

**Speech**

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## **Implementation of monetary policy in turbulent times**

### Money Market Event

**Dewet Moser**

Alternate Member of the Governing Board\*

Swiss National Bank

Zurich, 31 March 2016

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\* The speaker would like to thank Severin Bernhard, Lucas Fuhrer, Basil Guggenheim, Carolin Hecht, Peter Kuster und Barbara Stahel for their support in preparing this speech.

Ladies and Gentlemen

For my own part, it is also a great pleasure to welcome you to the SNB's traditional Money Market Event here in Zurich. The title of the speech I will give today is 'Implementing monetary policy in turbulent times'. Perhaps you still recall our event of last year. The speech I presented on that occasion was titled 'A new chapter in monetary policy implementation', an allusion to the discontinuation of the minimum exchange rate against the euro on 15 January 2015. This decision has continued to affect the economy, the public and the financial markets to this day. Those were also turbulent times for the SNB: in order to be able to fulfil its mandate in a changed environment, it had to redirect the implementation of its monetary policy. A few weeks ago, at our most recent monetary policy assessment, we reaffirmed our commitment to the path we have chosen since then: we will continue to charge a negative interest rate on sight deposits, and will remain active in the foreign exchange market in order to influence exchange rate developments where necessary. The Swiss franc remains significantly overvalued.

We know that, despite the depreciation of the Swiss franc in recent months, its current relationship to the euro presents a challenge to the Swiss economy. Thus from today's vantage point, should the SNB have continued to adhere to the minimum exchange rate? My concise answer is no, and I would like to illustrate it using **slide 1**. When the minimum exchange rate was discontinued, the SNB pointed to the fact that 'divergences between the monetary policies of the major currency areas' – in other words, the euro area and the US – had increased significantly, and would become even more pronounced. The chart therefore shows the development of the trade-weighted euro in red and the US dollar in blue – and excludes the Swiss franc and thus also the effect of discontinuing the minimum exchange rate. From mid-2014 onwards, the paths of the two most important international currencies diverge. To date, the gulf between the weaker euro and the stronger US dollar has not narrowed, and certainly not closed.

### **Adhering to the minimum exchange rate – not a viable option, even ex post**

What can we learn from this chart about the scale of the interventions needed to continue enforcing the minimum exchange rate, come what may? At the beginning of 2015, we had to purchase foreign currency on a large scale in order to defend the minimum exchange rate. Thus the lion's share of last year's total foreign currency purchases of CHF 86 billion was recorded in January. After the minimum exchange rate was discontinued, the euro and the US dollar continued to diverge further. Of course, it would be presumptuous for anybody to claim to know the amount the SNB would have required to continue enforcing the minimum exchange rate. However, the reddish area between the two curves, and the red arrows, each of which shows renewed downward pressure on the euro, strongly suggest that the SNB would have been forced to use ever increasing amounts to defend the minimum exchange rate of CHF 1.20 per euro. Without our decision, the US dollar would at times have cost almost

CHF 1.15 and on average around 10 centimes more than the actual exchange rate. A further aggravation would have been a purely technical Swiss franc demand: When the euro/Swiss franc exchange rate was very close to the minimum exchange rate, it became attractive to sell euros against US dollars via Swiss francs because the euro/Swiss franc exchange rate could no longer move. The SNB would have had to absorb this additional selling interest in euro/Swiss francs. Against this backdrop, attempting to defend the minimum exchange rate at any price wouldn't have stood the ghost of a chance. Our balance sheet would have expanded rapidly and uncontrollably, without the prospect of a sustainable stabilisation of the exchange rate situation. The monetary policy benefits of the measure would have been out of all proportion to its costs.

Let us leave this hypothetical scenario and return to reality. You are already familiar with the dashed, dark curve in the chart on **slide 2** which I presented to you in my conclusion a year ago. It shows the average of analysts' forecasts for the trade-weighted Swiss franc in March 2015. We now know that, following its rapid appreciation in recent quarters due to the discontinuation of the minimum exchange rate, the Swiss franc has in fact weakened significantly. The actual performance is shown by the red dotted curve. As you see, the analysts' general consensus of a year ago was quite accurate. Their current expectation, as depicted by the dashed curve in the chart on **slide 3**, is that the Swiss franc will again weaken somewhat. From the SNB's perspective, this is good news, although it would be even better if the trend were more accentuated.

On a further positive note, the weakening of the Swiss franc took place in an environment that was not necessarily the most conducive. In **slide 4**, the trade-weighted Swiss franc is depicted by the red curve, and indexed since our last Money Market Event here in Zurich. The grey area represents the VIX or 'fear index', a measure of the US stock market's expectation of volatility. Despite uncertainty surrounding developments in Greece and China, the oil price, concerns about global growth and fears of a Brexit (shown as dark clouds in the chart), the Swiss franc has continued to weaken. An important prerequisite for this has been the return to orderly market conditions.

## **Foreign exchange market – return to orderly conditions**

**Slide 5** shows two key indicators of market quality. The upper section depicts the bid-ask spreads for the two most important Swiss franc currency pairs, namely euro/Swiss franc and US dollar/Swiss franc, as well as – for comparative purposes – euro/US dollar. The lower section shows the corresponding daily trading ranges as a measure of volatility. The grey area is the period during which the minimum exchange rate was in place. The narrower the bid-ask spreads and the narrower the trading ranges, the lower the transaction costs. Generally, the market quality in the relevant currency pair is thereby raised. The reason why both indicators for the Swiss franc pairs fell to such low values before the discontinuation of the minimum exchange rate is easily explained. Euro sellers were, in a manner of speaking, queuing up at the SNB, since it was providing the market with unlimited quantities of Swiss francs around

the clock. The minimum exchange rate, originally intended as an instrument for appropriate monetary conditions and guidance to the foreign exchange market, looked like becoming its cosy armchair. The decision on 15 January 2015 caused both bid-ask spreads and volatility to soar, resulting in a dramatic deterioration in market quality. This was due to the fact that the market needed time to adjust to the new conditions. The market makers widened bid-ask spreads due to the high volatility, and other professional participants also had to adapt their models to the new monetary relations. The prevalent uncertainty caused clients to refrain from placing new orders, and the Swiss franc's sudden drop greatly strained the risk budgets of many market participants. Low market quality means higher transaction costs. However, it also disrupts the price adjustment process, i.e. it takes longer for the market to absorb a transaction. It can be interpreted as a good sign that this condition did not persist for long, as evidenced by further developments in both our market quality indicators. The return to orderly market conditions helped to ensure that market participants would resume activities on the market and the Swiss franc would depreciate, despite many uncertainties. In such an environment, the twin pillars of our current monetary policy, namely negative interest and foreign exchange market interventions, were also able to take effect. From a monetary policy perspective, it is thus clear that the SNB still has a vital interest in the smooth functioning of the foreign exchange market.

Let us return now to the price adjustment process, and examine it somewhat more closely. Every transaction sends the market a signal in terms of price and transaction volume. Market participants receive this information, process it and adjust their orders accordingly. This gradual process leads finally to a new short-term equilibrium, until the market receives further information. The price adjustment can be analysed via the bid-ask spread. A single transaction can disrupt the best bid and ask prices. While the market processes this signal, the bid-ask spread slowly narrows, until it is back to its original level. The signal is evaluated, and the rate is again in equilibrium.

Of course, this price adjustment process is not always identical, since it depends on the individual condition and mood of the market. In **slide 6**, we see that, for each transaction in the euro/Swiss franc and US dollar/Swiss franc currency pairs, the extent to which the bid-ask spread widens and the time in which it narrows again depends on the time period in question. The flat grey curve shows the period before the discontinuation of the minimum exchange rate, when a transaction had hardly any measurable effect on the bid-ask spread. This was due to the substantial upward pressure on the Swiss franc, which, as you know, the SNB absorbed. In the days shortly after the discontinuation, liquidity almost dried up. The red hump-shaped curve shows what a substantial effect a single transaction had, as a result of this situation. At the same time, the broad red band signals the substantial exchange rate movements due to the high level of uncertainty on the market. Since then, the price adjustment process has normalised, as shown by the significantly flatter blue curve. The market is again processing transactions better, and quickly returning to equilibrium. The absorption capacity of the market has thus increased significantly. What is behind this?

The driver is market quality. **Slide 7** again illustrates the development of the bid-ask spread following a Swiss franc transaction. However, this time the curves and the bands around them relate to order books with differing volumes, rather than different time periods, as previously. The bid-ask spread reacts less strongly when the quoted volume, and therefore liquidity, is higher – which is also intuitively plausible. Thus the more crowded the order book and/or the better the market conditions, the lower the transaction costs.

### **Ongoing monitoring of foreign currency trading necessary**

The fact that the market has largely normalised with respect to both the euro/Swiss franc and the US dollar/Swiss franc currency pairs does not, however, mean that the SNB can rest on its laurels. The market is no one-way street. It is still capricious, and its mood can turn quickly. Or to put it technically: market conditions can change fundamentally within a few seconds, and they do not always move in a direction that might have been expected. **Slide 8** again shows the bid-ask spread in euro/Swiss francs, but this time not as the familiar curve. Each circle represents a trading day, and the larger and darker the circle, the more marked the jumps in the exchange rate on that day. The obvious assumption that exchange rate jumps should be restrained when the bid-ask spread is narrow, and therefore market quality good, is not confirmed. Reality shows that disruptions can also occur on days when the spread is narrow. For our monetary policy, the external value of the Swiss franc is a key parameter. Therefore we have to thoroughly analyse such phenomena on the foreign exchange market and draw the correct conclusions for implementation.

Since market conditions can change with lightning speed, we monitor foreign currency trading on an ongoing basis using appropriate technological resources. In **slide 9**, the visualisation of the order book in euro/Swiss francs, i.e. the buying and selling interest, is an example of this. The three dimensions are exchange rate, time and quoted volume in the order book. The colours relate to the volumes. Low volumes are dark blue, high volumes dark red. The ‘peaks’ on the left side represent the bid prices, and those on the right the ask prices. Our example shows instances of sudden increases in selling interest in the euro/Swiss franc rate. Shortly thereafter, the traded price, lying in the valley between the two peaks, also falls.

