

The effect of the monetary base expansion on the balance sheet of domestic banks

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Summary

This paper describes the balance sheet counterparts of the increase in Swiss franc deposits held by domestic banks at the SNB, and of the growth in Swiss franc deposits held by the public at domestic banks. It traces the growth in Switzerland's monetary aggregates since 2008 to its various sources. The results indicate that about two-thirds of the increase in Swiss franc deposits held by the public at domestic banks results from loans granted by these banks to households and firms, whereas about one-third can be attributed directly to the market operations conducted by the SNB to expand the monetary base and thereby the banks' liquidity.

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In the wake of the recent financial crisis, the SNB substantially increased the monetary base to provide the money market with liquidity and limit the appreciation of the Swiss franc. The expansion in the monetary base essentially appears in the form of an increase in sight deposits held by domestic banks at the SNB. This paper describes the effect of the monetary base expansion on the balance sheets of domestic banks.

First, the paper identifies the counterparts of the increase in liquidity on the balance sheets of domestic banks. When the SNB intervenes on the foreign exchange market, the different types of SNB counterparties on the market have different effects on the balance sheets of domestic banks. For example, if the SNB buys foreign currency from domestic customers, the growth in Swiss franc liquidity held by domestic banks at the SNB will coincide with an expansion in deposits of domestic customers at domestic banks, i.e. with an increase in monetary aggregates. By contrast, if the SNB buys foreign currency from customers of foreign banks which do not have a sight deposit account at the SNB, the increase in Swiss franc liquidity will be credited to the sight deposit accounts of domestic banks in favour of these foreign banks. The growth in Swiss franc liquidity held by domestic banks at the SNB will then coincide with an expansion in amounts due to foreign banks from domestic banks, leaving Switzerland's monetary aggregates unaffected. Overall, the counterparts of the increase in Swiss franc liquidity held by domestic banks can be assigned to domestic customers, foreign banks, foreign customers and a currency mismatch. The latter indicates that the growth in Swiss franc liquidity has not been balanced by equivalent growth in Swiss franc liabilities on the balance sheets of domestic banks.

Second, the paper traces the growth in monetary aggregates to its various sources. The analysis shows that, since 2008, about one-third of the increase in monetary aggregates can be attributed to the expansion of banks' Swiss franc liquidity by the SNB. The remaining two-thirds has resulted from the granting of loans by domestic banks to businesses and consumers. This means that the bank lending transmission mechanism is effective at stimulating the economy in Switzerland and that only a small proportion of the growth in monetary aggregates reflects an increase in the monetary base.

Analysing the balance sheet counterparts of movements in a given position is not completely straightforward because asset and liability positions of banks vis-à-vis different groups of economic agents may move in parallel. The paper therefore presents the method step by step. Section 2 shows how the SNB's expansion of the monetary base since 2008 has affected the Swiss franc liquidity of domestic banks. Section 3 presents an aggregated balance sheet for domestic banks. Both assets and liabilities are split into their main components, each of which is split further according to whether it is denominated in Swiss francs or foreign currency. In section 4, asset positions of the aggregated balance sheet are netted against their appropriate liability positions in order to derive suitable net positions for the domestic banks. These net positions trace back the sources and uses of bank funding with respect to different groups of agents, and serve as a basis for the counterpart analysis. Section 5 discusses the counterparts of the increase in Swiss franc liquidity held by domestic banks at the SNB, and the counterparts of the increase in Swiss franc deposits held by domestic customers at domestic banks. Section 6 concludes.

2 The expansion of the monetary base and banks' liquidity since 2008

In the wake of the recent financial crisis, the SNB substantially increased the monetary base to provide the money market with liquidity and to limit the appreciation of the Swiss franc. The monetary base is defined as the sum of the banknotes in circulation and the deposits held by banks and non-banks at the SNB. Chart 1 illustrates the development of the liability side of the SNB's balance sheet from January 1997 to October 2014. The expansion in the monetary base essentially appears in the form of an increase in sight deposits held by domestic banks at the SNB.

Domestic banks' liquidity consists of coins and banknotes held by these banks in their vaults plus their sight deposits at the SNB. Chart 2 plots the development of the Swiss franc liquidity from January 1997 to October 2014, as reported by domestic banks in the *Monthly Bulletin of Banking Statistics* published by the SNB. The rise in the banks' Swiss franc liquidity again reflects the measures taken by the SNB since 2008. A number of episodes can be identified:

- Banks' liquidity started to rise significantly in the last quarter of 2008 with the substantial provision of liquidity by the SNB and the introduction of Swiss franc swap facilities. In spring 2009, the SNB engaged in additional repo operations and purchased Swiss franc bonds as well as foreign currencies on the foreign exchange markets.
- The second significant increase in liquidity took place in spring 2010 with the escalation of the sovereign debt crisis in Europe, as the SNB intervened on the foreign exchange market to counter the resulting substantial upward pressure on the Swiss franc. This increase in liquidity was short-lived since it was reversed soon afterwards by way of reverse repo operations and the issuance of SNB Bills (short-term money market instruments issued by the SNB to withdraw liquidity).
- The third significant increase in liquidity occurred in August 2011 against the backdrop of a massive appreciation of the Swiss franc. The SNB adopted various measures to expand the monetary base, including the non-renewal of reverse repos and SNB Bills that fell due, the repurchase of outstanding SNB Bills, and the implementation of foreign exchange swap transactions. The SNB then set a minimum exchange rate of CHF 1.20 per euro on 6 September 2011.
- The fourth significant increase in liquidity occurred in mid-2012, reflecting foreign exchange market interventions necessary to defend the floor against the euro.

