

**FOR
AGENDA**

SM/13/97

April 24, 2013

To: Members of the Executive Board
From: The Acting Secretary
Subject: **Switzerland—Selected Issues**

This paper provides background information to the staff report on the 2013 Article IV consultation discussions with Switzerland (SM/13/96, 4/24/13), which is tentatively scheduled for discussion on **Wednesday, May 8, 2013**. Unless an objection from the authorities of Switzerland is received prior to the conclusion of the Board's consideration, the document will be published. Any requests for modifications for publication are expected to be received two days before the Board concludes its consideration.

Questions may be referred to Ms. Detragiache (ext. 36376) and Ms. Xiao (ext. 38679) in EUR.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Thursday, May 2, 2013; and to the Food and Agriculture Organization and the Organisation for Economic Cooperation and Development, following its consideration by the Executive Board.

This document will shortly be posted on the extranet, a secure website for Executive Directors and member country authorities.

Att: (1)

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Department Heads



SWITZERLAND

SELECTED ISSUES

April 23, 2013

Approved By
European Department

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NEGATIVE POLICY INTEREST RATES: SHOULD THE SNB CONSIDER THEM?¹

1. With policy rates reaching historical lows in many countries and shrinking interest rate differentials, the challenge of managing capital inflows and alleviating the resulting pressures on the exchange rate has rendered negative interest rates a policy option worthy of discussion. In the case of Switzerland, the SNB could charge negative interest rates on bank reserves, or on bank reserves above the minimum requirement. This policy would be aimed at lowering wholesale market interest rates, thus discouraging capital inflows and relieving pressures on the exchange rate. There are very few past episodes of using the negative interest rate to stem capital inflows.² A recent example is Denmark, which introduced a negative policy interest rate in the summer of 2012.

2. The negative interest rate is a policy that may raise special issues and even have drawbacks, particularly when countries want to use it to stimulate credit and economic activity. Negative interest rates may not be transmitted to other interest rates, thus limiting their effects on economic conditions. With negative rates, bank funding costs rise as they bear the monetary policy tax in the first place. If banks pass on the cost to borrowers by increasing lending interest rates, weaker borrowers would have fewer options and may bear the brunt of the tax³, which might reduce credit growth. On the other hand, attempts by banks to pass on the cost of negative interest rates to depositors may result in a flight to cash or non-financial assets, which would reduce financial intermediation⁴. In addition, negative interest rates may impair the functioning of the interbank market and may make money market mutual funds unprofitable as spreads become compressed and market turnover falls.

3. The conjuncture of Switzerland may render some of the potential drawbacks less relevant than in other countries. Activity in the interbank market is already very low, as all banks have excess liquidity. Switzerland is experiencing strong credit growth, particularly in the mortgage market. The impact of negative interest rates on mortgage rates depends on the pass-through. If banks cannot pass through negative rates to depositors, then negative interest rates on bank reserves would induce banks to increase mortgage interest rates; this would help curbing the growth of mortgage lending and housing prices. In this case, negative interest rates could help address the dilemma the SNB faces: low interest rates are necessary to defend the floor while

¹ Prepared by Yingbin Xiao.

² Sweden had a limited experiment in 2009–10, though money market rates did not become negative.

³ This distributional effect may depend on the bank's business model.

⁴ The risk of a switch into cash in the case of Switzerland might be higher than elsewhere because of the large denomination of its banknote and high use of cash. However, factors including security and insurability likely limit the extent of cash hoarding.

fuelling the bubble in the housing and mortgage markets. It would also alleviate the central bank's pressure from expanding further its balance sheet. On the other hand, corporate loans may also become more expensive, possibly reducing already weak investment. If banks can pass through negative rates to depositors, then lending rates would decline and pressures in the mortgage markets may intensify, but the pressures may be tempered if negative interest rates reduce capital inflows. The Danish experience (discussed below) shows the difficulty of pass-through.

4. Negative rates are present in some market segments in Switzerland. The Swiss government bill rates and some bond yields have already been negative for some time. In December 2012, Credit Suisse and UBS imposed negative interest rates on large short-term institutional deposits in Swiss francs. Both banks indicated that this was to manage their balance sheet in response to regulatory requirements. Market reactions on the foreign exchange and money markets on the day of announcements were significant. In addition, the measures resulted in a rapid drawdown of the affected deposits, suggesting that negative interest rates can be effective.

5. The recent experience with negative interest rates in Denmark has been favorable so far. Facing safe haven flows from the intensification of the euro zone crisis in the summer of 2012, the central bank of Denmark cut the rate on certificates of deposits (CDs) to -0.2 percent on July 5, 2012. The reduction of the CD rate below zero was accompanied by a simultaneous increase in the amount of reserves that banks could hold in their accounts at the central bank (their "current-accounts") at a zero interest rate to limit the amount of reserves subject to the negative rate.⁵ In the aggregate, banks can hold up to DKK 69.7bn (up from DKK 23.15bn) in their accounts at the central bank, while they receive a negative interest rate on any cash balances at the central bank in excess of this limit. After the move to the negative rate, money market rates fell, deposit rates did not change, and lending rates dropped slightly. The move achieved the desired impact on the exchange rate by reducing money markets rates and capital inflows while adverse repercussions on liquidity and the pass-through to credit conditions and retail customers were either short-lived or minimal.

⁵ Such an institutional arrangement benefits Denmark, but does not exist in Switzerland.

SNB'S BALANCE SHEET RISKS AND POLICY IMPLICATIONS¹

1. Following policy actions to combat the global financial crisis, stem the appreciation of the Swiss franc, and shore up the economy, the balance sheet of the SNB has seen an enormous growth during recent years. SNB's assets stood at 21 percent of GDP before the crisis.

The policy measures taken during the global financial crisis doubled its size. Afterwards, the 2010 and 2011 foreign exchange interventions and swaps led to a further increase in the balance sheet, including an increase of 22 percent of in one quarter in the summer of 2011, right before the currency floor was introduced. The currency floor stabilized capital inflows for the first eight months after its introduction leading to a decline in foreign exchange reserves, but the SNB had to intervene again in the summer of 2012 as the euro zone crisis intensified. Consequently, the SNB's balance sheet reached a record level of 84 percent of GDP, the largest among major central banks.

2. These policies have also transformed the structure of the SNB's assets and liabilities.

As the monetary and liquidity expansion has been carried out largely through an increase in SNB's foreign assets, foreign exchange reserves now account for 85 percent of the SNB's assets while gold dominates the rest. On the liability side, sight deposits are dominant as the accumulation in reserves has been largely matched by an increase in bank sight deposits.

3. A breakdown analysis shows that the SNB faces primarily exchange rate risk. As of now, 49 percent of foreign exchange reserves are in Euros, 28 percent in U.S. dollars, and 8 percent in yen. 82 percent of investments are in either government bonds or sight deposits at central banks, while 18 percent are in non-government securities, of which 12 percent in equities. The majority of bonds are high grade.

4. The SNB has taken steps to build up its capital in light of the increasing risks.

According to the National Bank Act, the SNB capital is built up through allocations from the annual result ("provisions for currency reserves"). These allocations are decided by the SNB and they have to take into account "developments in the Swiss economy." The SNB has a long term policy in place to increase its capital year by year via retained earnings. One of the steps it took was to double the size of the yearly retention of profits. The allocation for 2011 was set at CHF 3.2 billion, well above the CHF 0.7 billion set aside in 2010, and an allocation of CHF 3.6 billion has been announced for 2012, out of total profits of CHF 6 billion. The SNB's ability to generate profit distributions has fiscal implications. Profits not allocated to build up capital are used to pay a dividend (not to exceed 6 percent) to shareholders, and the rest is for distribution to the Confederation and cantons. To facilitate fiscal planning, these payments are smoothed over time by allocating the profits to a "distribution reserve" (a loss-absorbing part of capital) and then drawing pre-determined amounts

¹ Prepared by Yingbin Xiao.

from the reserve. Under a new agreement reached in 2011 after losses in 2010 had reduced the distribution reserves below zero, distributions to the Confederation and cantons are limited to one billion CHF per year (down from 2.5 billion previously), but if the distribution reserve exceeds 10 billion they can be increased. The threshold for the cancellation of the profit transfer was also increased to zero (up from -5 billion previously).

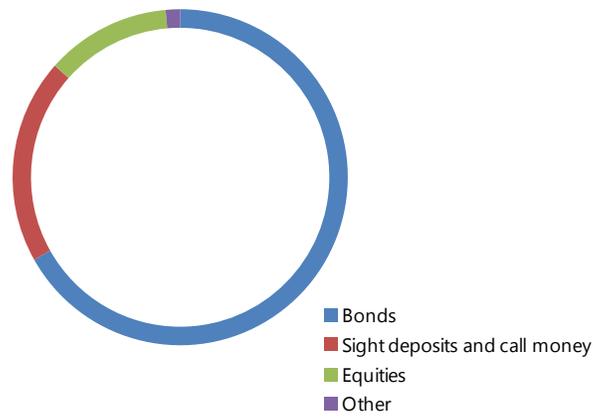
5. Despite increased profit allocations, the SNB capital has not kept pace with its growing balance sheet. At end-2012, equity and provisions stood at 11.6 percent of total assets, close to historical minima. If the SNB were to exit the exchange rate floor while it is still binding, the exchange rate would appreciate, mark-to-market losses could be very sizable, and, in some scenarios, these losses could even exhaust the SNB's capital. While central banks can operate with negative equity and use seignorage and other revenues to rebuild capital over time, there is a risk that this may cause political pressures and undermine independence.

6. The experience of other major central banks shows that various measures could be taken to manage risks arising from the massive balance sheet expansion. These measures include (i) building larger reserves by recapitalization and profit retention (e.g. European Central Bank, Bank of Japan); (ii) using historical cost accounting² (e.g. U.S. Federal Reserve, Bank of Japan); (iii) using mark-to-market accounting while setting up revaluation reserves (e.g. European Central Bank); (iv) reaching an explicit indemnification agreement with the fiscal authority (e.g. Bank of England).