### **The SNB remains agile and alert with regard to the market and technology**

The pace of foreign exchange trading has accelerated greatly in recent years. This is partly due to structural changes. The proportion of the volume that is transacted via electronic trading platforms has increased across all currencies. A survey by the Bank for International Settlements indicates that, between 2010 and 2013, this proportion rose from 55% to 64%, and the trend is likely to have persisted since then. The currency pairs of special interest to the SNB in terms of implementing monetary policy are no exception.

Thus we live in turbulent times, in terms of events on the foreign exchange market, but also with a view to structure and technology. Structural and technological changes are difficult to predict. For us at the SNB, just as for market participants, it is vital to remain agile and alert, and not merely out of professional curiosity. We must keep our knowledge and infrastructure up to date and optimised, so as not to be taken unawares by market developments.

The market moves swiftly and liquidity is fickle. Market participants are extremely flexible and, in relation to pricing, incredibly quick to react. The chart on **slide 10** shows the euro/US dollar market. The bars on the right side represent the quoted volumes in the order book. Orders are constantly being placed, adjusted and suspended. This continually changes the best bid and ask prices, as displayed on the left side of the chart. The red dots represent selling transactions. Taking advantage of these extremely rapid changes to obtain the best possible price and enter the market at the exact moment when the transaction will be particularly well absorbed requires specific hardware, software and algorithms.

Of course, technological development is important not just for the foreign exchange market. **Slide 11** shows the new face of the Swiss money market, i.e. the latest user interface for the money market infrastructure. In 2014, the SIX trading platform by SIX Repo Ltd went into operation. Since then, it has been extensively redeveloped. A month ago, the new platform was launched. The transition went smoothly, thanks to the thorough preparation of all parties involved. What are the benefits for you as market participants? The individual links in the proven Swiss value chain for the money market are now even more interconnected and better integrated. Communication between the trading system, on the one hand, and the settlement and payment system, on the other, has been improved. This lays the foundation for new applications and functionality. In implementing monetary policy, we are dependent on the Swiss franc money market functioning as efficiently as possible, and therefore on a modern, stable infrastructure. We therefore attach great importance to a trading platform that remains attractive in the long term.

### **Exemption threshold trading reviving the repo market**

As you know, the financial system is oversupplied with liquidity as a result of large-scale foreign currency purchases by the SNB. On the one hand, this liquidity pressure is helping to weaken the Swiss franc. On the other, it has led to a reduced requirement for liquidity, which has considerably slowed trading on the repo market. The introduction of negative interest on 22 January 2015 has, however, prompted a revival, as shown in **slide 12**. As measured against the left-hand scale, the blue bars represent average daily turnover from 2000–2007, in the peak year of 2008 (when the need for liquidity was exceptionally high due to the financial crisis), in 2014 and 2015, and finally in March 2016 on the new platform. Turnover, which is represented in the chart as the sum of all tenors, rose significantly following the introduction of negative interest. Most trades fall into the very short-tenor category (overnight). The black ‘candlesticks’ indicate the range of overnight repo rates and the grey ‘saucers’ depict the area representative of 50% of transactions. These values are shown on the right-hand scale and are

in negative territory. Since the introduction of negative interest, the candlesticks are very short and the saucers thin, which indicates stable market conditions. The repo rate is based on the interest on sight deposits of  $-0.75\%$ . The data for March suggests that the transition to the totally refurbished platform has not disrupted normal business.

Strictly speaking, the revival of the repo market has more to do with exemption thresholds than negative interest itself. As you are aware, we grant each account holder an individual exemption threshold, below which negative interest is not charged. I will come back to the design of negative interest and the calculation of the exemption threshold later. **Slide 13** illustrates the elements relevant to the repo market. Turnover on the repo market is plotted upwards from the cash provider's perspective and downwards from the cash taker's perspective. The dark red area is the volume of cash providers who have used up their exemption threshold and are reducing liquidity via the repo market. The dark blue area represents the turnover of cash takers who have not yet used up their exemption thresholds, which they manage via the repo market by absorbing liquidity. The repo market therefore continues to be an important instrument for optimal liquidity distribution.

## **Negative interest as an international phenomenon – the Swiss model**

I have spoken quite extensively about structural and technological changes on the foreign exchange market and about the new platform and developments on the money market. With all due respect for technological innovation, when all is said and done, it is just a means to an end. The primary focus for the SNB is ultimately its mandate. We are obliged to implement our monetary policy to enable us to fulfil our mandate in good conscience and to the best of our ability. It is not just the financial markets that are changing; the economy, both domestic and global, is undergoing a transformation. Against this backdrop, we are continuously reviewing our monetary policy and adapting it as necessary. For a while now, we have had to resort to unconventional monetary policy measures to fulfil our mandate in a very unusual international environment.

An important component of this environment is of course the steady downward trend in interest rates. **Slide 14** shows the key rates of selected central banks. With the exception of the US Federal Reserve, all central banks have lowered money market interest rates into negative territory and the trend is still downwards. The SNB is thus by no means the only central bank to go below the zero bound. The European Central Bank lowered its deposit rate into negative territory back in 2014. The key rate in Denmark has also been negative since 2014. Sweden has been using this instrument since 2015. Finally, the Bank of Japan introduced negative interest at the beginning of this year. Since it can have slightly different monetary policy motivations and every central bank considers the structure of its own financial system, the design of negative interest can vary between currency areas.

Let me now return to the current implementation of our monetary policy. As promised, I will talk in more detail about negative interest, which is being used to restore, at least partially, the

traditional interest rate differential against other countries. We are pursuing a rule-based, across-the-board approach with negative interest. Rule-based means that it is calculated for domestic banks over a specified period on the basis of the individual minimum reserve requirement. You will recall that the minimum reserve refers to banks' short-term liabilities, that is to the liabilities side of the banks' balance sheet. And across-the-board in the sense that all sight deposit account holders are subject to negative interest – with the exception of the central Federal Administration and the social security compensation funds for old age and survivors' insurance, disability insurance and the fund for loss of earned income.

However, negative interest does not have the same effect on all bank categories due to their different balance sheet structures. In the left-hand chart on **slide 15**, the minimum reserve requirement for three categories (big banks, cantonal banks and other banks) is multiplied by 20. Even though the curves shift somewhat over the period from 2005 to the beginning of 2015, two things are clear. First, based on the structure of the liabilities side, there are differences between the bank categories in the relative importance of minimum reserves. They are somewhat less important for the big banks than for the other categories. Second, the relative importance of minimum reserves over time remains quite stable.

The right-hand chart illustrates the sight deposits held at the SNB by the same three categories over the same period. As an asset item from the banks' perspective, they are shown in relation to the balance sheet. Here there is more momentum over time. The general rise is attributable to liquidity expansion caused by the SNB's monetary policy. Big banks hold relatively few sight deposits compared with the other banks category, with the latter holding 20% of the balance sheet at the end of 2015. What can we conclude from this? In the one chart, the exemption thresholds for all bank categories lie in a relatively narrow range. The other chart reveals the considerable differences in the propensity to hold sight deposits. It is particularly noticeable that the other banks had built up substantial sight deposits a few years before the introduction of negative interest and as a result were exhausting their exemption thresholds from the very start in January 2015. The overall conclusion must be that our method for calculating exemption thresholds is as fair as it can be.

Negative interest and foreign exchange market interventions, the two pillars of our current monetary policy, are complementary and mutually reinforcing. The SNB has set relatively generous exemption thresholds for domestic banks on the basis of 20 times the minimum reserve requirement over a specified period. Yet today, total sight deposits are well above the sum of the maximum possible exemption thresholds as you can see in **slide 16**. The process of equalisation via the money market has led to almost all banks actually using up their exemption thresholds. In other words, no additional Swiss francs created through foreign currency purchases can escape negative interest. The SNB has applied negative interest in such a way that the instrument has the desired broad monetary policy effect. Negative interest is based on clear, comprehensible rules and is applied across the board, thereby taking due account of the principle of equal treatment.



## **Reform of reference rates: Good things take time**

Before I make my closing remarks, I would like to turn briefly to the subject of reference interest rate reform as illustrated in **slide 17**. Negative interest aside, there is still a strong need for representative and reliable benchmarks. Manipulations of the Libor in various currencies came to light in 2012. Since then, the SNB has been actively involved in reform efforts at a national and international level. As far as the international sphere is concerned, it is clear that reform is a complex issue, and unfortunately we have no sword with which to cut the Gordian knot. But we have at least set some milestones. This year the Financial Stability Board, which is responsible for international coordination of efforts in this regard, will compile a report on the implementation of the recommendations it made in 2014. And the Libor administrator has put forward a series of reform proposals, which are aimed, among other things, at standardising interest rate notifications by Libor panel banks and basing the calculation of the Libor more firmly on transactions. These proposals also relate to the three-month Swiss franc Libor, which is the SNB's reference interest rate. They are to be implemented this year. In addition, the EU has almost finalised the new regulations on benchmarks for the financial markets, and in the US, UK and Japan, reform efforts are underway to develop alternative reference rates for the Libor.

In 2015, the national working group for the Swiss franc, which includes representatives of the banks and the SNB, reviewed the two key Swiss money market rates in the area of call money, SARON and TOIS fixing, with regard to increasing their use as benchmark interest rates. SARON relates to the secured market segment and TOIS fixing to the unsecured market segment. Since the calculation basis for TOIS fixing is very narrow, the working group recommends focusing efforts on SARON and testing it thoroughly. Furthermore, it is important to consider the practical aspects in a possible transition from TOIS fixing to SARON. The example of reference rate reform at an international level in particular reminds us that, despite the speed of change, there are still areas where good things take time.

In view of the changes in the financial markets, the proverb 'more haste, less speed' could also apply to the implementation of monetary policy. Since a picture is worth a thousand words, let us take a look behind the scenes at the SNB. **Slide 18** shows what our trading room looked like 30 years ago. As you can see, the number one data carrier for all processes was paper. But it is apparent that modern technology was gradually finding its way into traders' daily lives: a Reuters terminal can be seen rotating above their heads for general use, and a telephone trading system and calculating machine is on the table. Nevertheless, the group picture of five men and one woman also reminds us of something that never changes: now as then, the SNB trading room is characterised by a high degree of concentration and commitment. Yet, at the same time, it is impossible to ignore the fact that technology plays a much more prominent role today than in the 80s as you can see in **slide 19**.