Chart 1

LIABILITIES OF THE SNB

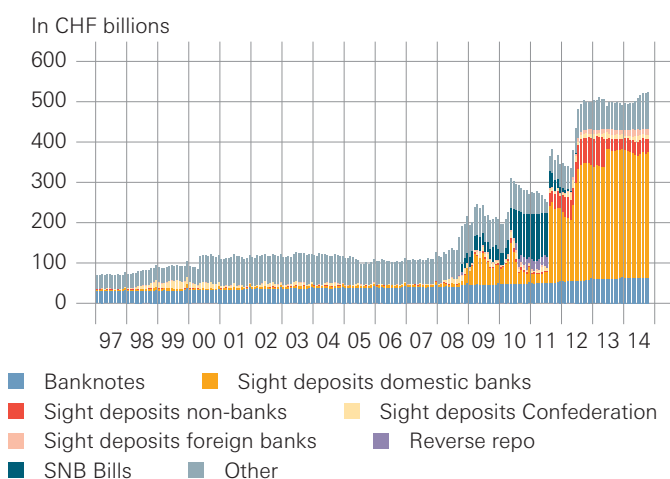
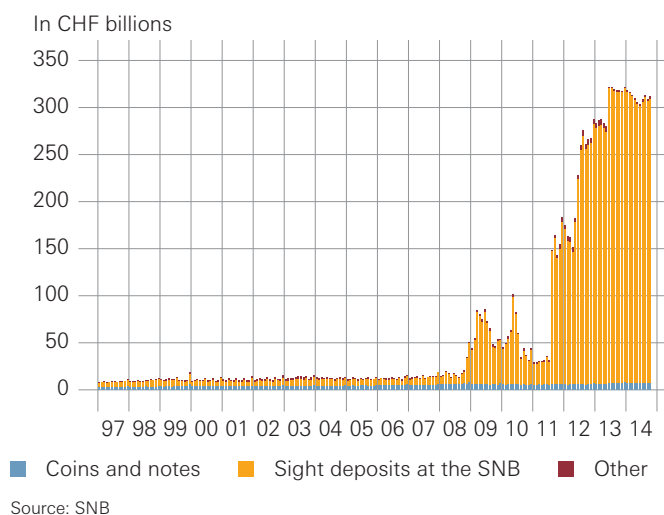


Chart 2

SWISS FRANC LIQUIDITY OF DOMESTIC BANKS



- The last significant increase in banks' liquidity up to October 2014 was in mid-2013. In contrast to the episodes described above, it was not caused by monetary policy measures. PostFinance Ltd was granted a banking licence in June 2013. As a consequence, its sight deposits at the SNB are now reported under sight deposits of domestic banks, rather than under sight deposits of non-banks.²

A comparison of charts 1 and 2 shows that the monetary base exceeds the Swiss franc liquidity of domestic banks. The difference can be explained to a large extent by banknotes held by non-banks, and by deposits held at the SNB by institutions other than domestic banks.

3

Aggregated balance sheet of domestic banks

For the sake of convenience, this section presents the structure of an aggregated balance sheet for domestic banks and the development of this balance sheet over time. This is a natural starting point for analysing the balance sheet counterparts of the increase in liquidity and in monetary aggregates.

Chart 3 shows an aggregated balance sheet of domestic banks (worldwide offices) for domestic and foreign positions as of December 2013. Positions are broken down according to their denomination: Swiss franc or foreign currency. The asset side is composed of (i) liquidity, (ii) money market claims and amounts due from banks, (iii) loans, (iv) trading assets and (v) other assets. The liability side, in turn, comprises (i) money market liabilities and amounts due to banks, (ii) deposits by non-banks, (iii) bonds issued by banks, (iv) other liabilities and (v) equity. A more detailed account of the underlying data and the definition of the various positions is given in Box 1.

Chart 4 illustrates the development of the aggregated balance sheet of domestic banks from January 1997 to October 2014. The structure of the aggregated balance sheet is the same as in chart 3. Asset positions are represented by positive bars and liability positions by negative bars. The upper panel plots positions in all currencies, the middle panel positions in Swiss francs, and the lower panel positions in foreign currency. As foreign currency positions are valued in Swiss francs, they are affected by changes in the exchange rate.

Although the present paper focuses on positions denominated in Swiss francs, it is important to keep track of positions in foreign currency because assets and liabilities in Swiss francs need not necessarily balance. An imbalance between assets and liabilities in Swiss francs and other currencies is referred to as a 'currency mismatch', as discussed below.

Positions in Swiss francs expanded steadily throughout the period. Positions in foreign currency, however, followed a cyclical pattern, expanding significantly from the second half of the 1990s up to the dot-com crisis as well as from 2003 up to the subprime crisis, and shrinking markedly thereafter.

The significant increase in Swiss franc liquidity since 2008 is clearly visible in the middle panel of chart 4. The lower panel shows that foreign currency liquidity held

² See *SNB Quarterly Bulletin*, September 2013, for more details on the effect of the granting of a banking licence to PostFinance Ltd on monetary aggregates.