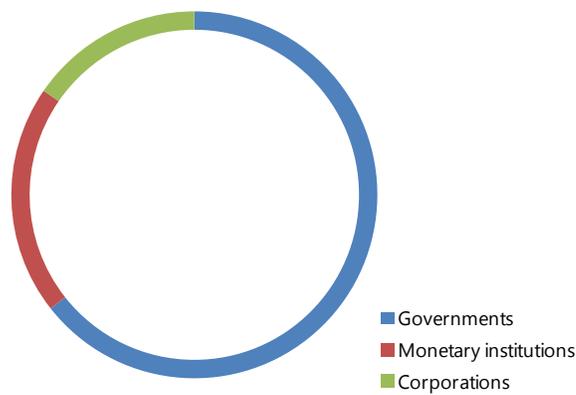
² This would help reduce the volatility of the balance sheet and financial income.

Figure 1. Switzerland: Foreign Currency Investments

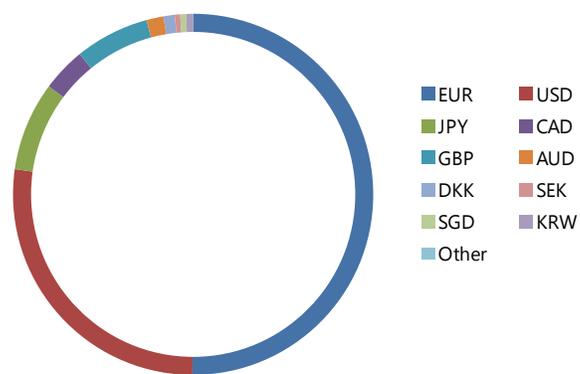
Breakdown by Investment Type
(Percent of total)



Breakdown by Borrower Category
(Percent of total)



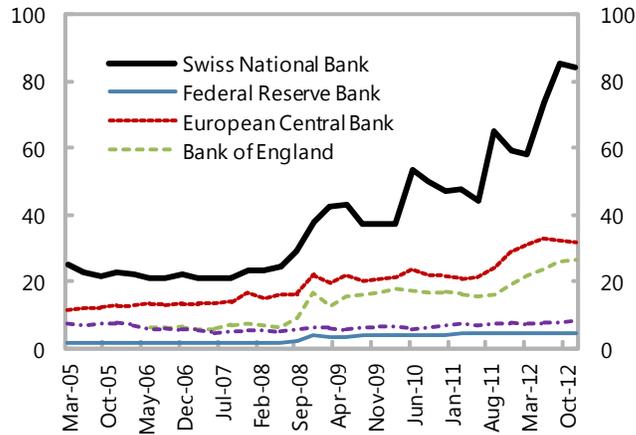
Breakdown by Currency
(Percent of total)



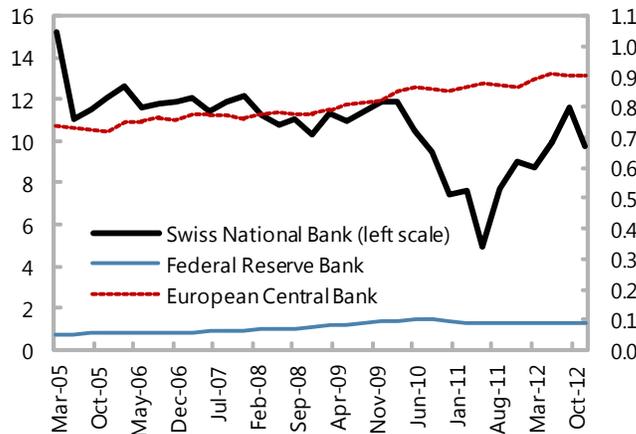
Source: Swiss National Bank.

Figure 2. Switzerland: Comparison of Central Banks

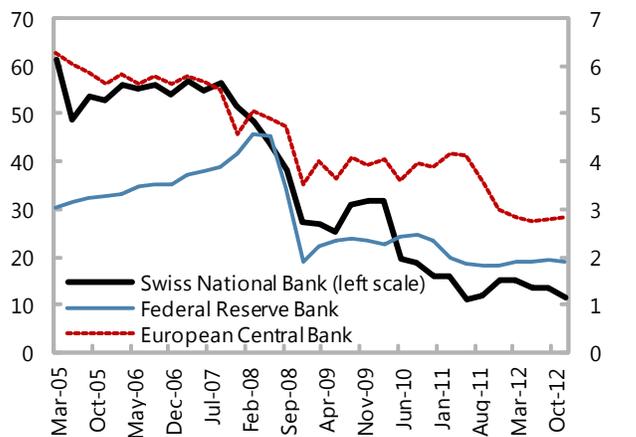
Total Assets-to-GDP Ratio
(Percent)



Capital-to-GDP Ratio
(Percent)



Capital-to-Assets Ratio
(Percent)



Sources: Haver Analytics; and IMF staff calculations.

UNDERSTANDING PRESSURES ON THE SWISS FRANC¹

1. The Swiss franc has long been a currency actively used in global financial markets. In the years preceding the global financial crisis (GFC), given low interest rates and the relatively stable nominal exchange rate, the Swiss franc was commonly used as a funding currency in carry-trade transactions and as a currency of denomination for loans in emerging European countries and Austria. Since the inception of the crisis, the negative interest rate differential with other major currencies has virtually vanished, as all central banks lowered interest rates to support economic activity. This reduced the attractiveness of the franc as a funding currency, setting the stage for the beginning of an appreciation cycle for the Swiss currency.

2. As problems in the euro zone periphery mounted, the franc has been increasingly seen as a “safe haven” currency, leading to strengthened capital inflows, both by foreigners and domestic residents repatriating capital from abroad.² These large inflows, in turn, considerably strengthened the upward momentum of the franc and increased its volatility. More recently, as the recovery faltered and in the case of Japan deflation returned, major central banks engaged in more aggressive unconventional monetary policies, potentially pushing up demand for CHF-denominated assets.

3. In this paper we explore the empirical determinants of pressures on the Swiss franc with the purpose of sorting out the relative importance of four factors: conventional monetary policy stance in other advanced countries and large emerging markets, quantitative easing and other unconventional policies pursued by major central banks, the euro area sovereign debt crisis, and global risk aversion. We also explore whether the commitment to defend an exchange rate floor in September 2011 had an impact on exchange rate pressures after controlling for other determining factors.

The dependent variable

4. To measure pressures on the Swiss franc, with monthly data we construct an *exchange market pressure (EMP) index*—defined as the weighted average of the percentage change in the nominal exchange rate against euro and the change in central bank’s FX reserves measured in francs scaled by base money.³ Weights correspond to the inverse of the standard

¹ Prepared by Robert Tchaidze.

² “Safe haven inflows” should be interpreted as including inflows by foreign residents, repatriation of foreign investments by domestic residents, and diminished outflows by domestic residents.

³ The EMP was introduced by Lance Girton and Don Roper (1977), “A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience,” *American Economic Review*, Vol. 67, pp. 537–48.

deviations of each component.⁴ The top two panels of Figure 1 plot the index and bands corresponding to two standard deviations (the left chart) as well as its components (the right chart). While movements in the index were rather limited before 2008 and driven almost exclusively by changes in the exchange rate, volatility increased sharply with the GFC and a number of instances of changes in foreign exchange reserves, as the SNB stepped in to prevent excessive strengthening of the currency following surges in private capital inflows.

Explanatory variables

5. To study the source of pressures on the Swiss franc, we regress the EMP on several possible determinants. The sample period is 2009 H2–2012, the time period in which pressures on the Swiss franc, unprecedented monetary easing in major advanced countries, and the euro zone sovereign crisis coalesced. We also show results for a longer time period as an additional exploration of the data.

6. To capture conventional monetary policy outside of Switzerland we use the interest rate in advanced economies, measured as the average of policy rates in the Euro area, Japan, U.K., and the U.S., and the interest rate in major emerging economies, measured as the average of the policy rates in Brazil, Korea, India, Poland, Hungary, and South Africa.⁵ To capture quantitative easing, we use the growth rate of combined assets of the Fed, Bank of Japan, and Bank of England measured in Euros. The growth rate of assets of the European Central Bank (ECB) is included separately, as it may also be interpreted as a proxy for the euro zone crisis. The euro zone crisis is also captured by an average of the sovereign CDS spreads for Cyprus, Greece, Ireland, Italy, Portugal, and Spain with time-varying weights corresponding to the stock of general government debt. Global risk aversion is measured using the VIX index. Finally, to test whether the introduction of the exchange rate floor reduced pressures on the Swiss currency, we include in the regression a dummy variable for the post-September 2011 period. Plots of each of the regressors are in the four bottom panels of Figure 1.

Estimation results

7. The estimation results are presented in Table 1. When we include all the potential determinants, two variables seem to have a positive and statistically significant impact on the EMP index: the CDS spreads, reflecting the euro area sovereign debt crisis, and the expansion of the

⁴ Different ways have been proposed to weight the components of the EMP index. This paper follows Chapter 3 of the October 2007 World Economic Outlook.

⁵ Although it may seem more appealing to use interest rate differentials in order to measure monetary policy stance relative to that of Switzerland, it would not be appropriate from an econometric point of view, given endogeneity between the Swiss interest rates and changes in the EMP index. Also, during the period under consideration, the Swiss policy interest rate, having approached the zero lower bound, exhibited very limited variability.

combined balance sheet of the Fed, Bank of England, and Bank of Japan, reflecting an increase in the global liquidity (regression (1)). On the other hand, conventional monetary policy, the change in the ECB balance sheet, and the VIX do not have a significant impact. The adjusted R-squared of the regression is 23 percent, so there remains sizable unexplained variation. This is not surprising as changes in the exchange rate (or offsetting changes in the FX reserves) are notoriously hard to capture empirically.⁶ Interestingly, the dummy for the exchange rate floor has a negative and significant coefficient, indicating that the change in regime succeeded in abating pressures on the currency.⁷

Robustness

8. When we estimate the model including each explanatory variable one at a time, CDS spreads and central bank balance sheets remain significant, and so does the exchange floor dummy. While expansion of the ECB balance sheet does not have a statistically positive coefficient in the benchmark regression, it does so when included by itself (regression (5)). This may be because it is highly correlated with both the CDS spread and changes in other central bank balance sheets (Table 2). The results are also robust to excluding insignificant variables (regression (8)) and introducing a moving average term in the regression to address autocorrelation concerns (regression (9)).