## **Closing remarks**

I would now like to come full circle by returning to the start of my presentation. The Swiss franc is still significantly overvalued. It thus remains a key parameter for our monetary policy in the current environment, which means, as I said, that we are prepared at all times to purchase foreign currency, where necessary. Of course, this requires us to monitor developments on the foreign exchange market continuously, in all their dimensions. Achieving an in-depth understanding of market structures and following technological trends as closely as possible pose particular challenges. I hope that, with this small insight into our analytical toolbox, I have succeeded this evening in convincing you that the SNB is doing all it can to meet these substantial and ever-increasing demands.

In the Swiss franc money market, the SNB is working hard to ensure that the infrastructure remains up to date and attractive, even if it has hardly participated in the market itself for quite a while. Having said that, the monetary policy measure of negative interest, which has also been implemented by a number of other central banks, is reviving the repo market.

These are eventful times, and the SNB therefore has to remain flexible. Yet this is only half the story. At the same time, a central bank also has to be extremely firm and persistent when pursuing its policy objectives. Otherwise it risks becoming trapped in the hamster wheel of markets or politics. Now, let me thank you for your attention and invite you to the drinks reception, where you will have the opportunity to demonstrate your agility!

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# Implementing monetary policy in turbulent times

Dewet Moser  
Alternate Member of the Governing Board  
Swiss National Bank

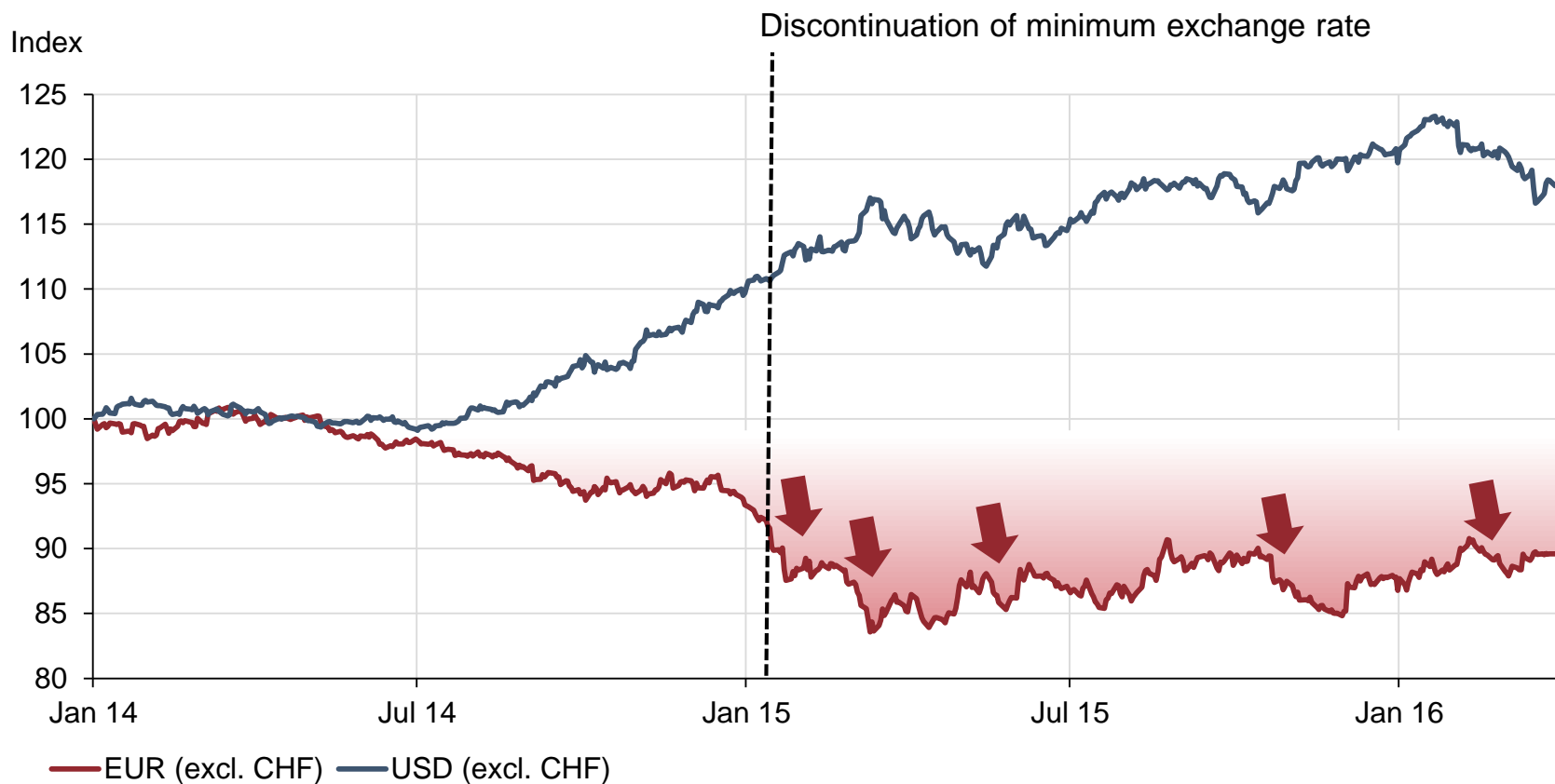
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# One year after discontinuation of minimum exchange rate: renewed weakening of euro

