transition. It is thus critical that they become involved, keep themselves informed about the working group's recommendations, and put them into practice. Participation in the working group is open to all those operating in

the market. I should add that an information session on the working group's latest activities and on future challenges will be taking place tomorrow in Geneva.⁷

Before finishing, I would like to emphasise that the SNB retains its ability to steer interest rates even without the Libor. For instance, it is currently doing so by means of the negative interest rate on the sight deposits which the banks hold at the SNB. The disappearance of the Libor or the transition to another interest rate would change nothing in that respect. To date, in order to implement its monetary policy, the SNB has allowed the three-month Swiss franc Libor to fluctuate within a range. Obviously, this element of its strategy will have to change. The SNB will announce the requisite changes in due course.

Conclusion

Ladies and Gentlemen, to conclude:

We have seen that, ten years on from the crisis, central banks' basic mission has not fundamentally changed. However, the environment in which they operate has evolved and continues to do so. For this reason, it is essential that the SNB has a precise understanding of the changes it faces, and adapts itself in response, in order to ensure the continued and optimal fulfilment of its mandate.

To date, the SNB has been able to rely on a sound strategy and on the skills and state-of-the-art technologies that allow it to remain agile in a constantly changing world. I am convinced that it will continue to do so in the future.

Thank you for your attention.

⁷ Information on the working group, including updates on outstanding issues, is available at www.snb.ch/en/ifor/finmkt/fnmkt_benchm/id/finmkt_reformrates.

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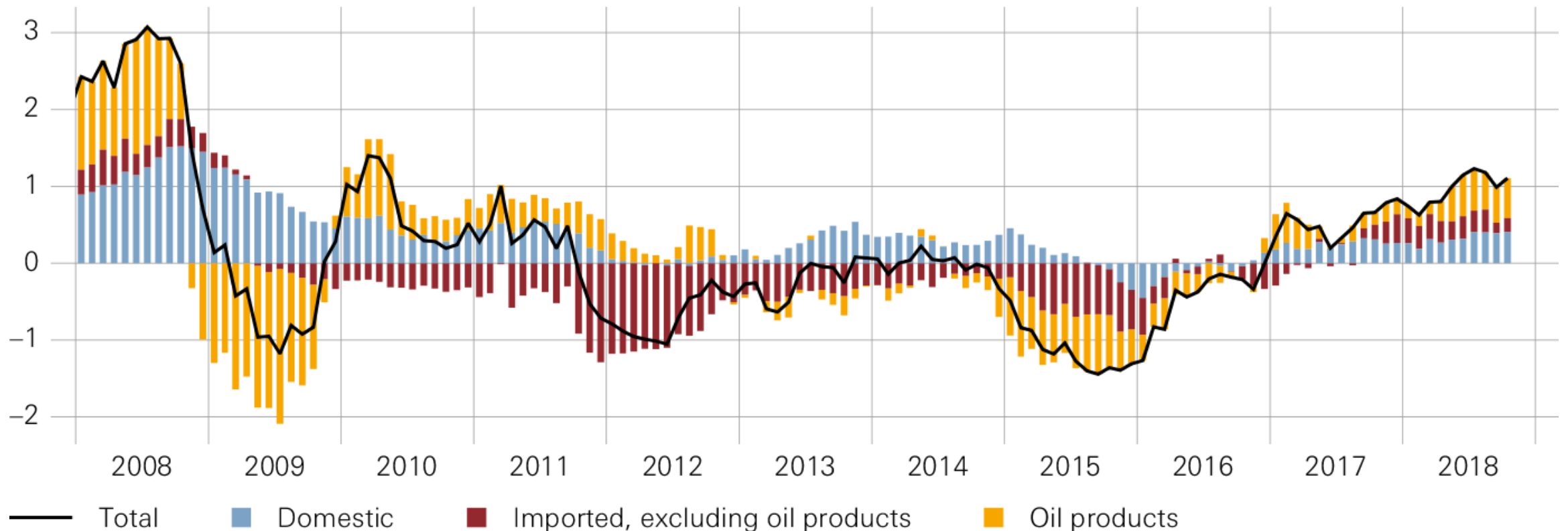
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BANQUE NATIONALE SUISSE
BANCA NAZIONALE SVIZZERA
BANCA NAZIUNALA SVIZRA
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After the crisis, inflation in Switzerland remained subdued due to low oil prices and strong appreciation of the CHF