9. Finally, comparing regressions (8) and (9) and regressions (10) and (11), in which the model is estimated for the periods 2008M1–2012M12 and 2003–2009H1, we see that while both CDS spreads and central bank balance sheets continue to have a significant impact on the EMP, the magnitudes of the coefficients is different: expansion of the balance sheets has a much smaller impact, while the CDS spreads had a somewhat bigger impact. This, together with other estimations, suggests a structural break occurring sometime in the second half of 2008.

Economic size of the effects

10. Turning to the economic importance of the effects, estimation results suggest that an increase of 100 basis points in the weighted-average CDS spreads for Euro area countries under market pressure leads to an increase in the EMP index of some 0.3 percent, which in absence of the SNB's FX interventions, would translate into a Swiss franc appreciation of 0.4 percent per month. Likewise a 1 percent expansion in the balance sheet of the three major

⁶ Much of the unexplained variation relates to extreme movements in the EMP index: when we add to the specification dummy variables for outlier observations of the index the fit improves considerably. In particular, the adjusted R-squared jumps to 60 percent with a dummy for August 2011, when the EMP had its largest spike.

⁷ The dummy has also been interacted with the explanatory variables in order to capture any other behavioral changes, but the coefficients on these interacted terms turned out to be insignificant.

central banks causes an appreciation of 0.5 percent per month. Meanwhile, the introduction of the floor is estimated to have prevented appreciation of the currency by some 5 percent a month.

Table 1. Regressions for Exchange Market Pressure Index¹

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	2009M7-2012M12									2008M1- 2012M12	2003- 09M6
<i>Sample:</i>											
<i>Constant</i>	5.37	2.75	1.21	0.96	1.38	0.77	1.53	0.19	0.25	0.43	-0.16
	0.97	0.77	0.22	2.09	3.11	1.46	1.02	0.38	0.46	1.23	-1.60
<i>Interest Rate ADV, %</i>	-2.91	-3.01									
	-0.19	-0.38									
<i>Interest Rate EM, %</i>	-0.66		0.03								
	-0.40		0.04								
<i>Fed, BoJ, BoE Balance Sheets, %</i>	0.34			0.33				0.36	0.34	0.07	0.05
	2.55			2.76				3.25	3.05	2.10	4.10
<i>ECB Balance Sheet, %</i>	0.06				0.19						
	0.59				2.07						
<i>CDS Spreads, %</i>	0.28					0.24		0.27	0.28	0.25	0.51
	2.15					2.24		2.82	2.71	2.87	2.30
<i>VIX, percentage points</i>	0.00						-0.01				
	-0.05						-0.08				
<i>Dummy</i>	-3.64	-1.14	-1.07	-0.94	-1.49	-3.45	-1.07	-3.59	-3.75	-3.43	
	-2.75	-1.45	-1.25	-1.36	-1.99	-2.69	-1.39	-3.15	-3.05	-3.02	
<i>MA(1) Component</i>									0.12	0.00	
									0.71	0.00	
<i>Adj. R-squared</i>	0.23	0.00	0.00	0.16	0.10	0.11	0.00	0.29	0.28	0.15	0.25
<i>Durbin-Watson</i>	1.83	1.61	1.62	1.69	1.67	1.64	1.62	1.73	1.95	1.68	2.31

Source: IMF staff calculations

¹t-statistics in small font under the coefficients, statistically significant variables in red.

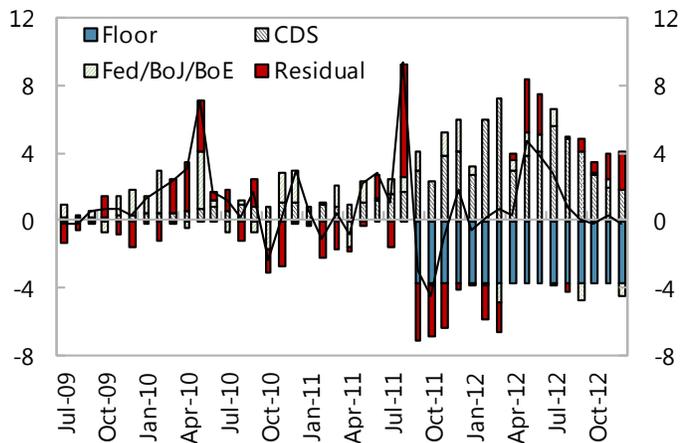
Table 2. Cross Correlations

	2003-2012						
	EMP	AD	EM	CB3	ECB	CDS	VIX
EMP	1.00						
ADvanced Countries Interest Rate	-0.26	1.00					
EMerging Economies Interest Rate	-0.29	0.59	1.00				
CB3, Growth Rate of the Balance Sheets	0.30	-0.02	0.08	1.00			
ECB, Growth Rate of the Balance Sheet	0.20	0.06	0.06	0.57	1.00		
CDS, Weighted Average	0.20	-0.55	-0.46	0.02	0.12	1.00	
VIX	0.21	-0.31	-0.06	0.47	0.24	0.06	1.00
	2009M07-2012M12						
	EMP	AD	EM	CB3	ECB	CDS	VIX
EMP	1.00						
ADvanced Countries Interest Rate	0.01	1.00					
EMerging Economies Interest Rate	-0.10	0.49	1.00				
CB3, Growth Rate of the Balance Sheets	0.41	0.13	0.00	1.00			
ECB, Growth Rate of the Balance Sheet	0.23	0.27	0.29	0.38	1.00		
CDS, Weighted Average	0.00	-0.25	0.55	-0.10	0.35	1.00	
VIX	0.02	0.54	0.03	0.26	0.25	-0.26	1.00

Source: IMF staff calculations

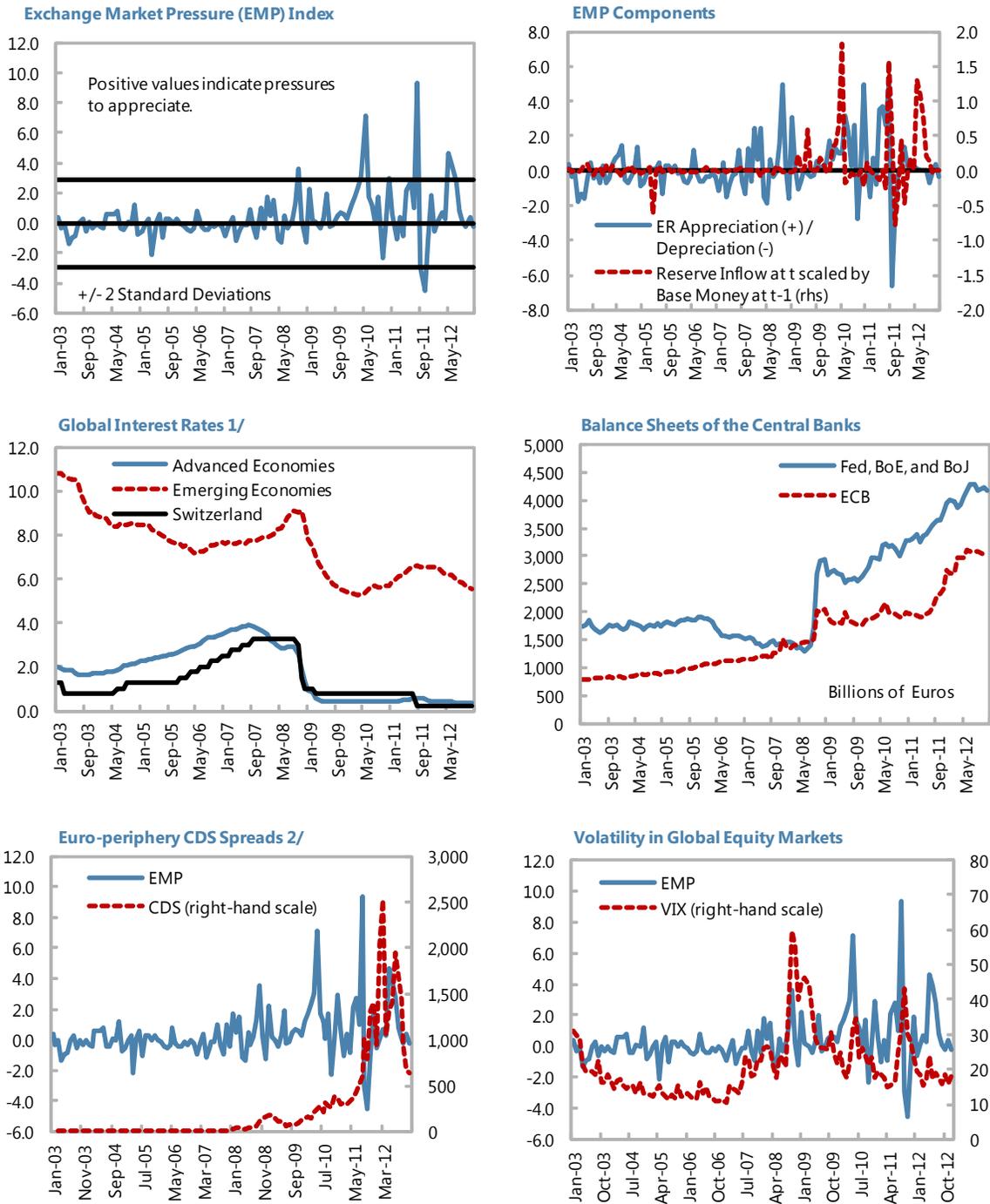
11. Using our regression coefficient estimates (regression (8)), we decomposed the predicted changes in the EMP index into the three subcomponents: the effect of unconventional monetary policy in major economies, the effect of the euro area sovereign debt crisis, and the effect of the floor. As the chart shows, until summer of 2011, unconventional monetary policy in major advanced countries was the main driver in the movements of the index. In 2011, as the CDS spreads in the Euro zone countries under market pressure climbed, these spreads became the main driver of pressures on the Swiss franc, though the new exchange rate regime managed to offset a considerable part of these pressures.