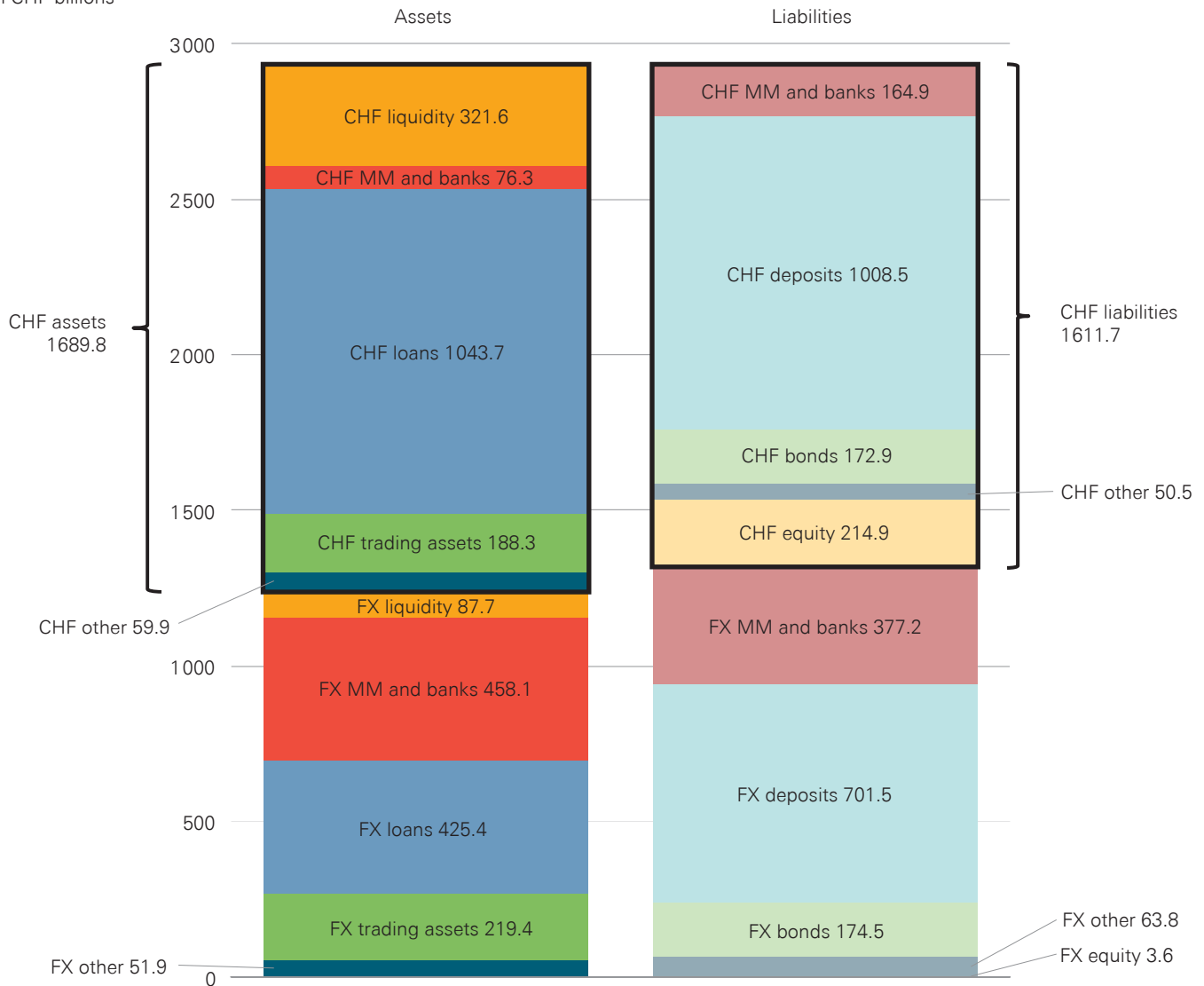
by domestic banks also expanded in the wake of the recent financial crisis. However, the effect of the growth in liquidity on other balance sheet positions is difficult to assess at first sight. In the next section, asset positions

are netted against their corresponding liability positions to obtain appropriate net positions of banks. This will then allow us to identify how net positions have evolved with the increase in liquidity.

Chart 3

**AGGREGATED BALANCE SHEET OF DOMESTIC BANKS, DECEMBER 2013:
WORLDWIDE OFFICES, DOMESTIC AND FOREIGN POSITIONS**

In CHF billions



Box 1

STRUCTURE OF BANKS' BALANCE SHEETS

Assets

Banks' assets are grouped into six positions, reflecting different business activities. *Liquidity* consists of cash and sight deposits held by domestic banks at central banks or at their correspondent banks.¹ *Money market (MM)* claims

consist of money market instruments held by domestic banks, whereas *Banks* stands for amounts due from other banks. For the sake of simplicity, money market and bank positions are lumped together in charts 3, 4, and 5. *Loans* represents amounts lent to customers. *Trading assets* consists of trading portfolios, precious metals, financial investments and participating interests. *Other assets* comprises tangible fixed assets, accrued income and prepaid expenses, other assets and unpaid capital.

¹ Up to May 2013, Swiss franc liquidity also included postal accounts. PostFinance Ltd was granted a banking licence in June 2013.

Liabilities

Liabilities are also grouped into six positions, corresponding to different sources of funding. *Money market (MM)* liabilities consist of money market instruments issued by domestic banks. *Banks* stands for amounts due to other banks. *Deposits* represents amounts due to customers as sight, savings or term deposits. *Bonds* comprises bonds issued by domestic banks, such as cash bonds, standard bonds and mortgage-backed bonds. *Other liabilities* consists of accrued expenses, deferred income and other liabilities. *Equity* includes value adjustments and provisions, reserves for general banking risks, bank capital, general legal reserve, reserve for own shares, revaluation reserve, other reserves as well as profit and loss carried forward and accrued.