CPI: DOMESTIC AND IMPORTED GOODS AND SERVICES

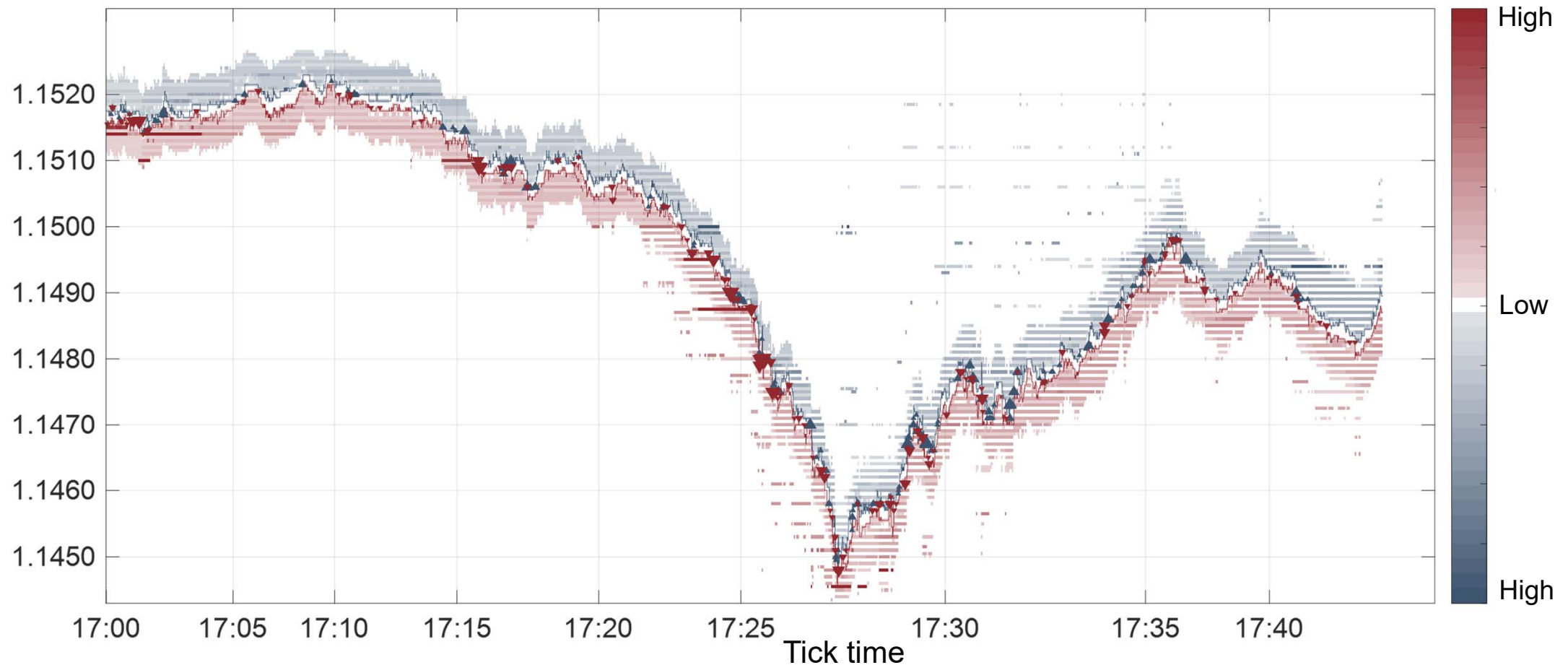
Year-on-year change in CPI in percent. Contribution of individual components, in percentage points.



Sources: FSO, SNB.