## TRADE-WEIGHTED EURO AND US DOLLAR

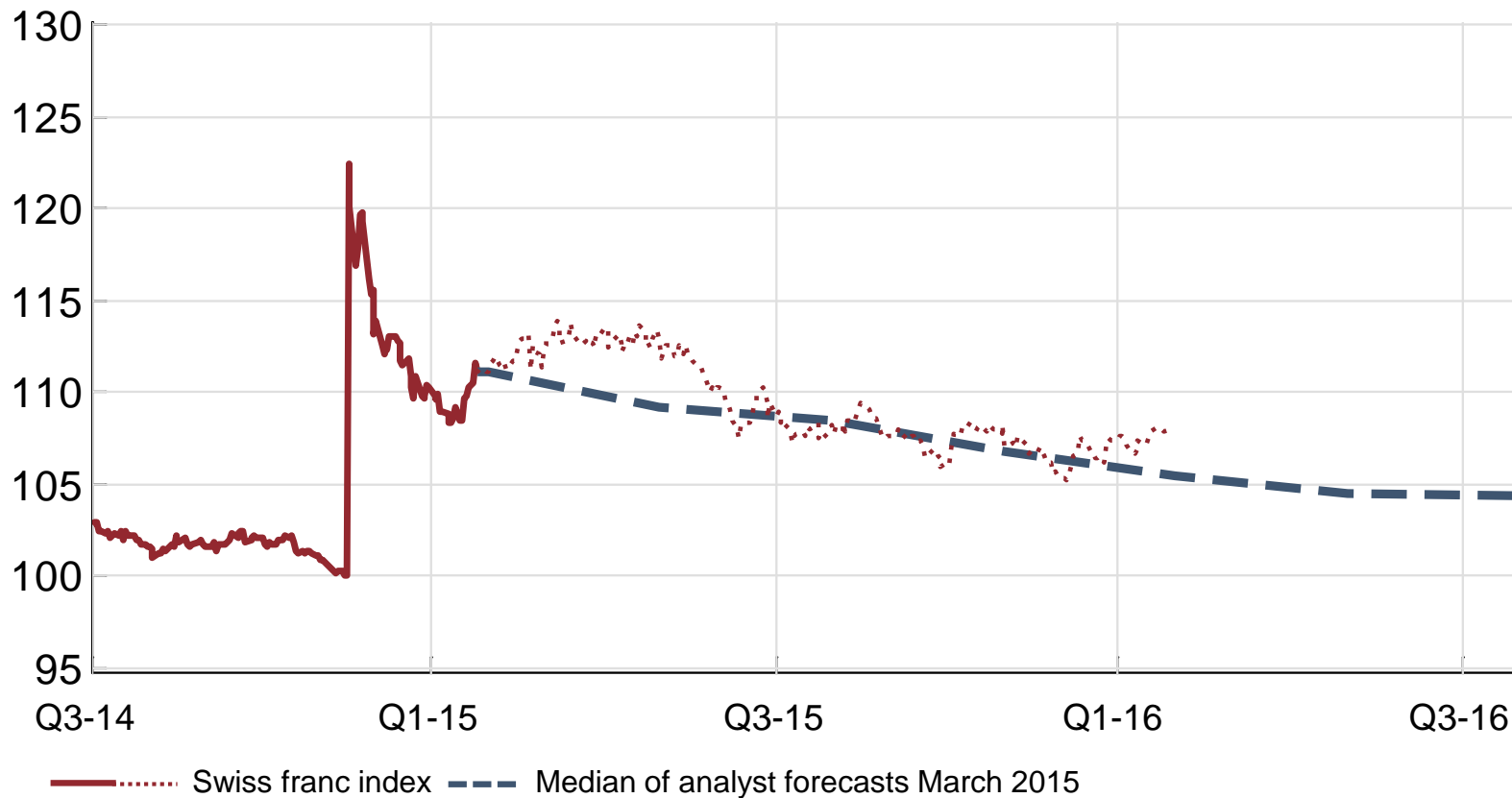


Sources: SNB, Bloomberg

# The Swiss franc has depreciated

## ANALYST FORECASTS FOR TRADE-WEIGHTED SWISS FRANC

Index



Sources: SNB, Bloomberg

# Analysts expect further weakening

## ANALYST FORECASTS FOR TRADE-WEIGHTED SWISS FRANC

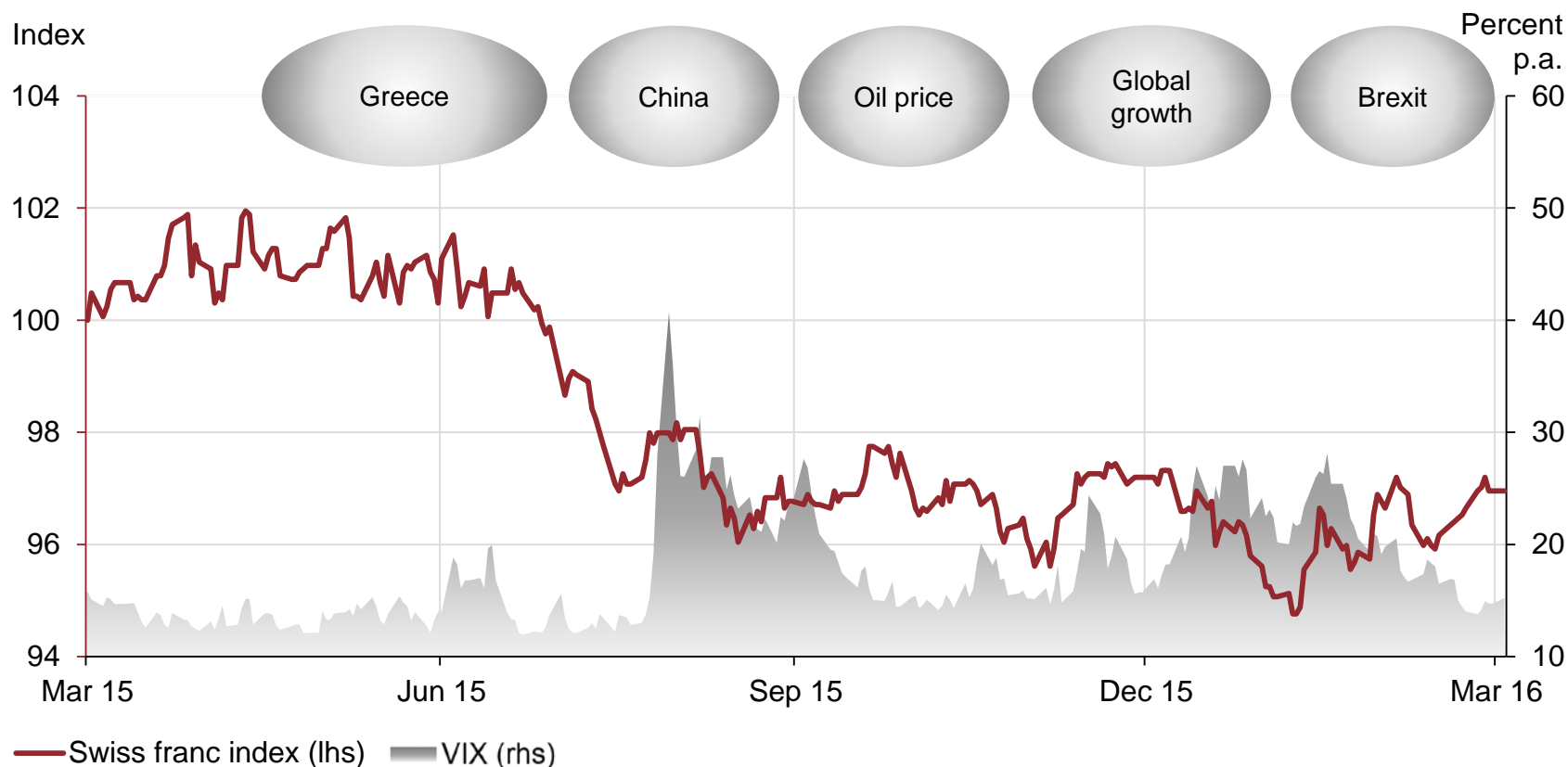
Index



Sources: SNB, Bloomberg

# Depreciation despite challenging market environment

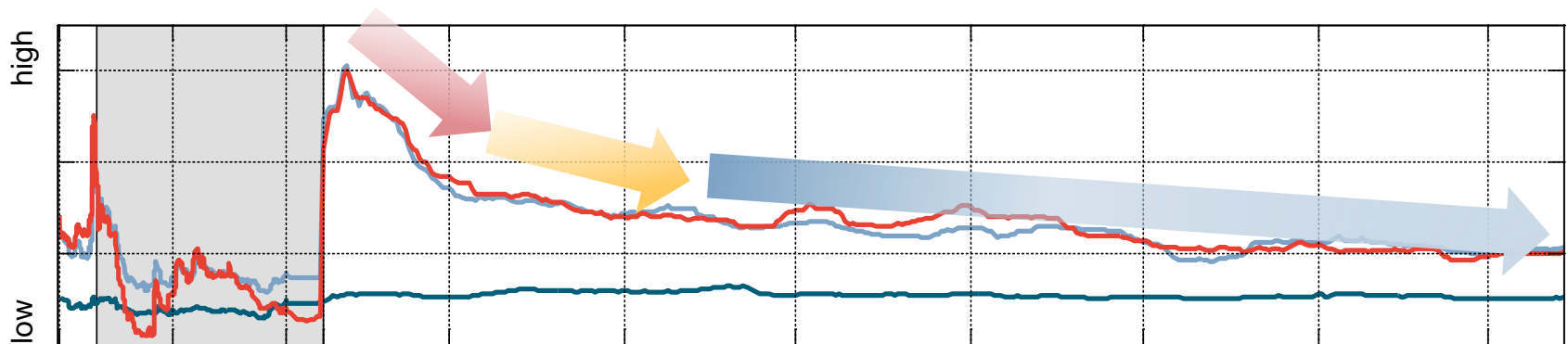
## TRADE-WEIGHTED SWISS FRANC AND RISK MEASURE