Exchange Market Pressure Index and Contributions of Various Determinants



Source: IMF staff estimates.

Figure 1. Switzerland: Determinants of the Exchange Rate Pressures



1/ Simple averages of policy interest rates: Euro area, Japan, U.K., and the U.S. for advanced economies, Brazil, Korea, India, Poland, Hungary, and South Africa for the emerging ones.

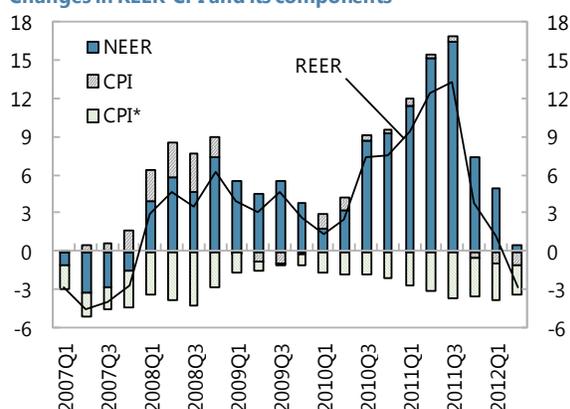
2/ Weighted average of the spreads for Cyprus, Greece, Ireland, Italy, Spain, and Portugal with time-varying weights corresponding to the stock of general government debt.

Source: Haver, Bloomberg, and IMF staff calculations.

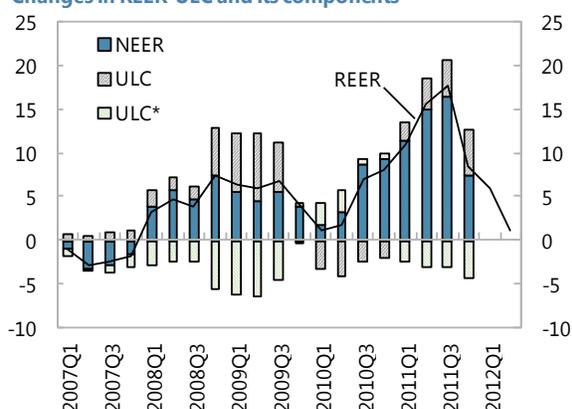
HOW DID THE SWISS ECONOMY ADJUST TO EXCHANGE RATE APPRECIATION?¹

1. Since 2008 the Swiss franc has been appreciating in real terms, mostly on the back of strong nominal appreciation. This trend reverted in 2011 Q3 when the SNB announced it would defend a floor on the nominal exchange rate against the euro.² By then the currency had appreciated by 32 percent in terms of REER-CPI and by 40 percent in terms of REER-ULC from its end-2006 level. Since the introduction of the floor, the NEER and the REER-ULC have depreciated by some 6 percent, while REER-CPI has depreciated by 8 percent reflecting the negative inflation differential with trading partners.

Changes in REER-CPI and its components



Changes in REER-ULC and its components



Sources: Eurostat; OECD (for Swiss ULC estimates); Haver Analytics; and IMF staff calculations.

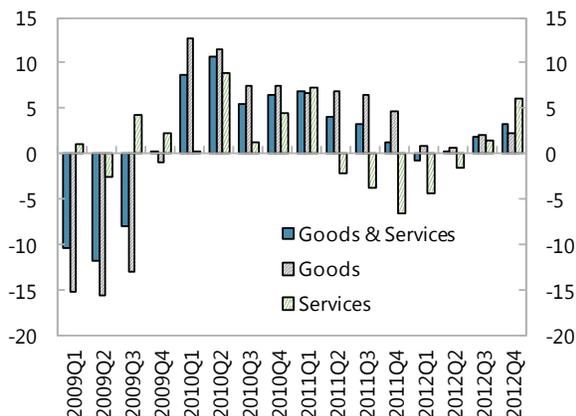
2. The sharp appreciation of the franc has raised concerns about possible negative effects on the Swiss external performance, in particular on the export sector. Although the trade balance has continued to record sizable surpluses (around 2½ percent of GDP for goods in addition to some 8 percent of GDP in services in 2010–12), export growth has been declining (from some 12 percent in the 2010 H1 to less than 0.5 percent in 2012 H1, well below the pre-crisis average of just above 5 percent).

3. To gain further understanding of the effects of exchange rate appreciation, it is useful to examine the performance of Swiss export goods in global markets during the last decade. Exports of goods represent some 35 percent of GDP, while exports of services constitute a further 15 percent. The main categories of exported goods are chemicals, manufactured goods, and machinery and transport equipment, while the main destinations are Germany, the United States, Italy, France, and the United Kingdom.

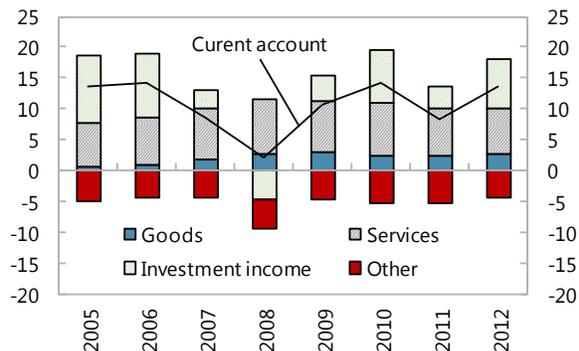
¹ Prepared by Robert Tchaidze.

² See IMF Country Report No. 12/107, "Unprecedented Currency Appreciation and Policy Response."

Switzerland: Growth Rates for Real Exports (SA)



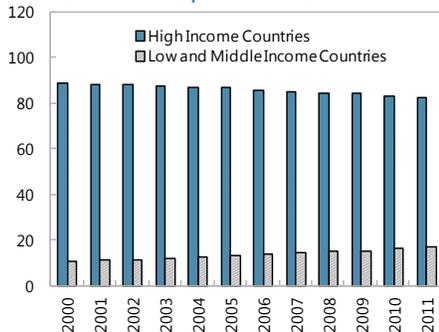
Switzerland: Current Account Components (Percent of GDP)



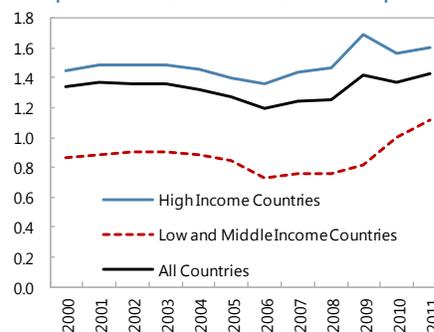
Source: Haver Analytics.

4. A closer look at the market shares of Swiss exports in these economies reveals a rather surprising stability (Figure1). In spite of significant movements in the exchange rate and variability in the market share of other competitors in these markets, the shares of Swiss goods have been broadly unchanged. Likewise, the top of the “country-product” matrix for the Swiss exports has been fairly stable through the decade,³ even though exports to low- and middle-income countries have been playing a bigger role.

Distribution of Exports from Switzerland



Imports from Switzerland as a Share of Total Imports

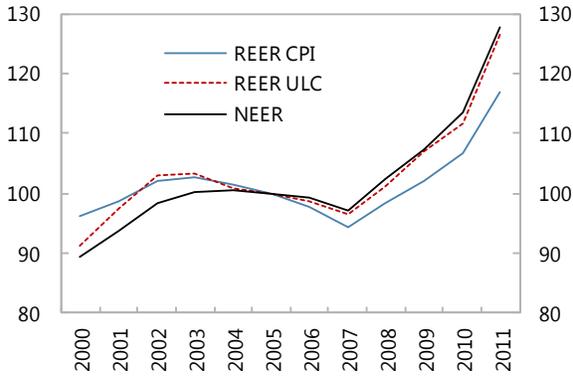


Source: U.N. COMTRADE and IMF staff calculations.

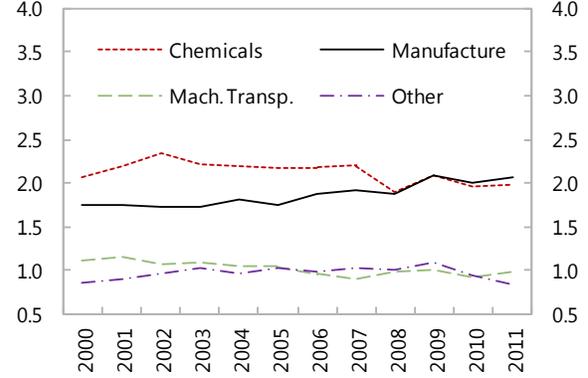
³ The top of this matrix is Germany, Machinery and transport equipment; Germany, Chemicals; United States, Chemicals; Germany, manufactured goods; United States, Machinery and transport equipment; Italy, Chemicals.