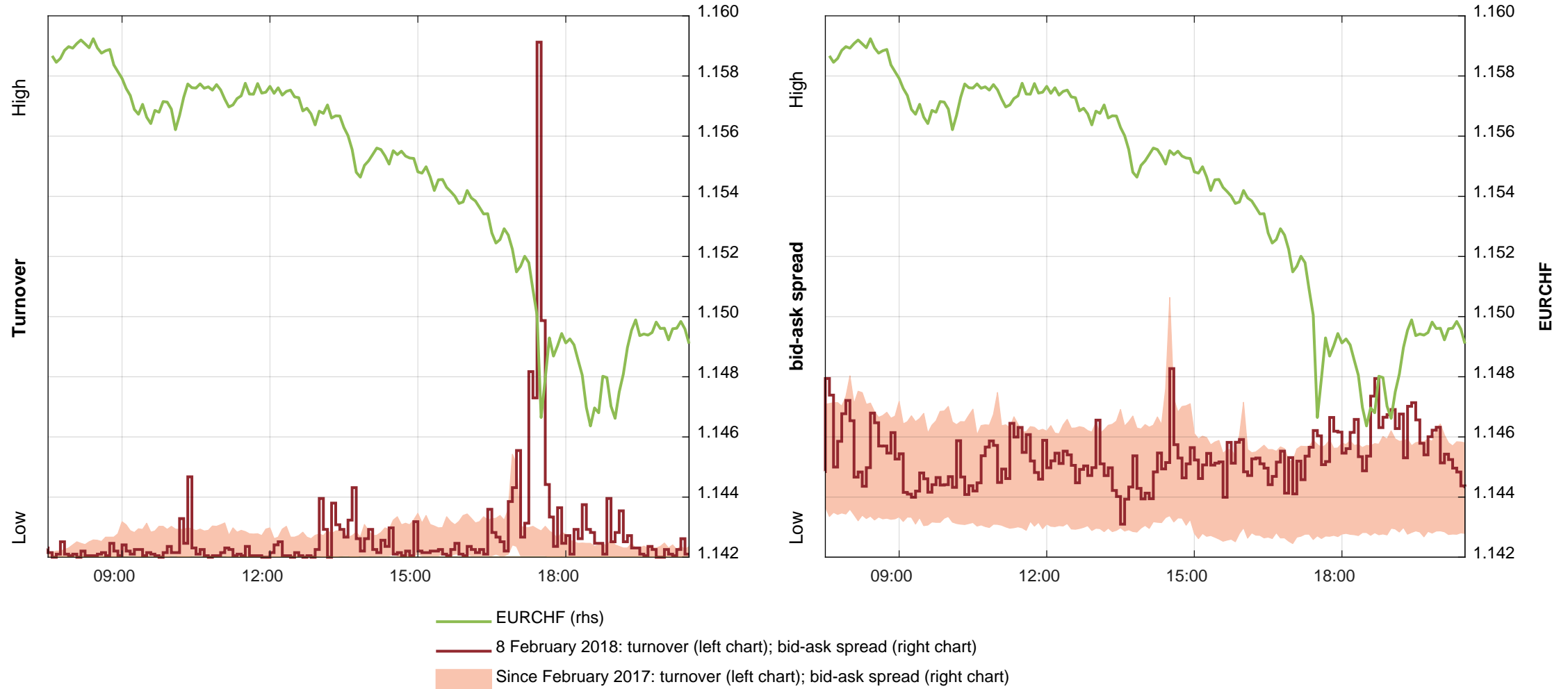
The SNB monitors the microstructure of the market in real time using high-frequency data

EURCHF exchange rate and order book on 8 February 2018



Source: SNB.