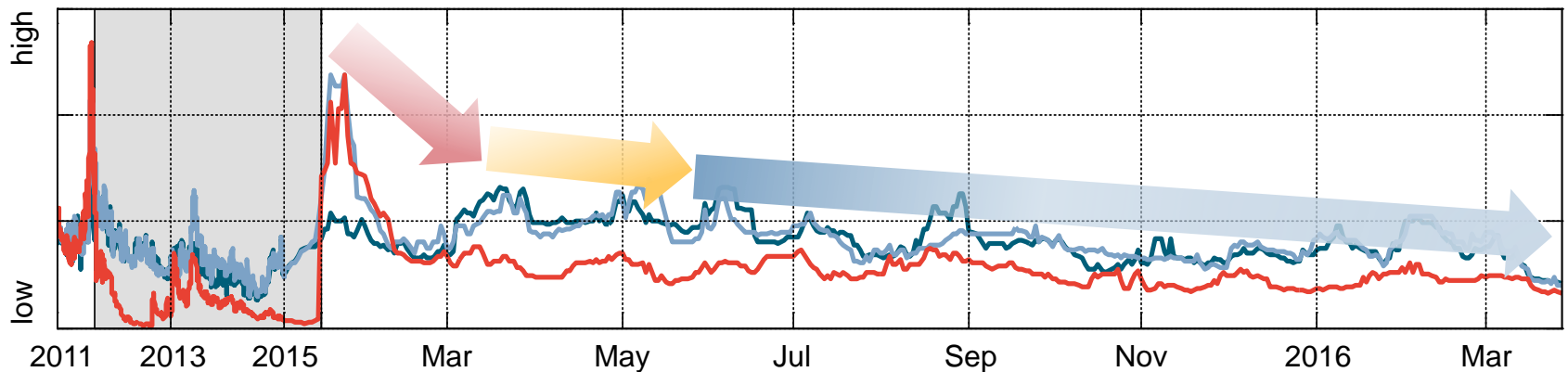
Sources: SNB, Bloomberg

# Market conditions in Swiss francs have normalised ...

## BID-ASK SPREAD



## TRADING RANGE



— EUR/CHF — USD/CHF — EUR/USD

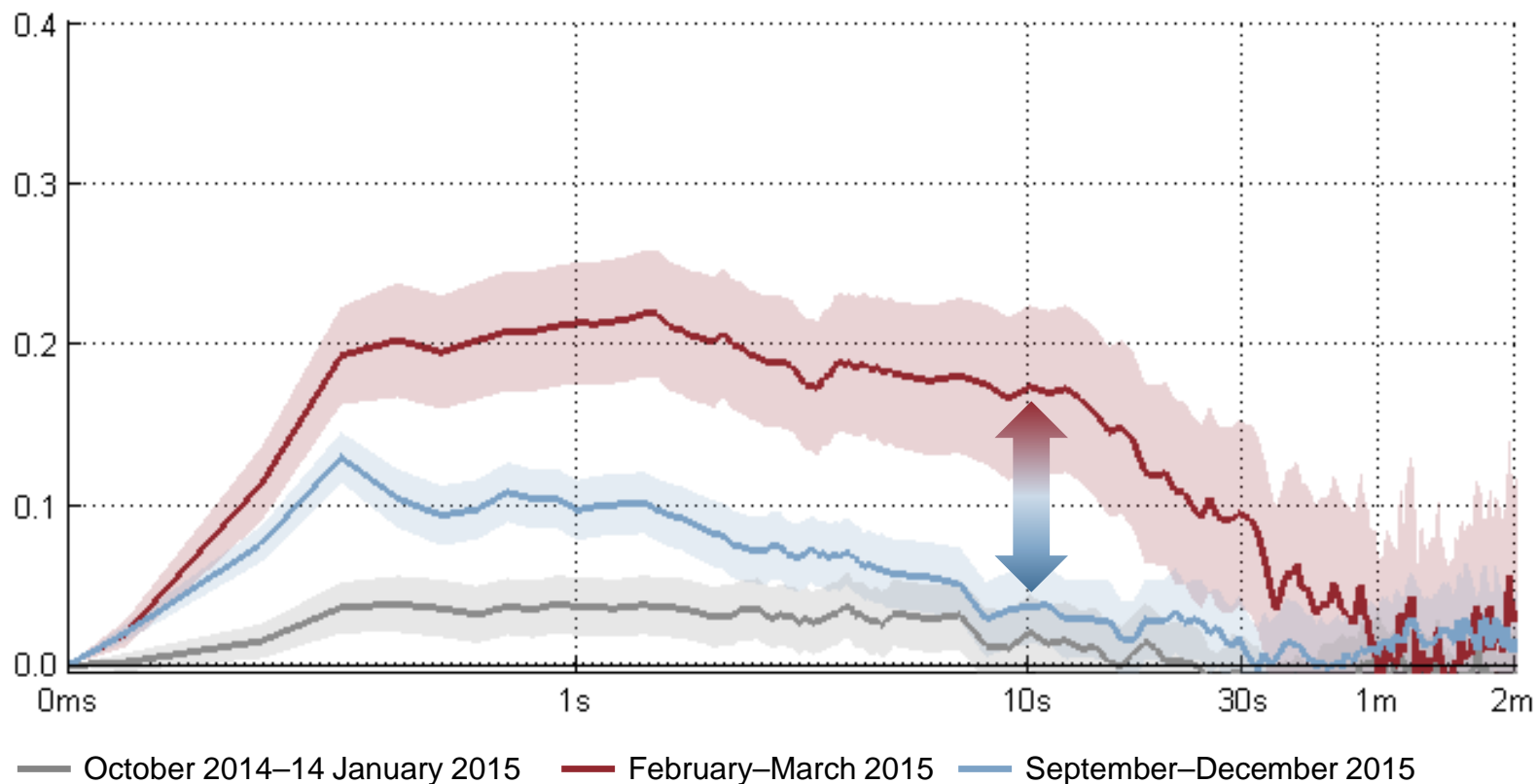
Source: SNB



... as has the price adjustment process

## BID-ASK SPREAD FOLLOWING A SWISS FRANC TRANSACTION

Basis points

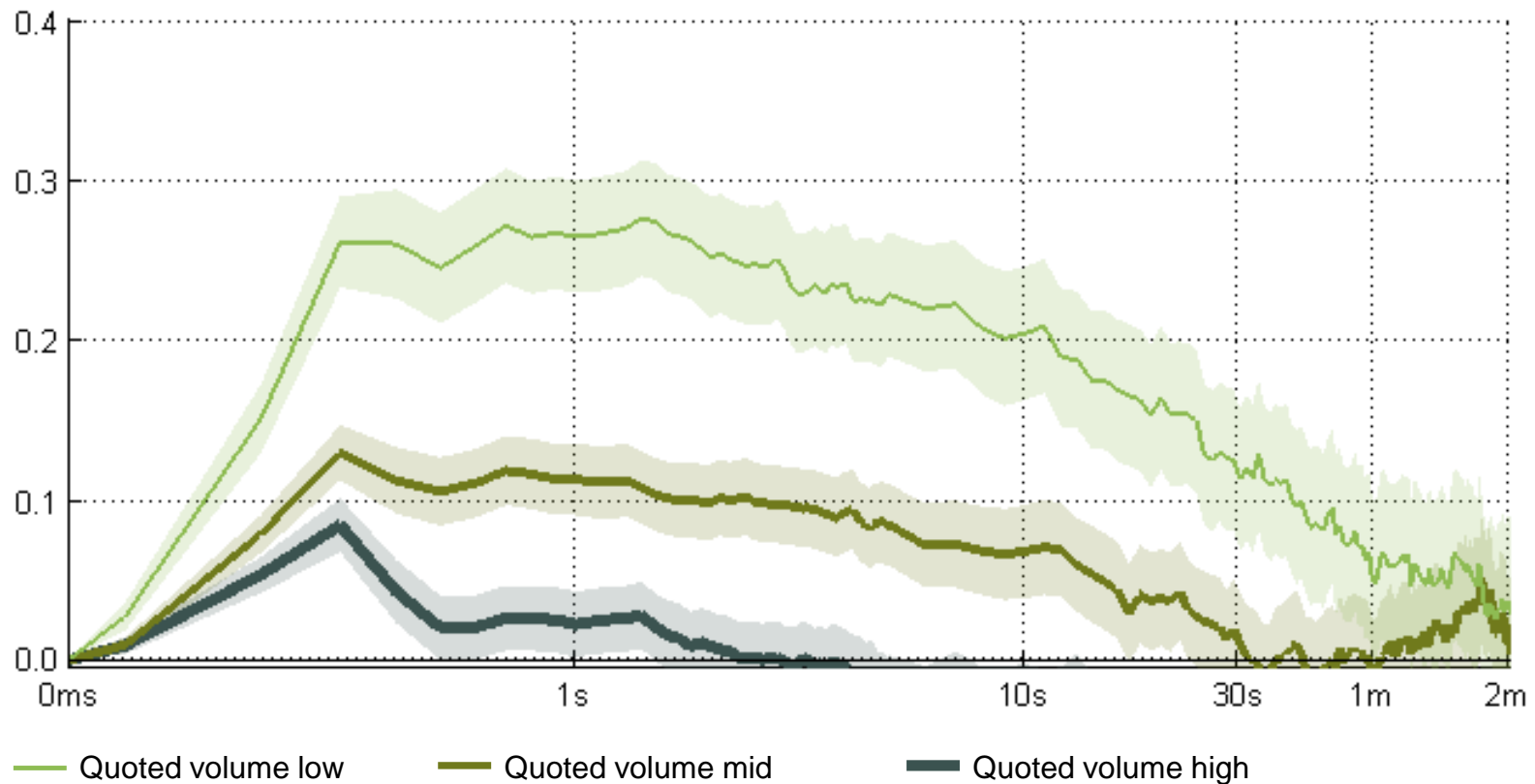


Source: SNB

# A smooth price adjustment process requires stable market conditions

## BID-ASK SPREAD FOLLOWING A SWISS FRANC TRANSACTION

Basis points

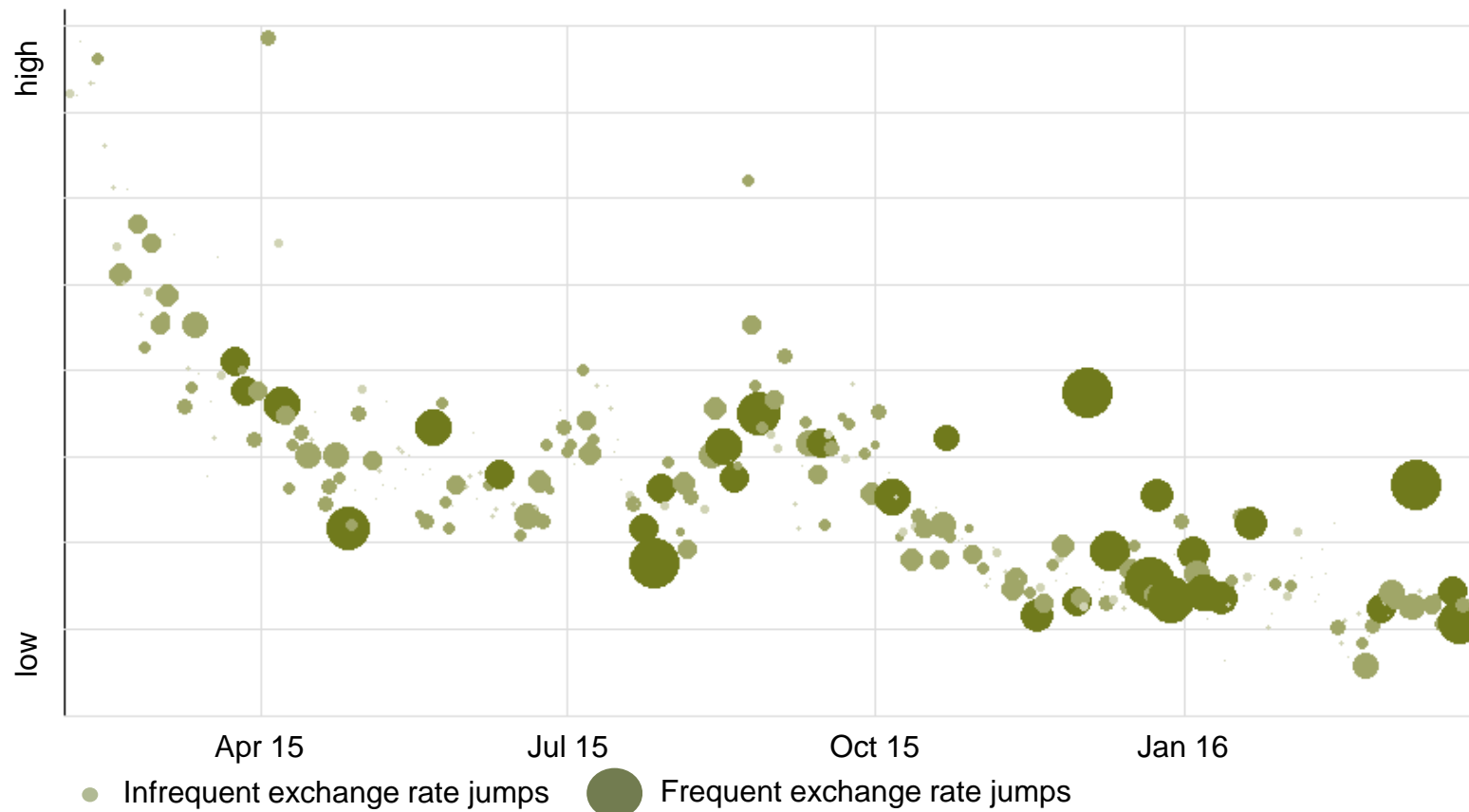


Source: SNB

# Exchange rate jumps are unpredictable

## FREQUENCY OF EXCHANGE RATE JUMPS AND BID-ASK SPREADS IN EUR/CHF

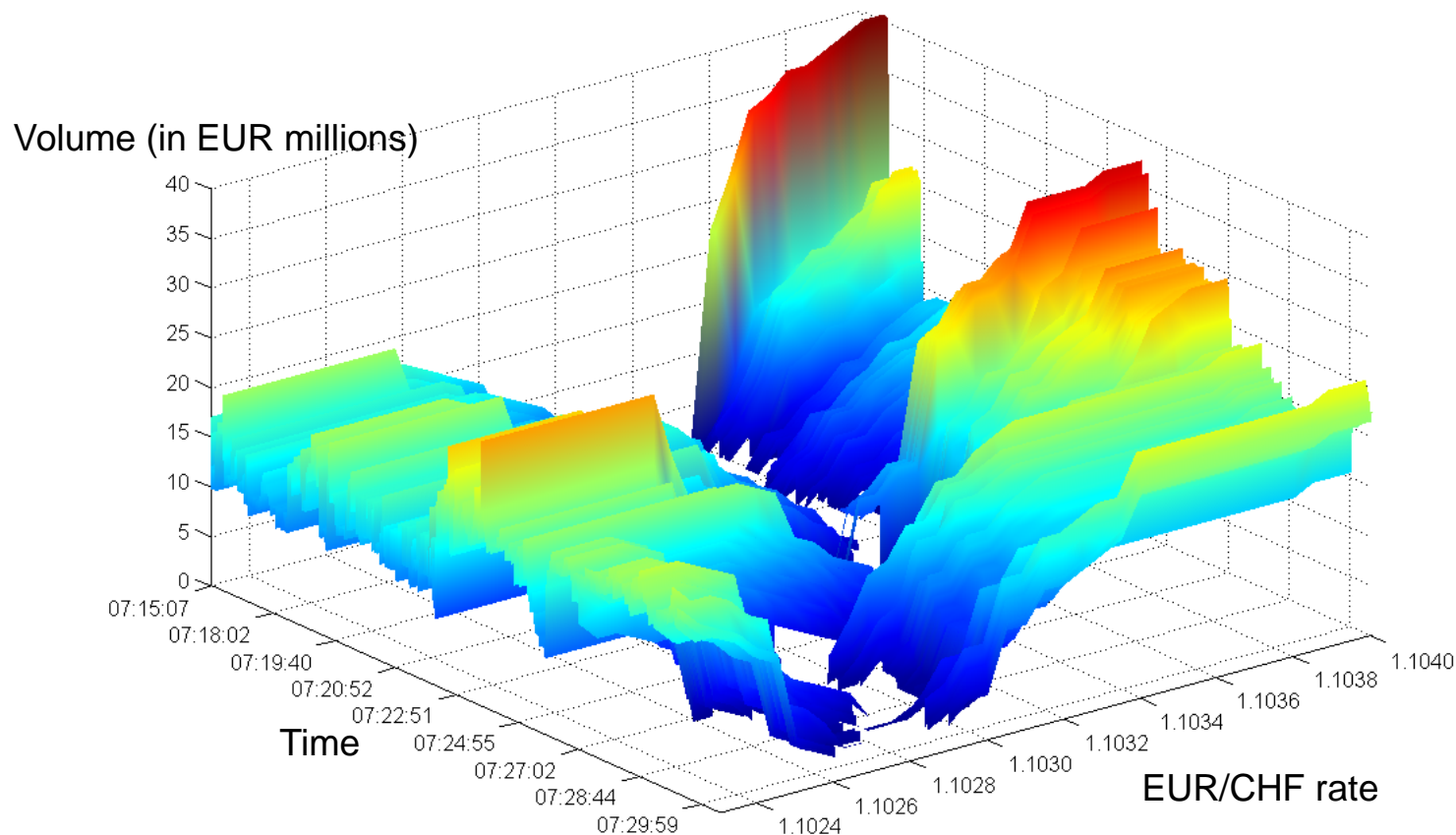
Bid-ask spreads



Source: SNB

# Ongoing monitoring of market is necessary ...

## EXTRACT FROM EUR/CHF ORDER BOOK



Source: SNB

# ... with the appropriate technology

## EUR/USD RATE AND ORDER BOOK



Source: SNB

# Technological change also on the money market

The screenshot displays a complex financial trading interface with multiple panels:

- Top Navigation:** WORKSPACE, AUCTION ALLOC, REPO QUOTES STD, REPO QUOTES NON, BILATERAL, CONTRACT INVENTORY, ACTIVITY, EVENTS.
- AUCTIONS OVERVIEW:**

Status	B/S	CCY	Term	Asset
ENDED	BUY	CHF	ON	SNBGC
ENDED	SELL	CHF		SNB BILLS (CHF) 28T CH0TEST21300
- QUOTING: REPO STANDARD:**

Bid	Ask	SQTY	Margin	Book ID
-0.150000	-0.160000	80,000,000	1.00	268446753
0.200000	0.190000	80,000,000	1.00	268447777
-0.100000	-0.200000	50,000,000	1.00	268448545
-0.080000	-0.100000	80,000,000	1.00	268448289
0.400000	1.100000	50,000,000	1.00	268441633