Figure 1. Effective Exchange Rates and Market Shares

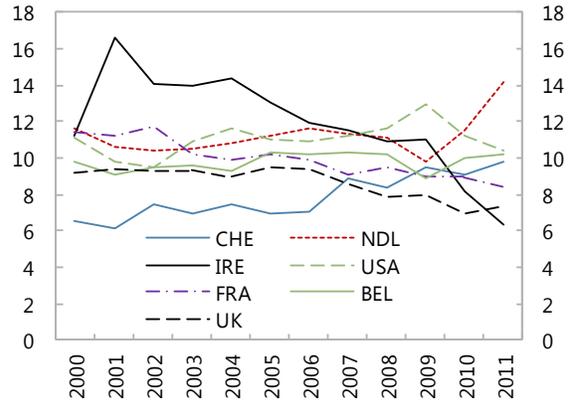
Effective Exchange Rates
(Index 2005 = 100)



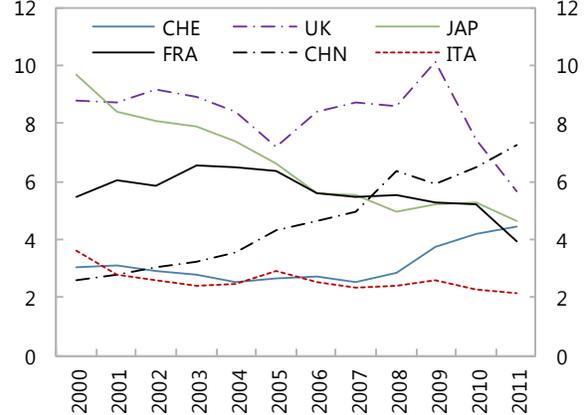
Shares of Swiss Exports in World Imports
(Based on SITC 1 classification of products)



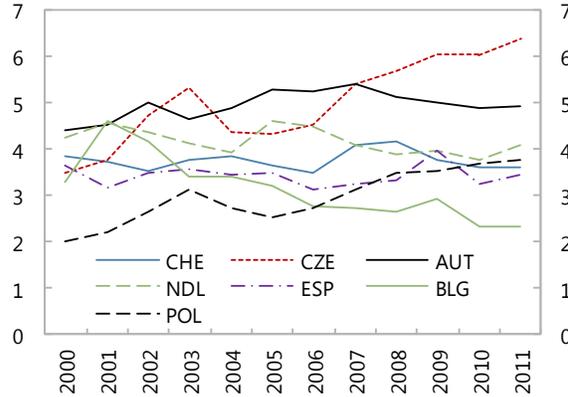
Germany, Chemicals. Top Exporters



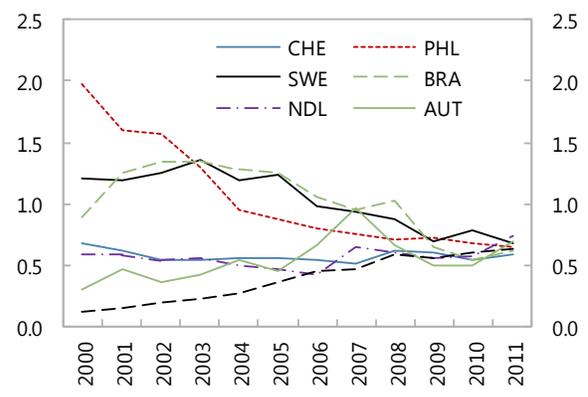
USA, Chemicals. Selected Exporters



Germany, Mach. Transp. Selected Exporters



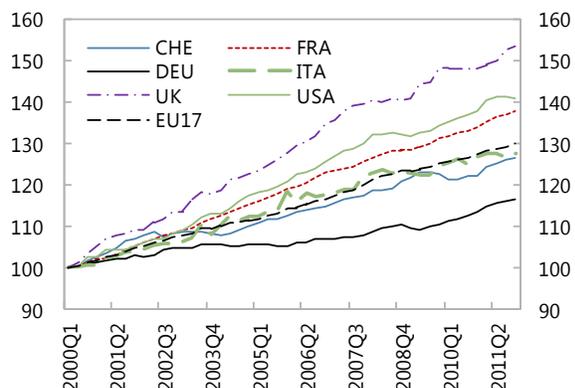
USA, Mach. Transp. Selected Exporters



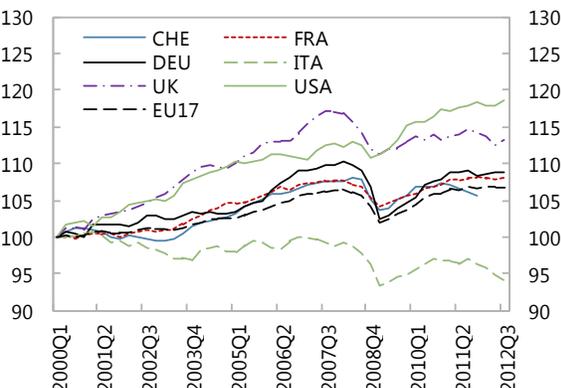
Sources: Eurostat; UN Comtrade; and IMF staff calculations.

5. These observations suggest that Swiss exporters managed to hold on to their market share in important export markets despite the real appreciation. They may have done so by limiting the pass-through of exchange rate changes to export prices by reducing wages, accepting lower margins, or increasing productivity.⁴ In addition, exporting industries may be built around production of very specific items, which are particularly valued for their brands or special characteristics and hence face limited price competition. In the latter case, it would be the cyclical position in the destination economies that determines the Swiss exports rather than the real exchange rate.⁵

Labour Compensation per Unit of Labour Input



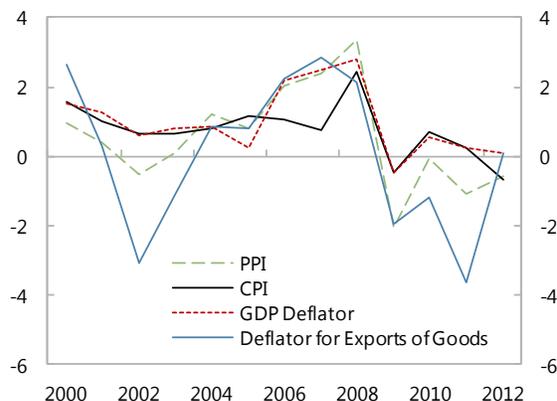
Labour Productivity Index



Source: OECD.

6. Developments in labor compensation and productivity show that since 2000 both variables have evolved broadly in line with EU averages, suggesting that the adjustment has not taken place via a reduction in labor costs.⁶ Thus, the pressures must have been absorbed through a reduction in non-wage costs or through lower profits.

Measures of Inflation



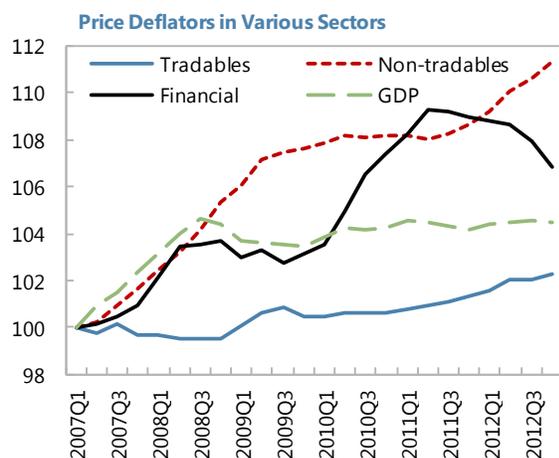
Sources: Haver Analytics; and IMF staff calculations.

⁴ It could also be the case that Swiss exporters moved parts of their production chains abroad. If this were the case, then one would observe an increase in imports of intermediate goods and corresponding changes in employment. Unfortunately, limited data availability precludes a test of this hypothesis. SNB estimates, however, do suggest that Swiss multinational firms have been increasing employment abroad, although without laying off workers at home.

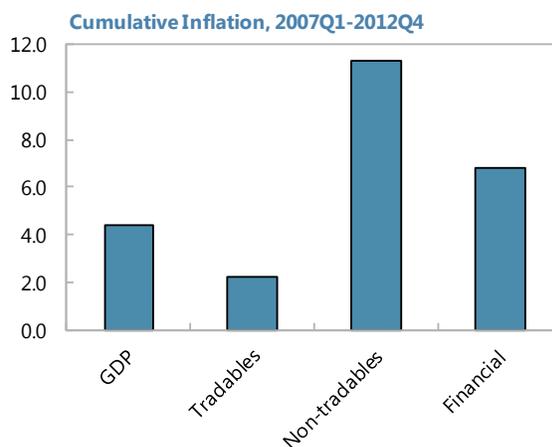
⁵ This is in line with findings in IMF Country Report No. 11/16, "Impact of Exchange Rate Movements on Export Performance and Consumer Prices," which found exports to advanced economies not be affected much by exchange rate fluctuations.

⁶ Ideally one should look at wages and productivity in the export-oriented sectors, but such data are not available. Labor costs in tradable sector may have grown less than in the non-tradable sector, but there are indications that productivity has been growing faster in tradable sectors.

7. While difficult to verify, such a claim is supported by the fact that the Swiss export good deflator tends to decline much more during the periods of real appreciation (see, in particular, 2002 and 2007–11) than other prices in the economy, likely reflecting an effort to limit price increases in foreign markets.⁷ A similar picture emerges when comparing inflation in tradable,⁸ non-tradable, and financial⁹ sectors. Namely, inflation in tradable sector was subdued, at 0.4 percent a year, compared to 1.4 and 1.9 percent in financial and non-tradable sectors correspondingly.



Source: Haver and IMF staff calculations.



⁷ If export goods make a larger use of imported intermediate inputs than other goods, however, it may be that the larger decline in the export deflator simply reflects the falling domestic price of imported inputs.

⁸ Tradable sectors include agriculture, forestry, and fishing; industry, excluding construction; trade, travel, accommodation, communication (the industry breakdown of data is based on NACE2 classification).

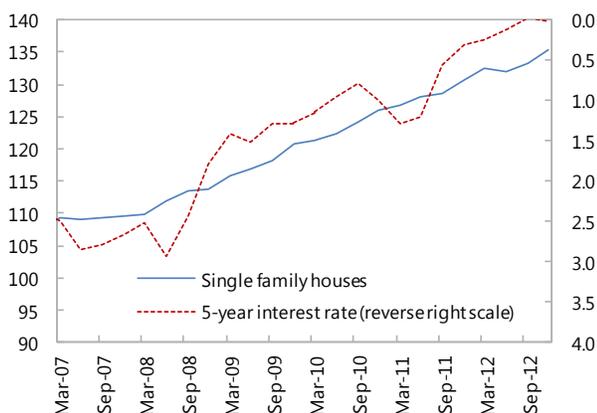
⁹ Financial services are quoted separately, given the international nature of this sector in Switzerland.