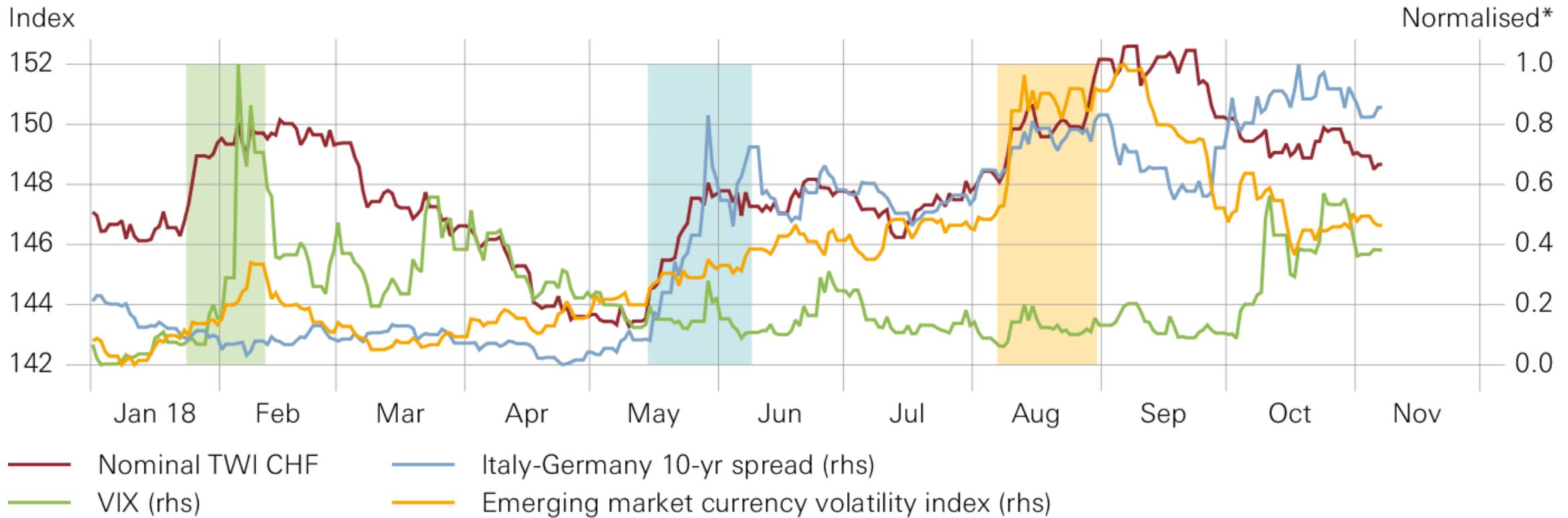
Unusually high trading activity for the EURCHF pair between 17:00 and 17:30, but robust liquidity conditions



Source: SNB.

Since the beginning of the year, various risk-off phases have led to an appreciation of the CHF