0.450000	0.440000	80,000,000	1.00	268442401
0.450000	0.440000	80,000,000	1.00	268442913
0.600000	0.600000	79,000,000	1.00	268441377
0.900000	0.890000	80,000,000	1.00	268442145
1.000000	0.900000	80,000,000	1.00	268442657
0.200000	0.990000	80,000,000	1.00	268443169
2.000000	1.000000	60,000,000	1.00	268443425
2.100000	2.050000	80,000,000	1.00	268441889
- QUOTING: REPO NON STANDARD/SPECIAL:**

CCY	Index	Asset	BoB	Term	BQTY	Bid	Ask	SQTY	Open
GBP	RONIA	L2ACHF	BOND	NON					
GBP	RONIA	L2A	BOND	NON					
GBP	RONIA	L1	BOND	NON					
GBP	RONIA	L1CHF	BOND	NON					
GBP	RONIA	SNBGC	BOND	NON					
- ACTIVITY: POST-TRADING:**

Market / Segment / Objects	In	Out	Cont...	Last
OTC Market				
CH Repo Market				
- ACTIVITY: PRE-TRADING:**

Market / Segment / Model / Objects	In	Out	Exec	Last
OTC Market				
CH Repo Market				
- PUBLIC TRADES:**

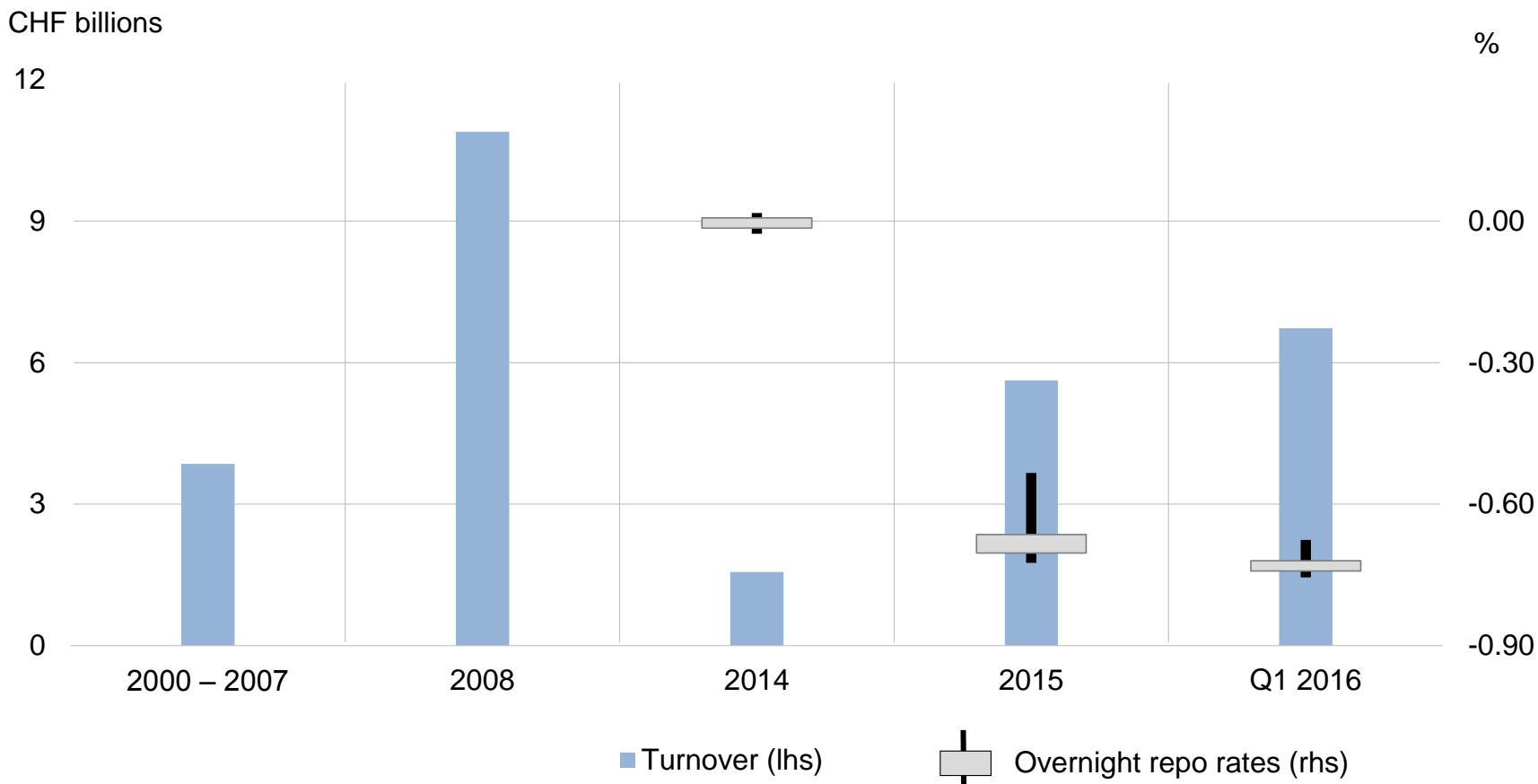
Date	TPA Contract Type ID	S	CCY	Amount	Rate	Term	Purch
18.11.2015	CH0008257062	SETTLACCEPTED	CHF	1,000,000	0.600000	1M	20.11.
18.11.2015	CH0008257096	SETTLACCEPTED	CHF	3,000,000	0.990000	6M	20.11.
18.11.2015	CH0008257096	SETTLACCEPTED	CHF	1,000,000	0.100000	6M	20.11.
18.11.2015	CH0008257062	SETTLACCEPTED	CHF	1,000,000	-0.750000	1M	20.11.
18.11.2015	CH0008257062	SETTLACCEPTED	CHF	1,000,000	-0.740000	1M	20.11.
18.11.2015	CH0008257054	SETTLACCEPTED	CHF	1,000,000	0.450000	3W	20.11.
18.11.2015	CH0008257062	SETTLACCEPTED	CHF	1,000,000	-0.500000	1M	20.11.
18.11.2015	CH0008257054	SETTLACCEPTED	CHF	1,000,000	-0.620000	3W	20.11.
18.11.2015	CH0008257005	SETTLACCEPTED	CHF	10,000,000	-0.850000	ON	18.11.
18.11.2015	CH0008257013	SETTLACCEPTED	CHF	2,000,000	-0.800000	TN	19.11.
- EVENTS:**