THE SWISS HOUSING MARKET: WHAT ARE THE RISKS?¹

1. The extremely low interest rate environment has spurred mortgage lending and pushed up house prices.

As the SNB lowered interest rates in late 2008, interest rates on mortgage loans followed down and have reached record low levels. With lower rates, mortgage lending started to grow. Since 2009 the stock of mortgages has increased by about 5 percent per year and reached 140 percent of GDP in 2012. As a result of the increased demand, house prices have shot up and the combination of increased mortgage lending and elevated housing prices is a potential risk to the banking sector that deserves significant attention.

House Prices and Interest Rate



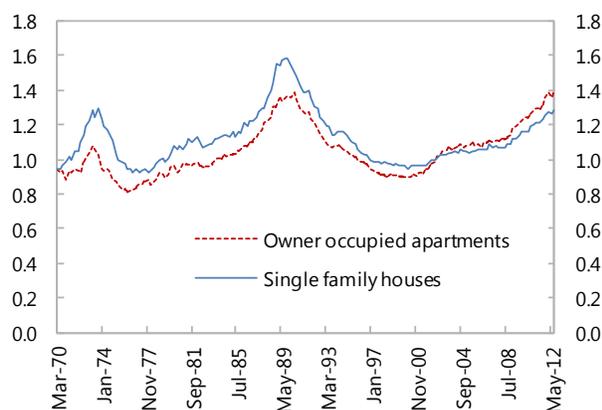
Sources: Wuest & Partner; IFS.

House prices are high, but it's too early to call it a bubble

2. Real house prices are high, and at an all-time high for owner-occupied apartments.

Prices have been on an increasing trend since the late 1990s and the average price for a single family home has increased by about 49 percent.² Prices for owner-occupied apartments have increased even more (72 percent) and in the last four years the annualized price increase (5 1/2 percent) substantially exceed nominal GDP growth. When deflating house prices by the CPI, owner-occupied apartment prices are slightly above the peak of the boom-bust period in the late 80s to early 90s.³ Single family home prices are still below the peak, but still high by historic standards.

Real Residential Real Estate Prices (Index)



Sources: Wuest&Partner; and IFS.

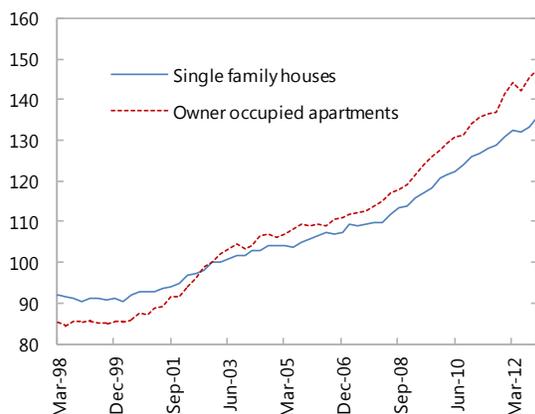
¹ Prepared by Erik Lundback.

² Asking prices are used instead of transaction prices since for earlier periods the number of observations underlying the data is significantly larger.

³ Wüest & Partner asking price index.

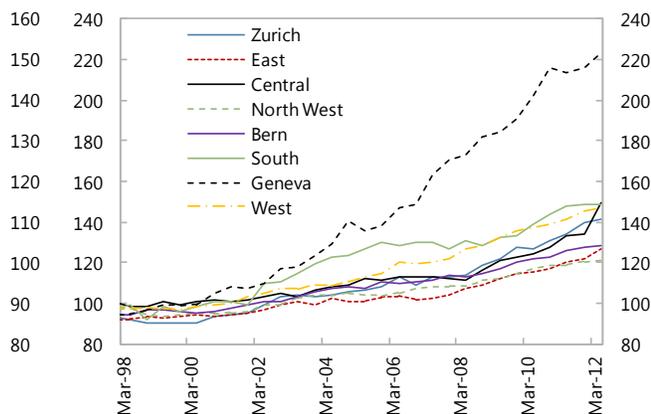
3. Residential house price increases are especially pronounced in certain segments and region. Turning to regional patterns, Geneva stands out with price increases far exceeding the other regions in both the single family home and the owner occupied segments. It is also important to note that the price increases started from already high price levels.

Nominal Residential Real Estate Prices
(Index, 2002Q4=100)



Source: Wüest & Partner.

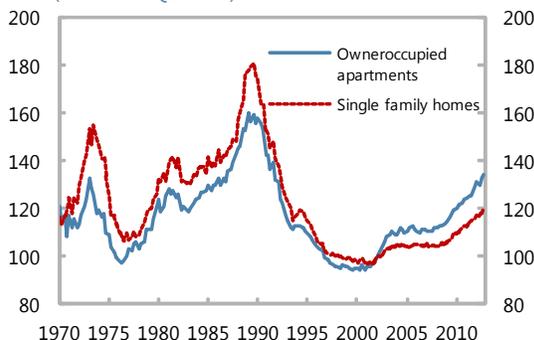
Single Family House Nominal Prices by Swiss Regions
(Index, 1996H1 = 100)



Source: Wüest & Partner.

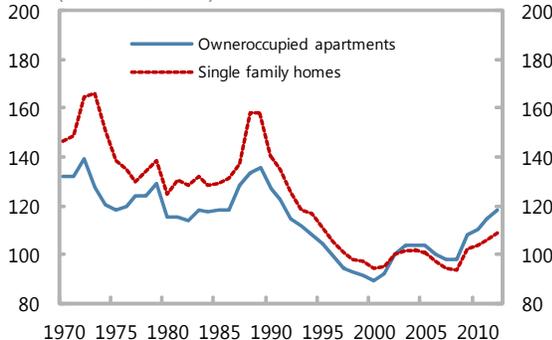
4. Current prices look less elevated when compared to income and rents. Following the boom in the late 80s housing prices fell dramatically and their subsequent growth remained subdued relative to growth in rents and in GDP per capita until the late 2000s, when housing price growth accelerated. While these ratios are still well below the levels reached at the peak of the previous boom, the ratio of price to rents for owner occupied apartments is already 15 percent above its long-term average.

Price-to-Rent Ratio
(Index 2002Q1 = 100)



Source: Swiss National Bank.

Price-to-GDP per Capita Ratio
(Index 2002 = 100)



Sources: IFS; SNB; WEO; and staff calculations.

5. Overall, housing price developments in Switzerland have thus far been less dramatic than during other boom and bust episodes. To get a sense of how Switzerland's most recent developments compare to past experiences, peaks after which prices declined by at least 10 percent

in the coming four years were identified in a sample of 21 advanced countries over the period 1970–2011.⁴ Then nominal and real prices and price-to-income and price-to-rent ratios were indexed with a base 16 quarters before the peak, and extended 16 quarters past the peak. The most recent developments in Switzerland (labeled “CHE now”) end in September 2012 and are indexed from 16 quarters back. These indicators are displayed in Panel 1 and a few observations can be made: (i) the recent growth in Swiss nominal and real house prices is more moderate than that observed in the boom phase of a typical bubble; (ii) the recent development in the price-to-income ratio, however, is not very different from the comparators, as upward trends in this ratio were overall less pronounced; and (iii) the two Swiss bust and boom episodes (early 70s and late 80s/early 90s) are quite similar to the typical bubble observed in other countries. Thus, other countries experiences are likely to be relevant benchmarks for the analysis of current trends in Switzerland.

The main concern is the high level of mortgage debt

6. However, outstanding mortgages are at an all time high relative to GDP, and the level of mortgage debt is high in international comparison. Total outstanding mortgages now stand at about 140 percent of GDP, which is an all time high. The average growth of mortgage lending as share of GDP has been about 5 percent in the last four years, which is about 3 percentage points above its 30-year average, but this followed 6 years of below-average growth, so it may represent at least in part catching up. During the last ten years, mortgage growth has very similar to its 30-year average. However, the amount of outstanding residential mortgages in Switzerland is among the highest compared to other advanced countries.

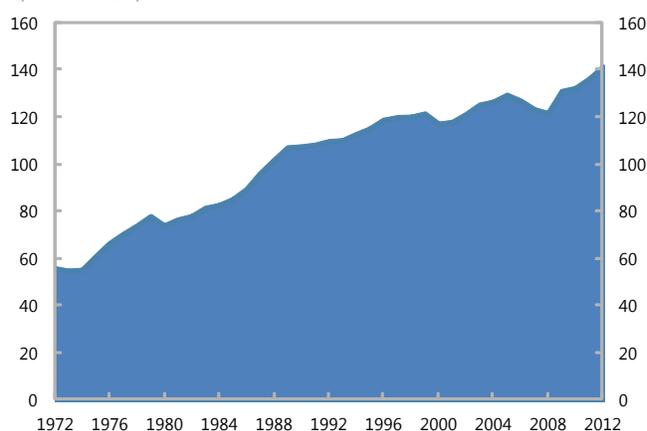
7. Perhaps even more worrying is that banks report no quantitative tightening of lending condition as measured by loan-to-value (LTV) and loan-to-income (LTI). In qualitative lending surveys, conducted by the SNB, senior risk officers report a slight tightening of lending conditions and standards during 2012. However, in *quantitative* lending surveys, banks report no tightening of LTVs or LTIs on new mortgages, and the number of exceptions to banks’ individual internal lending policies remains substantial and is not decreasing.⁵ This suggests that households taking out mortgages may become financially stretched and increasingly exposed to the risk of a price correction or interest rate increase down the road.⁶

⁴ The sample of countries include Australia, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the U.K., and the U.S. In 12 of the countries, plus Switzerland, had there been at least one boom-bust episode: Denmark, Spain, Finland Greece, Ireland, Italy Japan, Korea, the Netherlands, Norway, Sweden, and the US

⁵ According to the SNB, around one fifth of new mortgages for residential real estate have LTVs above 80 percent, and LTI ratios suggest that affordability would be stretched for a significant share of new loans if interest rates increased to about 5 percent.