Office location

The *Monthly Bulletin of Banking Statistics* contains balance sheet data from banks located in Switzerland. However, these banks may have offices in Switzerland as well as branches abroad. *Domestic offices* includes only balance sheet positions originating in bank offices located in Switzerland and in the Principality of Liechtenstein, while *Worldwide offices* additionally includes positions originating in branches abroad.

Counterparty residence

Balance sheet positions also indicate the place of residence of the counterparty. This criterion applies to all balance sheet positions, regardless of whether the counterparty is a creditor, debtor or issuer of securities. *Domestic positions* describes balance sheet positions for which the counterparty has its residence in Switzerland or in the Principality of Liechtenstein. *Foreign positions* consists of balance sheet positions for which the counterparty has its residence abroad.

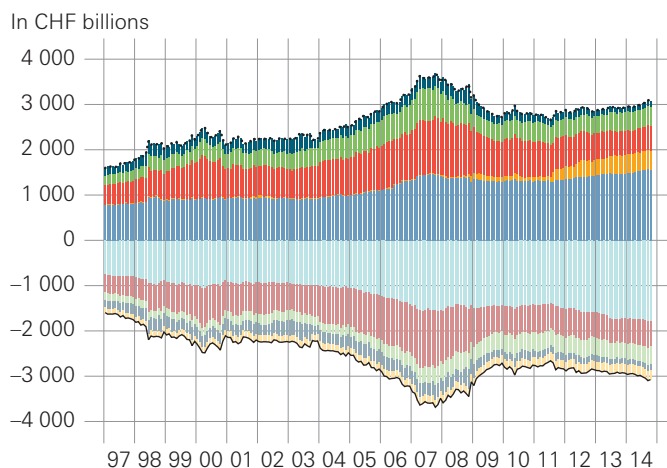
Currency

The banking sector's balance sheet is also structured according to currency denomination. Positions are broken down into *Swiss francs* and *foreign currency*. Foreign currency positions are expressed in Swiss francs.

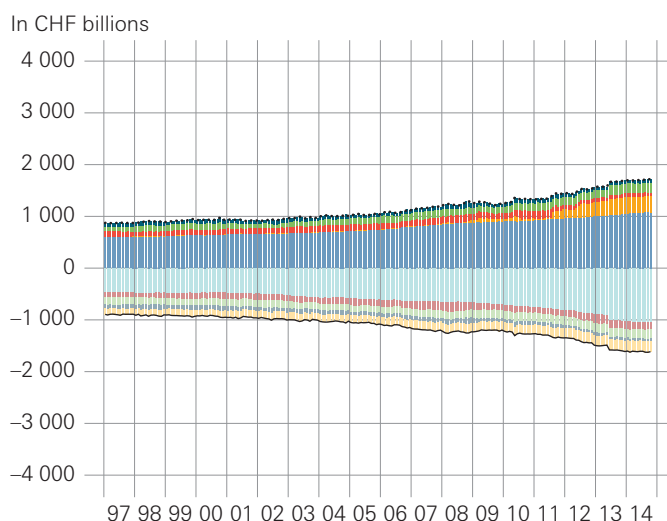
Chart 4

BALANCE SHEET OF BANKS: WORLDWIDE OFFICES

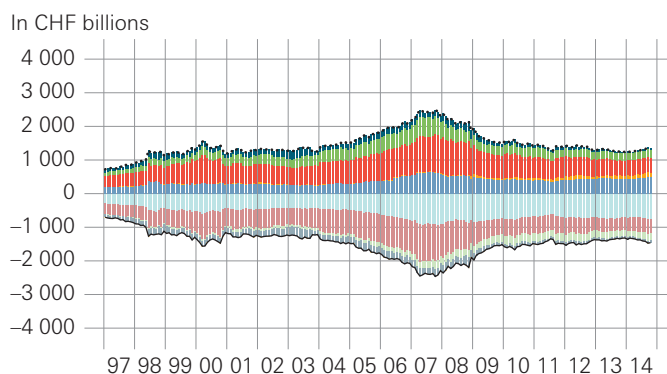
Domestic and foreign positions in all currencies



Domestic and foreign positions in CHF



Domestic and foreign positions in foreign currency



■ Loans ■ Liquidity ■ Due from MM and banks
■ Trading assets ■ Other assets ■ Deposits
■ Due to MM and banks ■ Bonds ■ Other liabilities
■ Equity Total assets — Total liabilities

Source: SNB

4 Netted balance sheet of domestic banks

As observed in the previous section, the effect of the increase in liquidity on other positions is hard to depict from the aggregated balance sheet in chart 4. Therefore, asset positions are netted against their corresponding liability positions to identify the net positions of banks vis-à-vis different groups of economic agents. This allows us to trace back the sources and uses of bank funding with respect to different groups of agents. The netting procedure serves as an intermediate step to perform the counterpart analysis presented in section 5. Therefore, this section merely describes the procedure and briefly elaborates on the interpretation of the netted balance sheet.