Quote State Change 18.11.2015 16:41:29

Quote 254 has changed state to CANCELLED

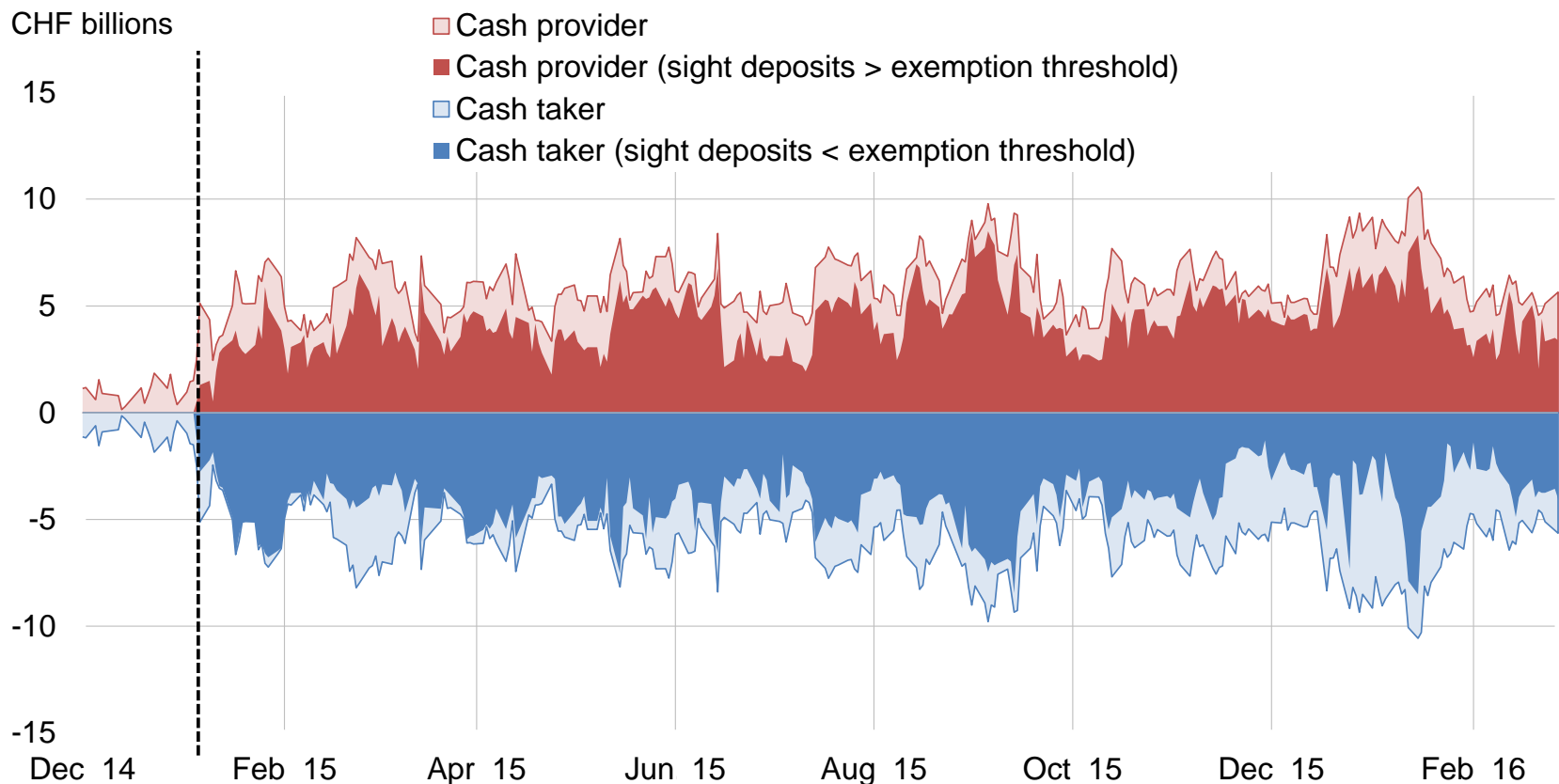
# Stable turnover and interest rates

## TURNOVER AND REPO RATES ON SWISS FRANC REPO MARKET



# Exemption threshold trading

## REPO MARKET TURNOVER

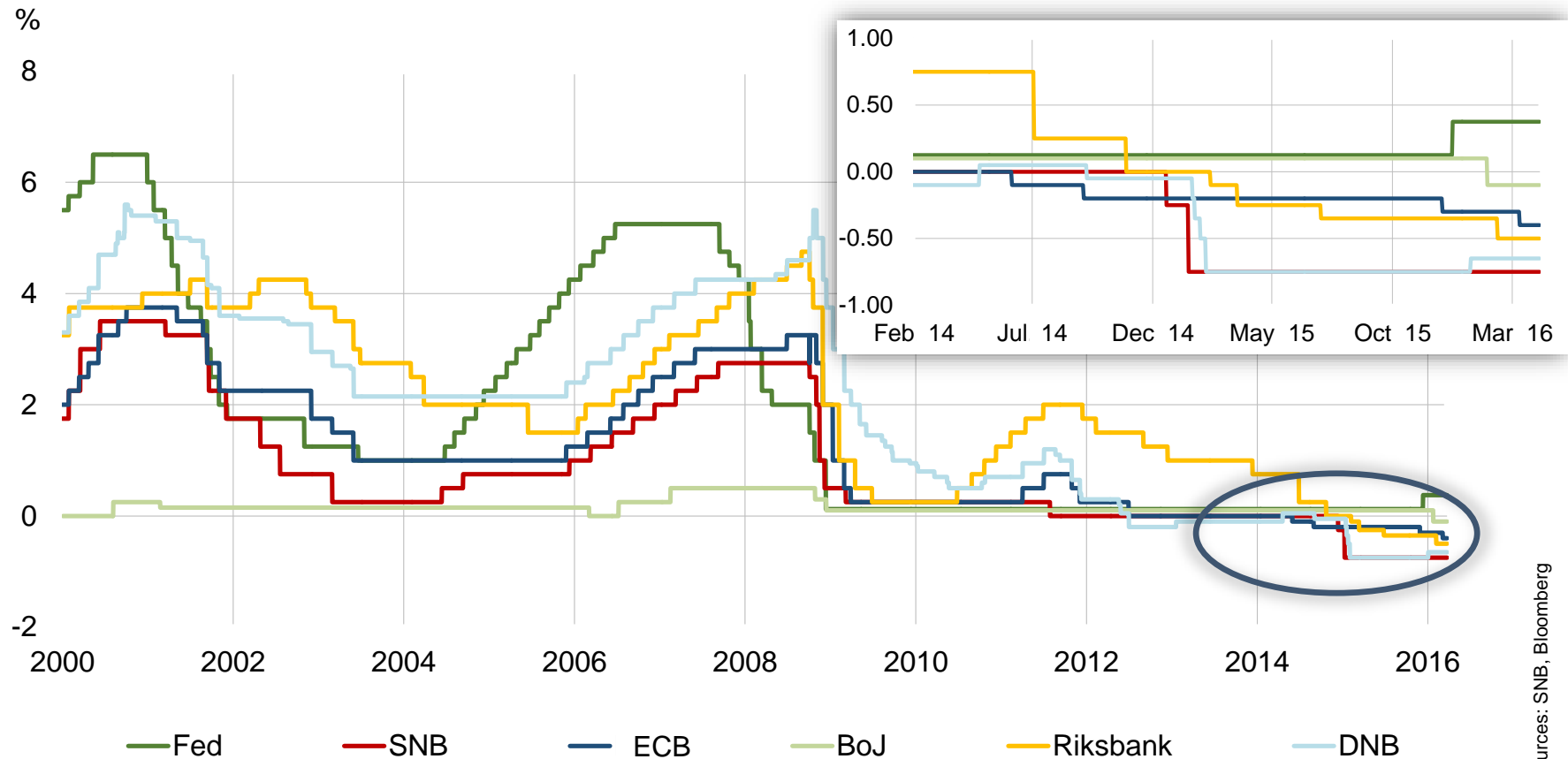


Sources: Estimates SNB, SIX Repo Ltd



# Global interest rates increasingly negative

## KEY RATES

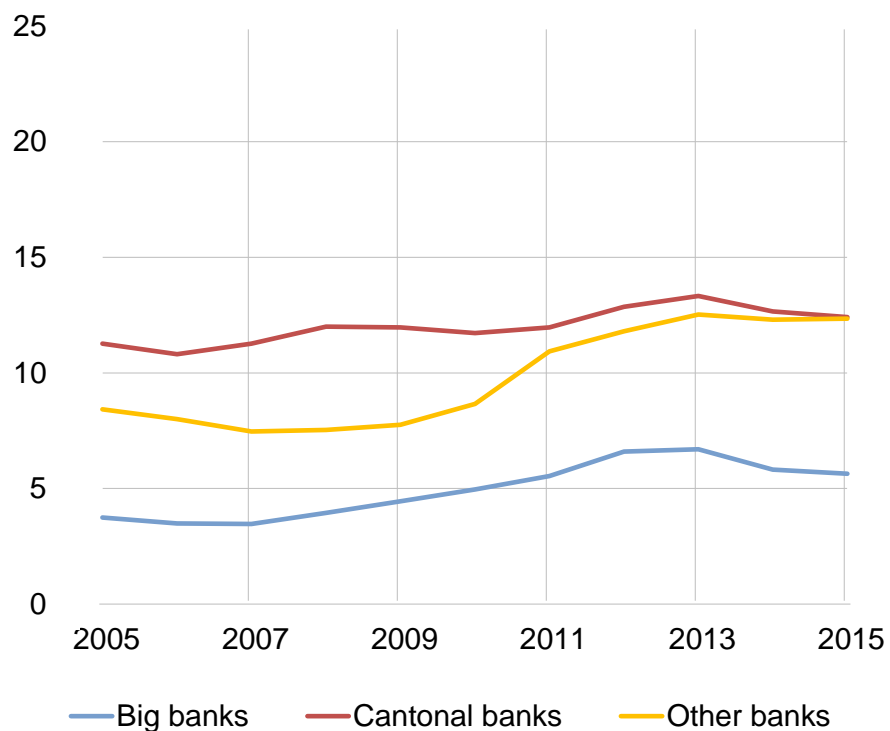


Sources: SNB, Bloomberg

# Design of negative interest rate

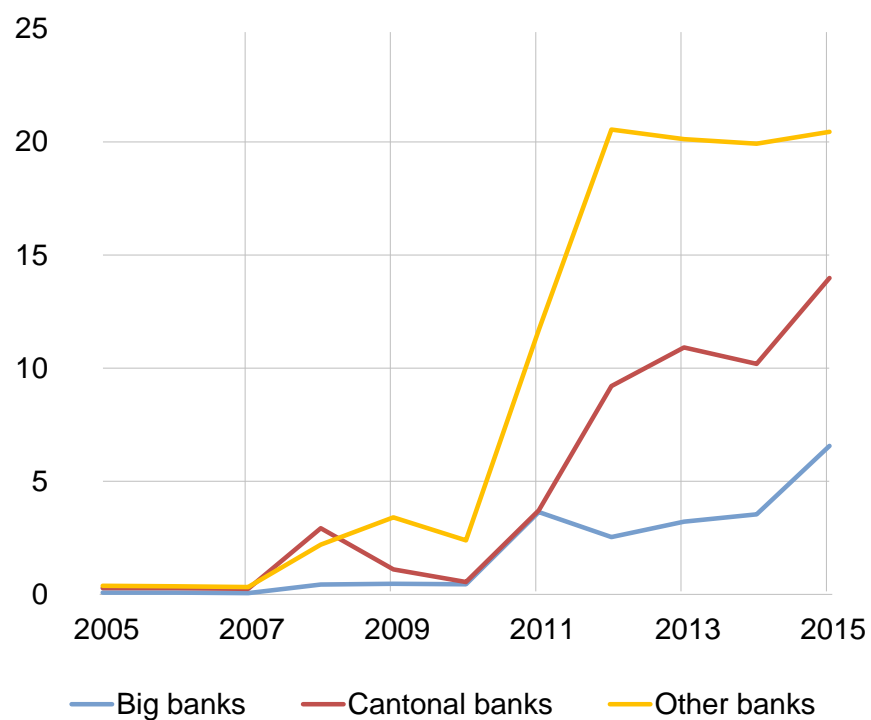
## MRR/TOTAL ASSETS

20 TIMES THE MRR AS PERCENTAGE OF TOTAL ASSETS