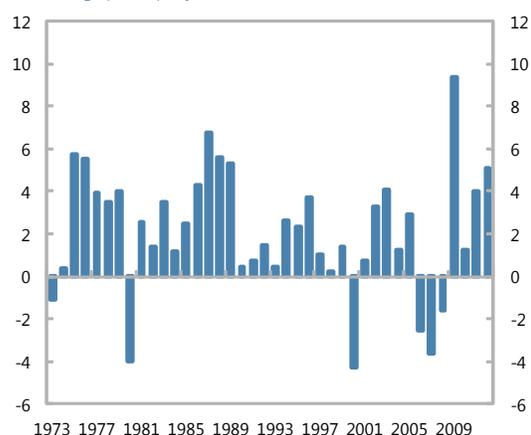
⁶ Swiss mortgages are typically at about 5-year maturity and fixed interest rate, with an option to roll over the mortgage. The new mortgage, of course, might carry a higher interest rate if market rates have increased. A recent quantitative survey by the SNB indicates that Libor mortgages (a mortgage product with very short repricing maturity and an interest rate tied to the Libor rate) account for more than 15 percent of newly extended mortgage loans in 2012.

Total Mortgages
(Percent of GDP)



Sources: IFS; SNB; WEO; and IMF staff estimates.

Mortgages to GDP Growth Rate
(Percentage points per year)



Sources: IFS; SNB; WEO; and IMF staff estimates.

The authorities have taken measures and consider further action

8. The Swiss authorities see the developments in the housing and mortgage markets as risky and have recently introduced measures to address these concerns:

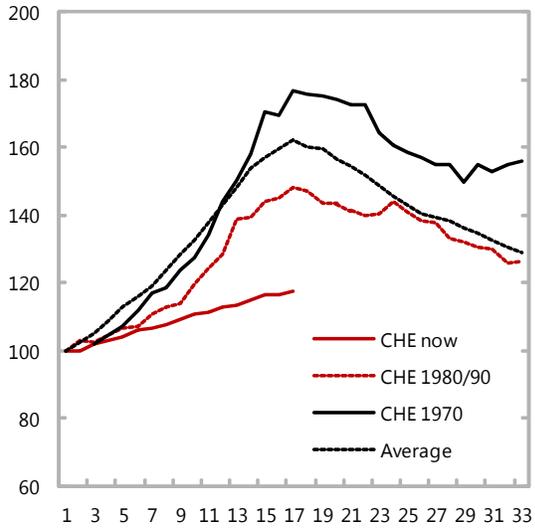
- (i) New requirements for mortgage financing were drawn up by the Swiss Bankers Association as minimum regulatory standards and were approved by FINMA, the microprudential supervisor. The standards consist of: (i) a minimum down payment of 10 percent of the lending value of the property from the borrower's own funds, which may not be obtained by pledging or early withdrawal of Pillar 2 pension assets; and (ii) mortgages must be paid down to two thirds of the lending value within a maximum of 20 years.
- (ii) Banks will be required to apply a risk weight of 100 percent for mortgages which do not comply with the new minimum standards.
- (iii) Mortgages exceeding 80 percent of the property value will have a risk weight of 100 percent applied to the part of the loan exceeding the 80 percent threshold.
- (iv) Banks using an internal ratings-based approach have to apply a bank-specific multiplier when calculating risk-weighted assets for Swiss residential mortgages. The multiplier is to be applied to new and renewed mortgages.
- (v) Banks will have to hold a countercyclical capital buffer (CCB) of 1 percent of their risk-weighted, direct or indirect, mortgage-backed positions secured by residential property in Switzerland starting September 30, 2013.

The first two measures have been phased in since mid-2012, and the third and fourth measures went into effect at the beginning of 2013, while the CCB was activated on February 13, 2013.

Figure 1. House Price Indicators During Boom and Bust Episodes

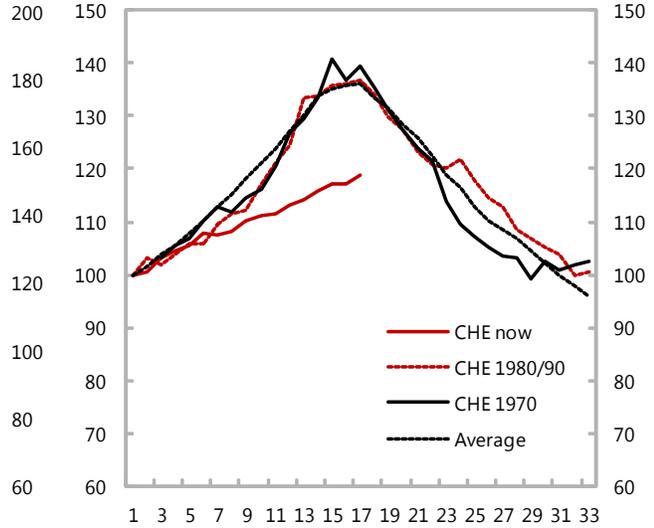
Nominal House Prices

(Index 16 quarters before peak = 100)



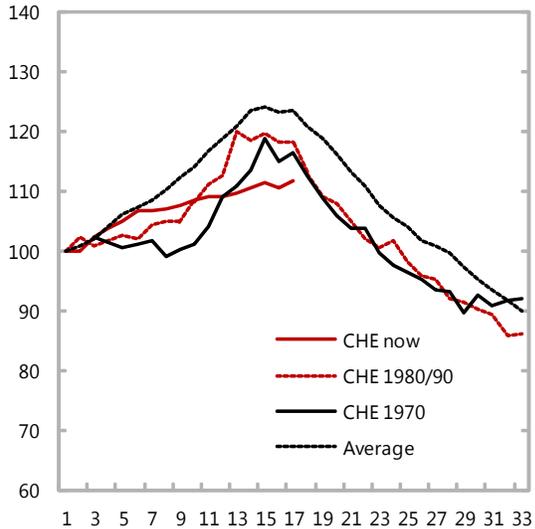
Real House Prices

(Index 16 Quarters Before Price Peak=100)



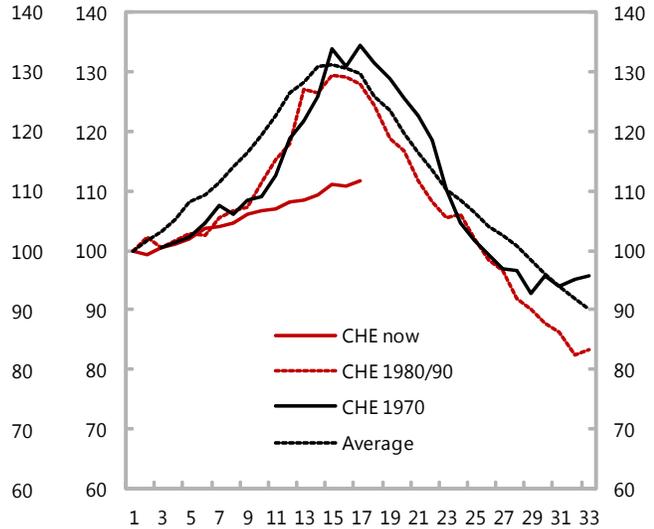
Price-to-Income Ratio

(Index 16 Quarters Before Price Peak = 100)



Price-to-Rent Ratio

(Index 16 Quarters Before Price Peak=100)



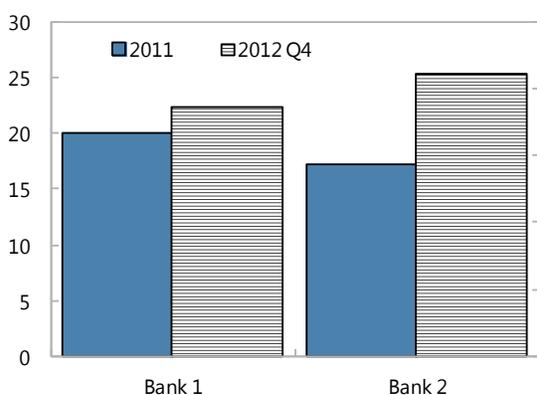
Sources: OECD; and IMF staff calculations.

SWISS G-SIBS: THE ONGOING CHALLENGES¹

1. The two large Swiss banks are in a restructuring and consolidation phase. Both banks report profits for 2012 excluding one-time losses (such as restructuring and consolidation costs, fines, and provisions for litigations and regulatory issues); taking into account these losses, however, one of the banks report an overall loss and the other much weaker profitability. Credit impairment is down, both in absolute and relative terms. Both banks also report that their regulatory capital ratios have substantially improved and are already close to the regulatory core capital minimum of 10 percent based on full implementation of Basel III rules. However, much of the improvement in capitalization has been achieved by reducing risk-weighted assets (RWA). In particular, one of the banks reduced RWA by over 30 percent in 2012, while reporting virtually unchanged capital. Two thirds of the reduction in RWA was in the investment banking business following a strategy to sharply pare down fixed-income, currency and commodity activities. The other bank reduced RWA by a sizable 15 percent through a reduction in fixed income sales and trading.

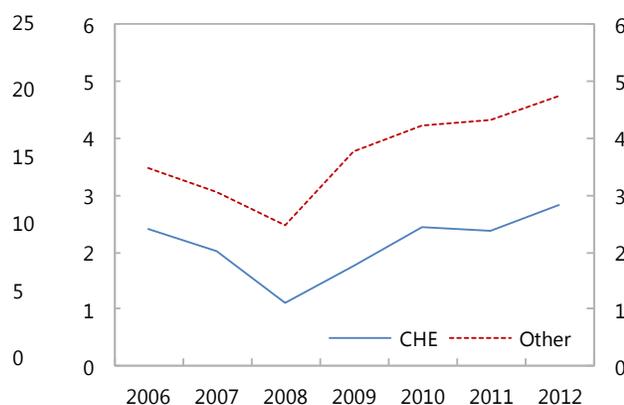
2. In a peer comparison, the two Swiss G-SIBs continue to be highly leveraged.² While the Swiss banks compare favorably to other G-SIBs in terms of Basel II capital adequacy, their leverage remains high, though total assets were reduced by more than 10 percent in both banks. Specifically, considering a simple leverage ratio measured as tangible equity to total assets, the Swiss banks are still well below their peer average (about 1½ percentage points) and below most of their peers, though it is worth pointing out that the leverage ratio of one of the Swiss banks is steadily improving from a very low level, while the other appears quite stationary. As part of the TBTF legislation, Switzerland also introduced the TBTF Leverage Ratio going into effect in 2013, with a

Basel II.5 Total Capital Ratio 1/
(Percent)



Sources: Fourth Quarter Reports

Leverage Ratio
(Percent)



Sources: Bankscope

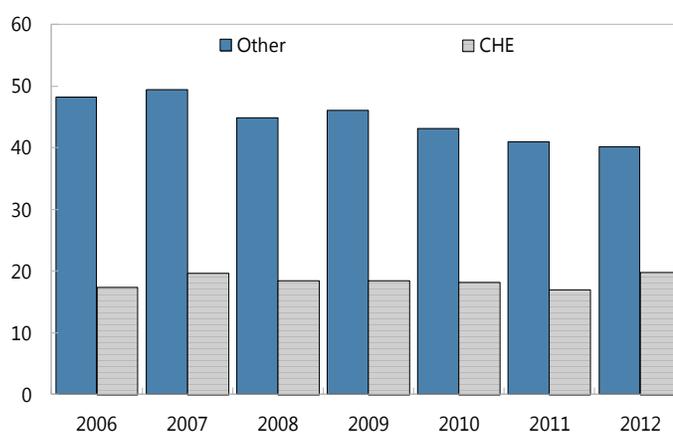
¹ Prepared by Erik Lundback.