SWISS FRANC EXCHANGE RATE FRAGILITY AND RISK-OFF EPISODES

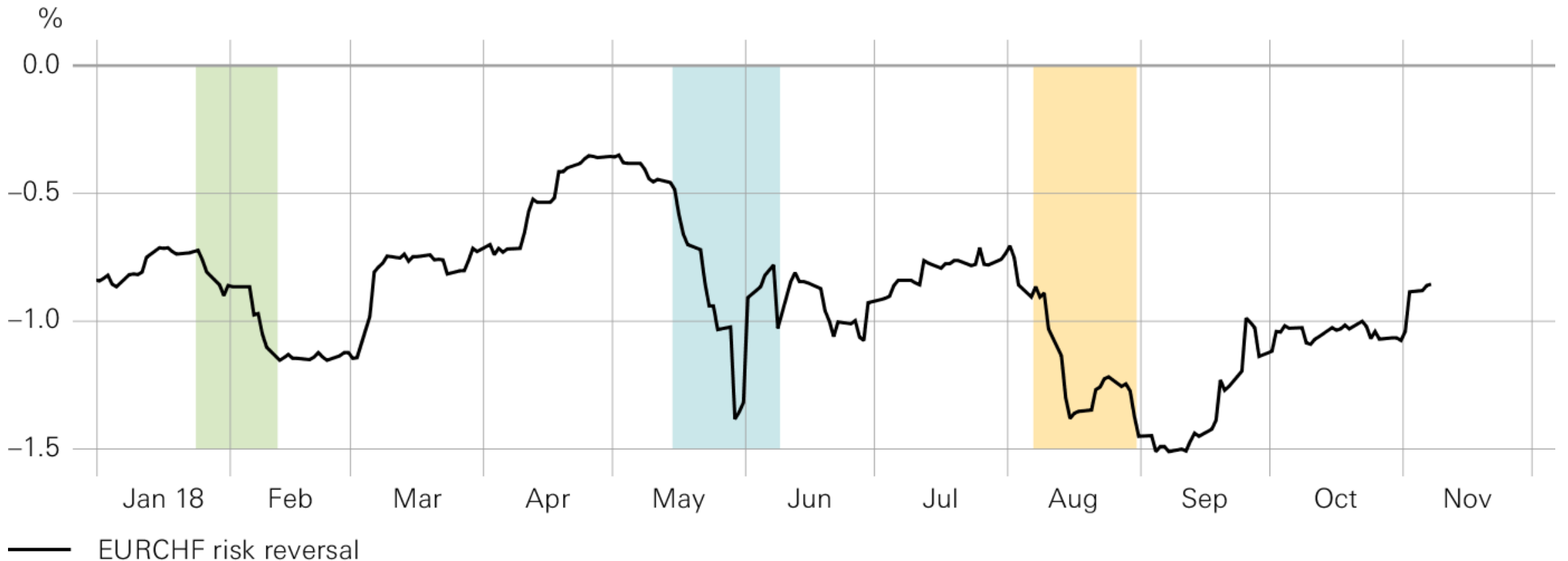


* 0 represents the lowest observed value since the beginning of the year and 1 the highest observed value.

Sources: Bloomberg, JP Morgan, SNB.

Options market reflects the fragility on the foreign exchange market

3-MONTH RISK REVERSAL



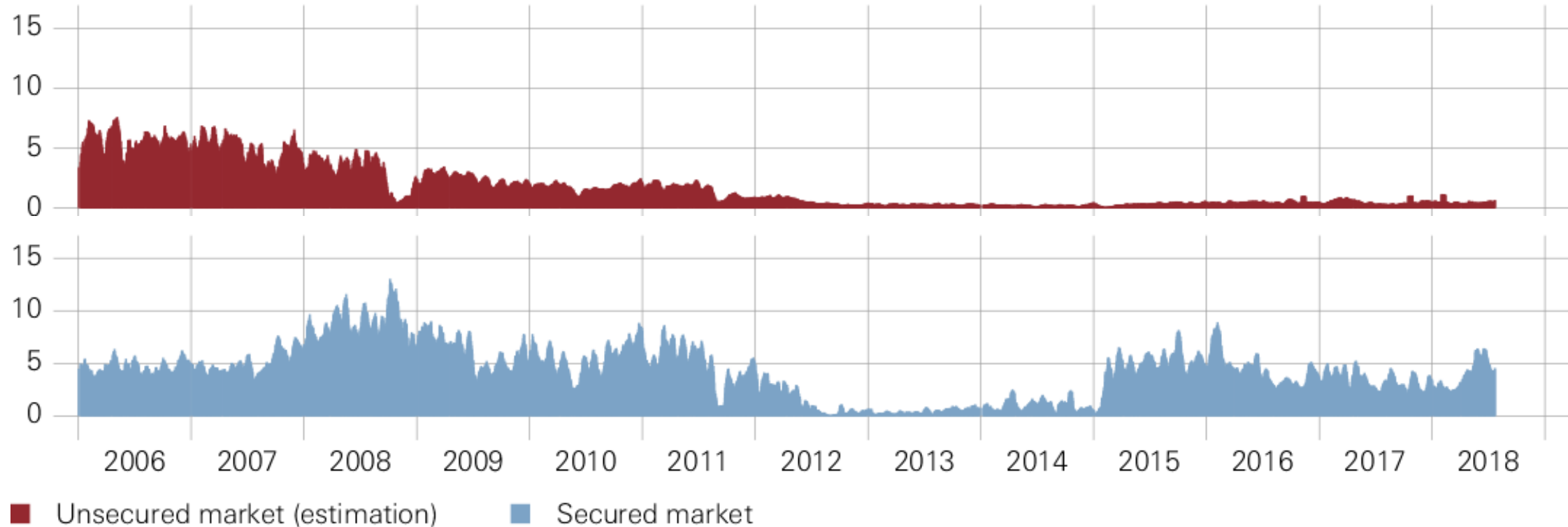
Sources: Bloomberg, SNB.