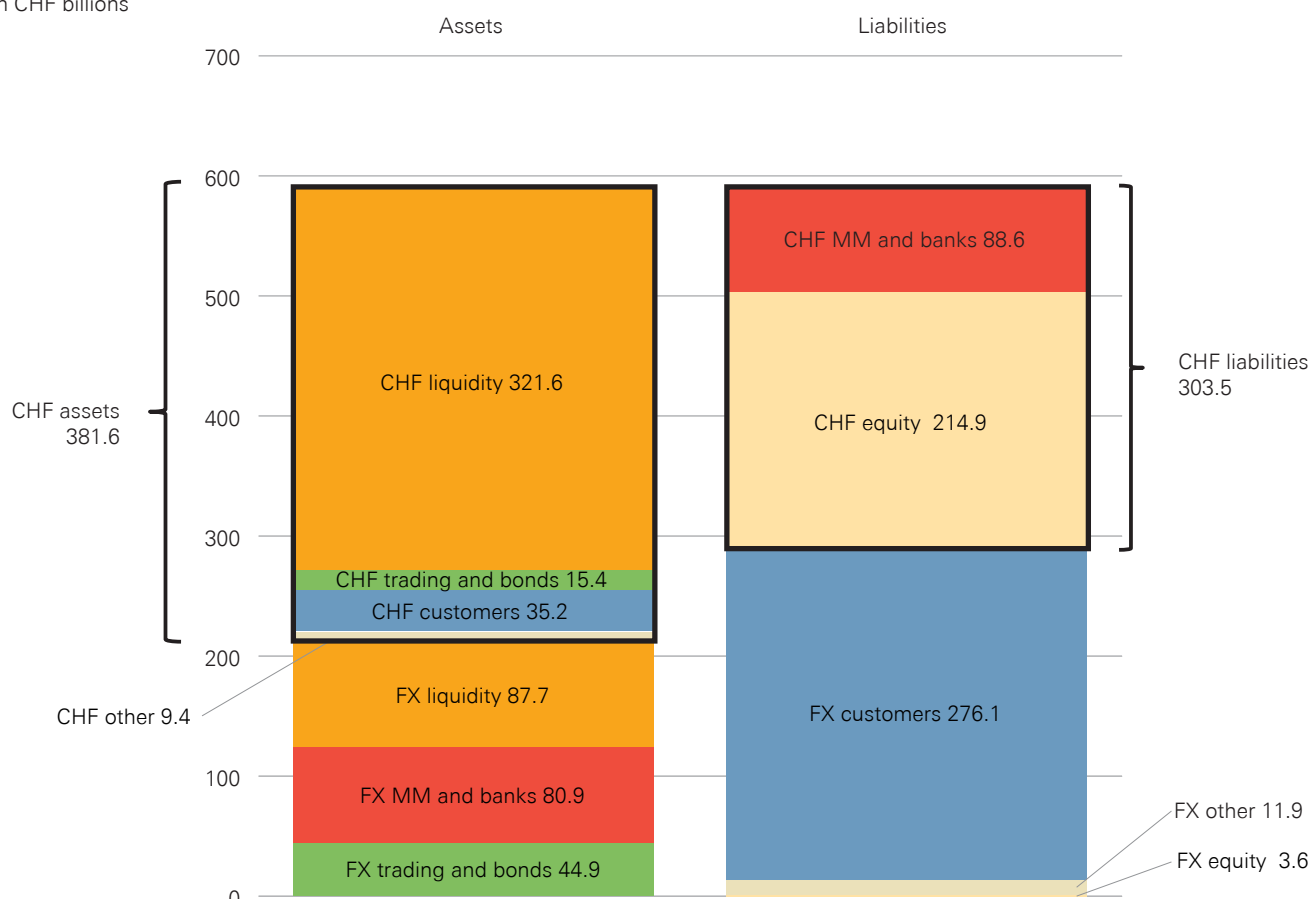
When asset and liability positions are netted against each other, the aggregated balance sheet of domestic banks in chart 3 reduces to the netted balance sheet shown in chart 5. Positions are netted as follows:

- Money market instruments held by domestic banks (assets) are netted with money market instruments issued by domestic banks (liabilities) to reveal the net position of domestic banks vis-à-vis the *money market*.
- Amounts due from banks (assets) are netted with amounts due to banks (liabilities) to reveal the net position of domestic banks vis-à-vis other *banks*. For simplicity, in charts 3, 4 and 5 money market and bank positions are consolidated.
- Customer loans granted by domestic banks (assets) are netted with customer deposits at domestic banks (liabilities) to reveal the net position of domestic banks vis-à-vis *customers*.

Chart 5

NETTED BALANCE SHEET OF DOMESTIC BANKS, DECEMBER 2013: WORLDWIDE OFFICES, DOMESTIC AND FOREIGN POSITIONS

In CHF billions



- Trading assets held by domestic banks (assets) are netted with bonds issued by domestic banks (liabilities) to reveal the net position of domestic banks vis-à-vis the capital market. The corresponding net position is called *trading and bonds*.
- Other assets are netted with other liabilities, the net position being called *other*.
- *Liquidity* and *equity* are reported on the netted balance sheet at their gross amount.

The netting procedure can be applied to subsections of the aggregated balance sheet, for example according to office location, counterparty residence or currency.