## SIGHT DEPOSITS/TOTAL ASSETS

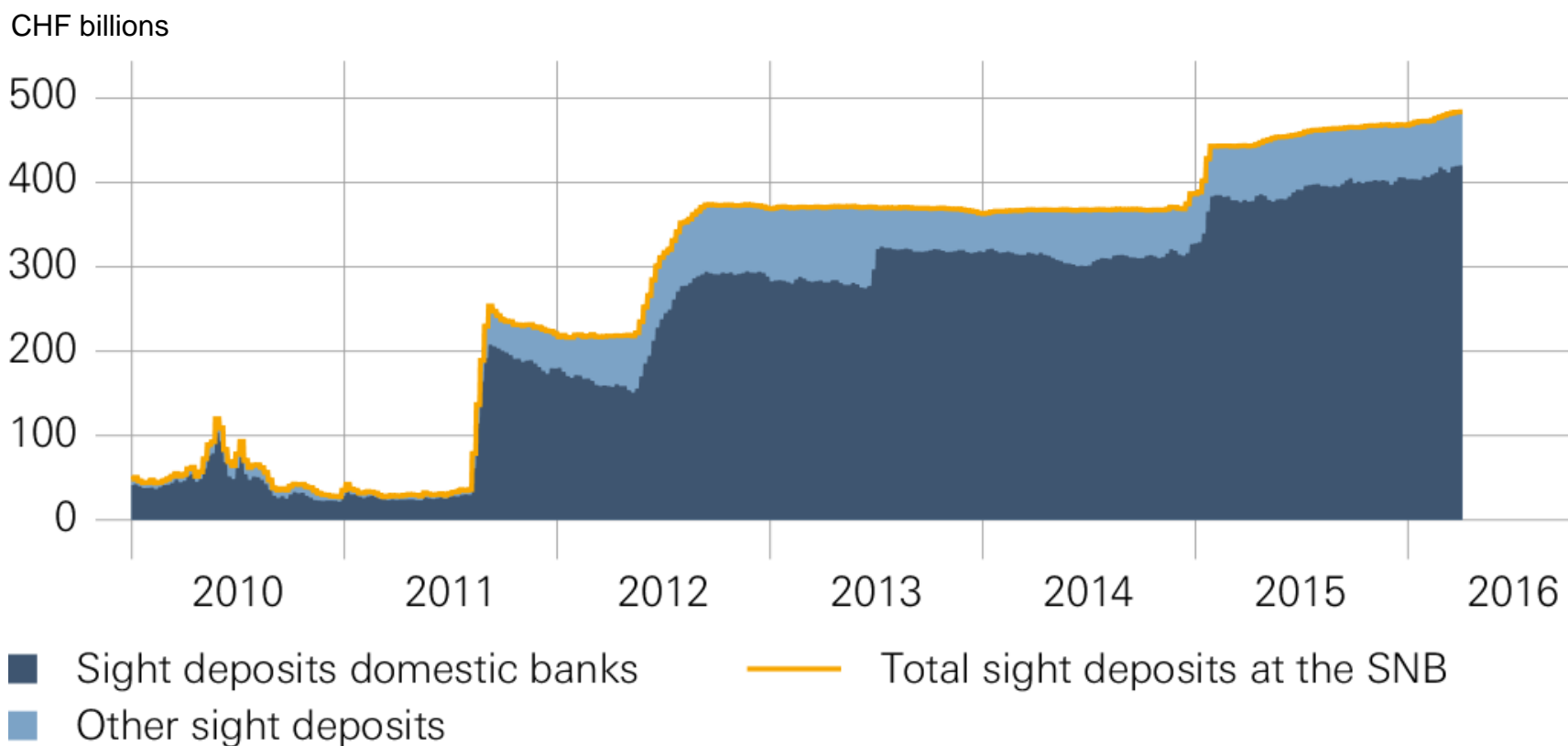
SIGHT DEPOSITS AS PERCENTAGE OF TOTAL ASSETS



Source: SNB data portal

# Liquidity increasingly subject to negative interest

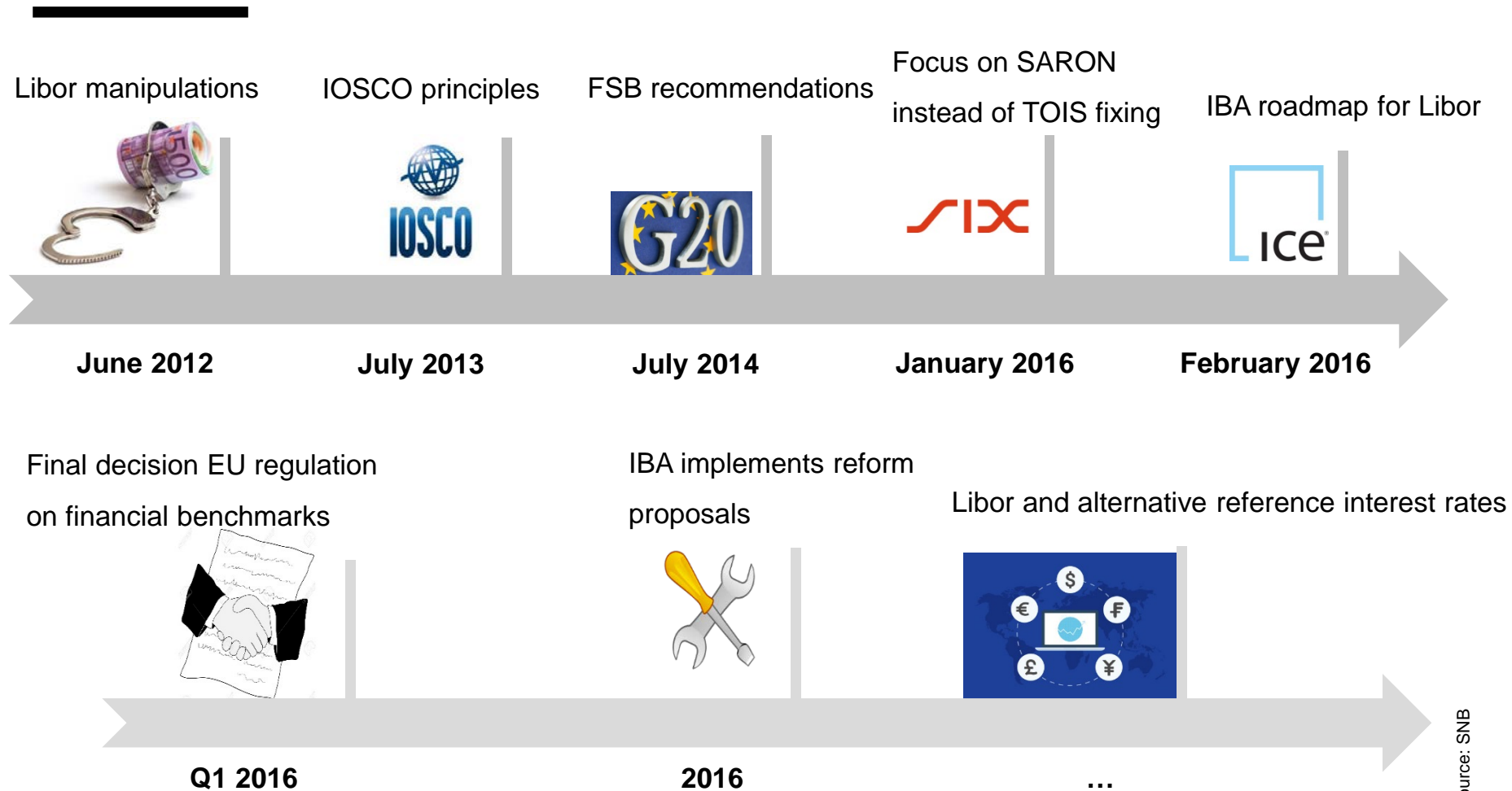
## SIGHT DEPOSITS AT SNB



Source: SNB

Source: SNB

# Reference interest rate reform underway



Source: SNB

# Money market and foreign exchange trading in the 1980s ...



Source: SNB

# ... and today



Source: SNB

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# Thank you for your attention.

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