Unsecured transactions have practically disappeared in favour of secured transactions

SHIFT FROM UNSECURED TO SECURED MONEY MARKET

14-day moving average; turnover day-to-day money

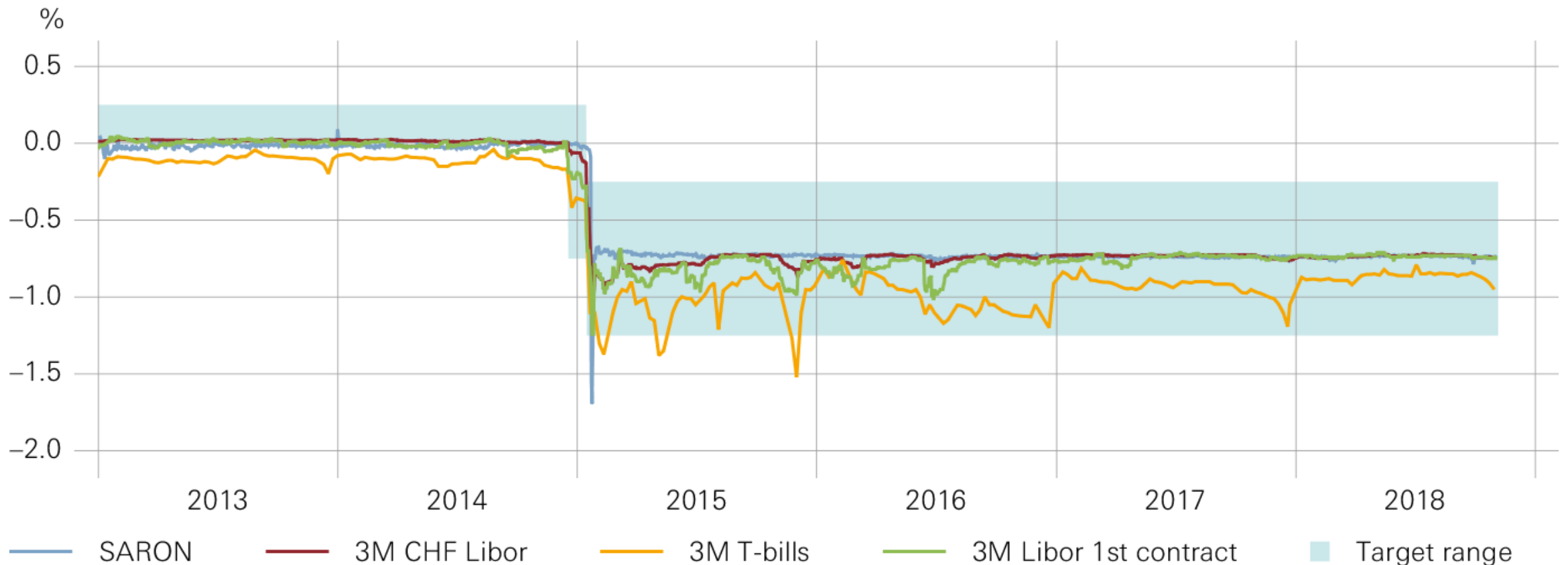
In CHF billions



Sources: SIC, SSX, SNB.

Efficient monetary policy transmission, even with a low volume of transactions

CHF MONEY MARKET INTEREST RATES



Sources: Bloomberg, SNB.