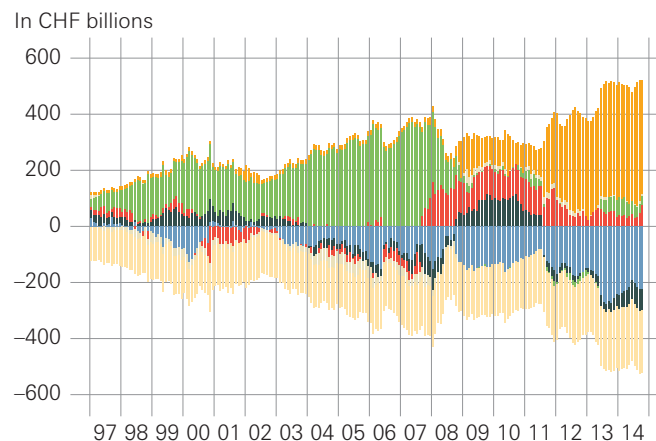
Chart 6 shows how the netted balance sheet of domestic banks illustrated in chart 5 has evolved since 1997. It also corresponds to the aggregated balance sheet in chart 4 after application of the netting procedure just described. A positive net position (positive bars) indicates that assets are larger than the corresponding liabilities, whereas a negative net position (negative bars) indicates an excess of liabilities over assets. The upper panel plots net positions in all currencies, the middle panel net positions in Swiss francs, and the lower panel net positions in foreign currency.

The development of net positions helps us to understand how the sources and uses of funds evolve across different groups of agents. For instance, the positive net Swiss franc position *Customers* (chart 6, middle panel, blue bars) indicates that the volume of customer loans exceeds that of customer deposits. The decline in this net asset position from 2008 onwards reveals that loans have expanded less rapidly than deposits since then. On the other hand, the significant increase in the net position *Money market* from mid-2010 to mid-2011 (chart 6, middle panel, dark blue bars) reflects the holding of SNB Bills by domestic banks. In foreign currency, the net liability position *Customers* (chart 6, lower panel, blue bars) shows that the volume of customer deposits exceeds that of customer loans. This net liability position funded the net asset position *Trading and bonds* in foreign currency (chart 6, lower panel, green bars). Whereas trading assets in foreign currency significantly exceeded bonds in foreign currency issued by these banks, this net asset position has declined markedly since 2007, as trading assets and bonds have become more balanced.

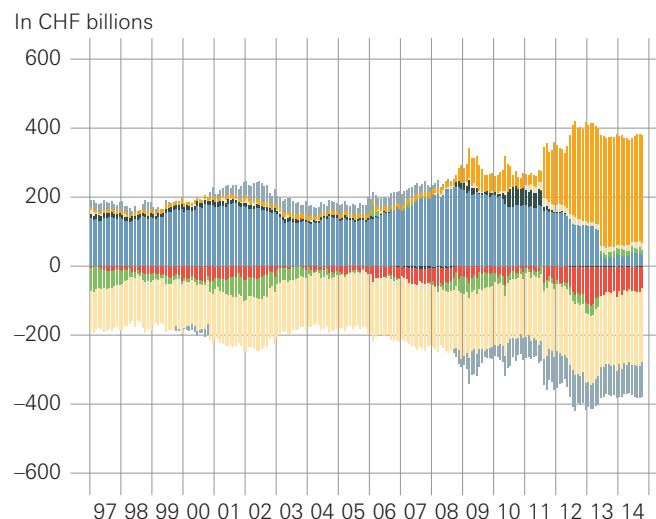
Chart 6

NETTED BALANCE SHEET OF BANKS: WORLDWIDE OFFICES

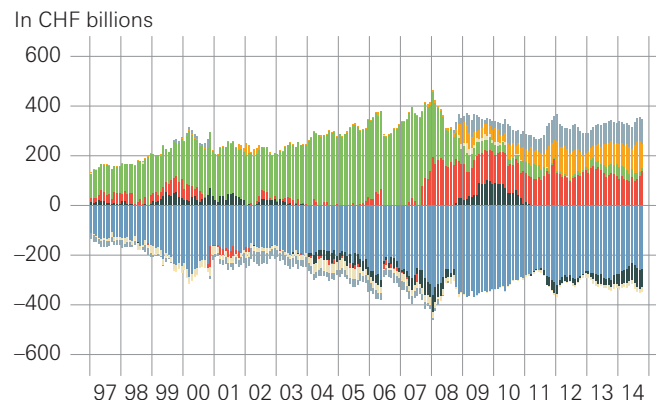
Domestic and foreign net positions in all currencies



Domestic and foreign net positions in CHF



Domestic and foreign net positions in foreign currency



- Customers ■ Money market ■ Banks
- Trading and bonds ■ Other ■ Liquidity
- Equity ■ Currency mismatch

Source: SNB

5

Counterpart analysis

In the middle and lower panels, the difference between assets and liabilities in Swiss francs and in foreign currency, respectively, indicates a currency mismatch. Up to 2008, the netted balance sheet in Swiss francs (middle panel) exhibits a positive currency mismatch, meaning that assets in Swiss francs were smaller than liabilities in Swiss francs. In other words, on balance Swiss franc liabilities were used to finance foreign currency assets. The currency mismatch appears with the opposite sign in the netted foreign currency balance sheet (lower panel).

In the wake of the strong growth in Swiss franc liquidity, the currency mismatch is reversed, and then appears on the liabilities side. This reflects the fact that the increase in Swiss franc liquidity (assets) following the SNB's monetary base expansion has not been balanced by an equivalent increase in Swiss franc liabilities. This observation is important when analysing the effect of the monetary base expansion on the balance sheets of domestic banks. Note, however, that the currency mismatch does not reflect the effective foreign exchange exposure of domestic banks. Such exposure can also be influenced by derivatives, which are only stated at their replacement value in banks' balance sheets.

Based on the netted balance sheet derived in the previous section, the counterpart analysis traces the cumulative change in a given position to the cumulative change in various sources and uses of funding. The counterpart analysis tracks how changes in a given position balance with changes in other net positions. The method can be applied to any balance sheet position. In the following, the focus is on the counterparts of the increase in banks' Swiss franc liquidity and on the counterparts of the increase in monetary aggregates. The cumulative changes in the net Swiss franc positions are derived from chart 6, middle panel. Cumulative changes in these net positions are then computed since the starting point of the analysis in October 2008.

5.1 THE COUNTERPARTS OF SWISS FRANC LIQUIDITY

Chart 7 plots the counterparts of the increase in Swiss franc liquidity held by domestic banks, cumulated since the monetary base started to significantly expand in October 2008. The black line plots the cumulative changes in liquidity. In addition, the chart shows separately the changes in net positions vis-à-vis domestic customers, foreign customers, domestic banks and foreign banks. Since liquidity is an asset position, an expansion in liquidity must be balanced either by an increase in liability positions or by a decrease in other asset positions. A decrease in net positions is illustrated by positive bars and an increase in net positions by negative bars.

Note that the net position of the domestic banking sector vis-à-vis domestic banks is typically not zero, as one would expect, because the *Monthly Bulletin of Banking Statistics* does not include the balance sheet of all domestic banks, or the balance sheet of the SNB. Therefore, positions of domestic banks (reporting to the statistics) vis-à-vis the SNB, such as those resulting from repo operations, entail a non-zero net position vis-à-vis domestic banks.

The process by which changes in liquidity are implemented by the SNB determines which counterparts on the balance sheet of domestic banks are affected. When liquidity is increased through repo operations, for instance, one may expect the counterpart of the expansion in liquidity on the balance sheet of domestic banks to be *domestic banks*. Repo operations cause the amount due to domestic banks (i.e. the SNB) to rise. Therefore, the net position of domestic banks (reporting to the statistics) vis-à-vis domestic banks (including the SNB) should decrease. This is what can be observed in March 2009

(positive red bar), when part of the expansion in liquidity was due to repo operations. From mid-2010 to mid-2011, liquidity was withdrawn by means of both reverse repo operations and SNB Bills, leading to an increase in the net position vis-à-vis *domestic banks* (negative red bars), as well as in the net position vis-à-vis the *money market* (negative dark blue bars).

Counterparts are more difficult to predict when liquidity is increased through interventions on the foreign exchange market, as in the first half of 2010 and from the second half of 2011 onwards. This is so because different types of agents can be the economic counterparty of the SNB on the foreign exchange market, leading to different effects on the balance sheet of domestic banks. There are four cases:

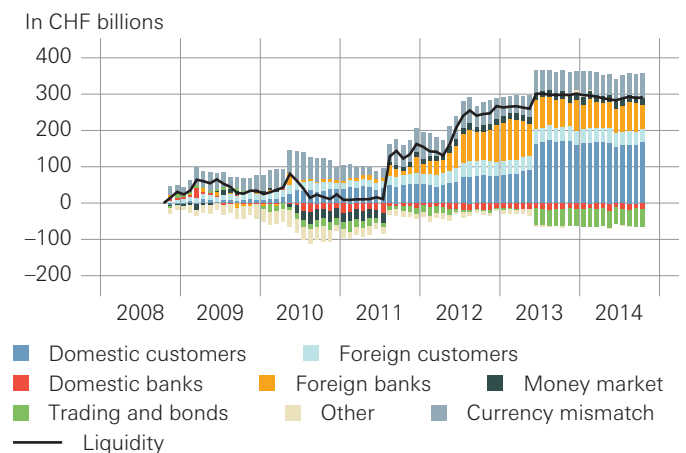
- When the SNB expands the monetary base by purchasing foreign currency from *domestic customers* of domestic banks, the SNB credits the sight deposit account of domestic banks in favour of domestic customers. The net position of domestic banks vis-à-vis domestic customers decreases because deposits of domestic customers grow more (or decline less) than loans to domestic customers. Correcting for the break caused by the inclusion of PostFinance Ltd in the banking statistics in June 2013, the mid-blue bars in Chart 7 indicate that approximately one-third of the increase in liquidity (about CHF 100 billion out of CHF 300 billion) has been balanced by a decrease in the net position vis-à-vis domestic customers.
- When the SNB purchases foreign currency from *foreign customers* of domestic banks, the SNB credits the sight deposit account of domestic banks in favour of foreign customers. The net position of domestic banks vis-à-vis foreign customers decreases because deposits of foreign customers increase more (or decrease less) than loans to foreign customers. This is captured by the light blue bars in chart 7, indicating that about CHF 40 billion of the increase in liquidity has been balanced by a decrease in the net position of domestic banks vis-à-vis foreign customers.
- When the SNB purchases foreign currency from agents who are customers of *foreign banks*, these banks will hold their Swiss franc liquidity at domestic banks because they do not have a sight deposit account at the SNB. When such transactions are settled, the SNB credits the sight deposit accounts of domestic banks in favour of foreign banks. Thus, the net position of domestic banks against foreign banks decreases because amounts due to foreign banks increase more (or decrease less) than amounts due from foreign banks. This is illustrated by the orange bars in chart 7, indicating that about CHF 80 billion of the increase in liquidity has been balanced by a decrease in the net position of domestic banks vis-à-vis foreign banks.

- When the SNB purchases foreign currency from domestic banks themselves, a substitution of foreign currency liquidity for Swiss franc liquidity takes place on their balance sheet, giving rise to changes in the *currency mismatch*. Such transactions, however, are not the only possible cause of changes in the currency mismatch. Foreign exchange derivatives, such as FX forwards, FX swaps and currency swaps, also lead to changes in the currency composition of the balance sheet. Therefore, the currency mismatch illustrated by the grey bars in chart 7 does not reflect the effective foreign exchange exposure of domestic banks.

Chart 7

LIQUIDITY COUNTERPARTS SINCE OCT 2008

Worldwide offices, domestic and foreign positions in CHF

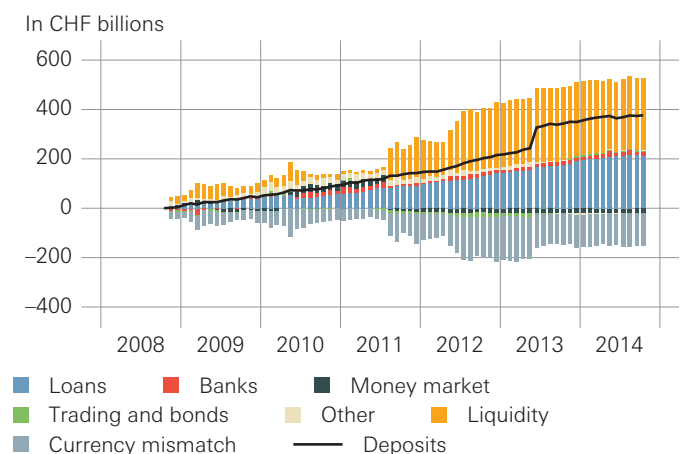


Source: SNB

Chart 8

DEPOSIT COUNTERPARTS SINCE OCT 2008

Domestic offices, domestic positions in CHF



Source: SNB

To sum up, this analysis shows that counterparts of the expansion in liquidity of domestic banks can be assigned to, in order of importance: domestic customers, foreign banks and foreign customers. The currency mismatch also indicates that the growth in Swiss franc liquidity has not been balanced by equivalent growth in Swiss franc liabilities. A portion of the liquidity expansion led directly to an increase in deposits of domestic customers (i.e. monetary aggregates) in excess of the increase in loans. However, as the next section shows, the bulk of the increase in deposits of domestic customers can be traced back to loans granted by domestic banks to domestic businesses and consumers, rather than directly to the expansion in liquidity.

5.2 THE COUNTERPARTS OF SWISS FRANC DEPOSITS

Using the same method as in the previous section, chart 8 plots the counterparts of the growth in Swiss franc deposits held by domestic customers at domestic banks, cumulated since October 2008. Since monetary aggregates include only the deposits held by domestic customers, chart 8 is derived from positions of domestic banks vis-à-vis domestic residents only, and ignores foreign positions of domestic banks. The black line now plots the cumulative growth in Swiss franc deposits held by domestic customers, which broadly correspond to M3 less currency in circulation. Since deposits are liabilities, an increase in deposits must be balanced either by an increase in asset positions or by a decrease in other liability positions. An increase in net positions is illustrated by positive bars and a decrease in net positions by negative bars.

Chart 8 shows that *loans* are the most significant counterpart of deposits. When banks grant loans, they credit the deposit account of borrowers, which entails a simultaneous increase in loans and deposits. Correcting for the break caused by the inclusion of PostFinance Ltd in the banking statistics in June 2013, about two-thirds of the increase in deposits has been balanced by an increase in loans. Deposits have grown by more than loans because of the expansion in *liquidity*, as highlighted in the previous section and illustrated by the orange bars in Chart 8.³ Movements in liquidity, however, have only had a limited impact on deposits. For instance, the withdrawal of liquidity in the second half of 2010 did not prevent deposits growing further in line with loans. And the significant expansion in liquidity in the second half of 2011 had a subdued effect on deposits.

Overall, about two-thirds of the increase in monetary aggregates results from the conventional bank lending transmission mechanism, while about one-third reflects the liquidity expansion by the SNB.

³ The difference between the increase in deposits and the increase in loans in chart 8 corresponds to the position *Domestic customers* in chart 7.

6

Conclusion

This paper has tracked the effect of the increase in liquidity on the balance sheets of domestic banks since October 2008. The netting procedure proves helpful in identifying the sources and uses of bank funding with respect to different groups of agents. It also allows us to trace changes in liquidity and customer deposits to changes in their various counterparts.

First, the analysis identifies four categories for the counterparts of the increase in Swiss franc liquidity held by domestic banks: (i) domestic customers, indicating that deposits of domestic customers rose more than loans to domestic customers, (ii) foreign banks, indicating that amounts due to foreign banks grew by more than amounts due from foreign banks, (iii) foreign customers, indicating that deposits of foreign customers at domestic banks increased more than loans by these banks to foreign customers, and (iv) a currency mismatch, indicating that the growth in Swiss franc liquidity has not been balanced by equivalent growth in Swiss franc liabilities.

Second, the paper shows that the increase in Swiss franc liquidity accounts for only one-third of the increase in Swiss franc deposits held by domestic customers, with the remaining two-thirds resulting from the granting of loans. This means that bank lending effectively stimulated the Swiss economy throughout the recent financial crisis.