² Data for comparison is latest available from Bankscope. The group of peers here comprises: Citigroup, Deutsche Bank, HSBC, JP Morgan Chase, Barclays, BNP Paribas, Bank of America, Bank of New York Mellon, Goldman Sachs Group, Mitsubishi, and Morgan Stanley, Royal Bank of Scotland.

minimum of 24 percent of the minimum total capital requirements, and will thus be phased in as the total capital requirement is being phased in. Going forward, both banks will have to more forcefully reduce their balance sheet or build up capital as the ratio becomes increasingly binding.³

3. A specific issue related to leverage is the reliance on internal ratings based models by the big banks and their low reported RWA. Internationally, market participants and supervisors are increasingly worried that internal ratings based models (IRBs) may not accurately capture risks, especially systemic and tail risk, and that this may lead to insufficient capitalization. A related concern is that RWAs across banks using IRB vary a lot, and, while this may reflect differences in actual risk taking and business models, it could also be due to different supervisory approaches in different jurisdictions, or different banks' modeling choices. This issue has recently been studied by international organizations, country authorities, as well as the private sector.⁴ According to these studies, while a substantial part of variations in RWAs can indeed be explained by differences in portfolios, there is also much left to be explained by other factors. Some recent studies show that the Swiss banks have among the lowest ratios of RWA to total assets within the G-SIBs.⁵ It is an open question, in Switzerland and elsewhere, if low RWAs reflect genuinely lower risk profiles or other factors. These concerns are being addressed at the international level within a broader project for

Risk Weighted Assets to Total Assets
(Percent)



Sources: Bankscope

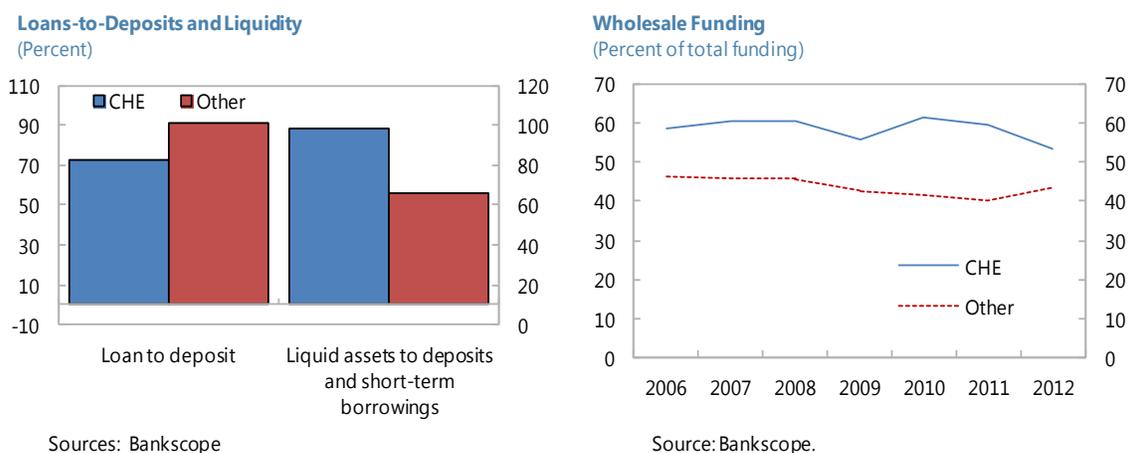
³ The leverage ratio is set at 0.24 times the regulatory capital ratio. Since the latter is set at 19 percent for TBTF banks by 2019, the minimum leverage ratio will then be 4.56 percent. Contingent convertible capital can be used to fulfill this ratio. Furthermore, if banks reduce their balance sheet size, then the minimum capital requirement and leverage ratios will be reduced.

⁴ See e.g. Cannata, Casellina, and Guidi, 2012, "Inside the labyrinth of Basel risk-weighted assets: how not to get lost," Banca d'Italia, *Questioni di Economia e Finanza*, 132; European Banking Authority, 2013, "Interim results of the EBA review of the consistency of risk-weighted assets. Top-down assessment of the banking book"; Le Lesle and Avramova, 2012, "Revisiting Risk-Weighted Assets," IMF Working Paper 12/90; and Accenture, 2012, "The New Importance of Risk-Weighted Assets across Europe."

⁵ This ratio is affected by the accounting standard used; specifically IFRS tends to result in a lower RWA/TA than GAAP. However, the Swiss bank reporting under IFRS has one of the lowest RWA-to-asset ratio among IFRS-reporting G-SIBs, while the Swiss bank reporting under GAAP has one of the lowest ratio among GAAP-reporting banks. Also, the Basel Committee report "Regulatory Consistency Assessment Programme (RCAP) – Analysis of Risk-Weighted Assets for Market Risk," January 2013 finds that one Swiss bank included in the sample had low RWA for market risk compared to peers, though it notes that "across the sample of banks deductions may not be fully taken into account when showing ratios of RWAs over trading assets and total assets" and "[t]hat this may cause the ratios to be underestimated."

regulatory consistency by the Basel Committee on Bank Supervision (BCBS); FINMA, the Swiss supervisory authority, is participating in this project.⁶ FINMA is also engaged in a BCBS working group reviewing the issue of information disclosure by banks to foster market discipline.

4. Both banks have favorable indicators of liquidity, though their share of gross wholesale funding is high. Basel III liquidity ratios are reported to be above 100 percent, liquid assets to deposits and short-term borrowings are high, and the ratio of loans to deposits is low. To some extent this reflects the easy monetary policy of the SNB paired with cautious business practices as the banks are reorienting themselves. The extent of gross wholesale funding in total funding is nevertheless large and both banks have declared intentions to reduce it, but it remains to be seen if and when the restructuring efforts will make a substantial impact.



5. The two banks have continued and accelerated their restructuring and consolidation process. The deep financial troubles in 2008–2009 (resulting in large public support for one of the banks), a new financial landscape, and new stricter capital regulations made a reorientation of the banks' business models and substantial balance sheet adjustments necessary. In the second half of 2012, both banks announced that they will accelerate and amend their restructuring plans, including raising capital and reducing assets. Both banks envisage further cost cutting through large reductions in personnel. One of the banks in mid-2012 announced a program to raise capital through end-2012, of which most had been raised by the end of the third quarter. The other bank announced it would drastically reduce or exit capital intensive investment banking segments (fixed income, commodities and currencies trading business). This announcement was followed by a very positive stock price reaction. CDS spreads for both banks have also come down substantially in the second half of 2012.

6. There are also changes in regulations abroad, which may add to the demands on capital of the two big Swiss banks. The Swiss "Too Big to Fail" legislation introduced significantly

⁶ Basel Committee on Banking Supervision, "Basel III Regulatory Consistency Assessment Programme," April, 2012.

higher minimum capital requirements and a new minimum leverage ratio. In addition, in particular a recent proposal in the U.S. would require foreign banking organizations with a significant U.S. presence to place all U.S. activities in an intermediate holding company, which would be under the supervision of the Federal Reserve and be subject to higher minimum capital and liquidity requirements. It is not clear how this proposal, if enacted, would impact total capital needs at the group level for the Swiss G-SIFIs, which both have extensive U.S. activities, but it may have some significant impact on capital requirements in the medium-term. Both the U.S. and the U.K. are also introducing regulations requiring separation of certain investment banking, including proprietary trading, from the regular banking activities, with important implications for both large Swiss banks.

7. The large banks are also facing numerous operational risks. In the recent past there have been several losses due to fines, legal settlements, or individual misbehavior. Both banks have been investigated for the LIBOR scandal, and one of them has agreed to pay about 1.5 billion U.S. Dollar in fines to supervisors. The same bank made large losses due to the actions of a “rogue trader” in early 2012 and its internal risk management was found faulty by the ensuing investigation. In addition, Swiss courts have ruled that retrocession fees (fees received by a bank for distributing third-party products to clients) should be reimbursed to clients. There are also numerous legal cases related to tax evasion and bank secrecy that have forced Swiss banks to agree to costly settlements, and may also have repercussions for their wealth management business going forward. Individually, these losses have not severely affected the banks’ financial position, and their effects on the stock prices of the two banks have been limited and temporary. However, losses could rise as litigation is ongoing. In addition, they raise concern on the ability of the two large Swiss banks to manage operational risks, and could lead to loss of confidence by wealth management customers.

OUTWARD SPILLOVERS FROM THE SWISS G-SIBS IN TIMES OF FINANCIAL STRESS¹

1. In this document, we explore outward spillovers from the two Swiss G-SIBs to the European banking system to assess the systemic importance of these banks in periods of financial stress. Co-variation in periods of stress is particularly relevant from the point of view of financial stability, of course. More specifically, we examine how financial distress in either of the two large Swiss banks would contribute to systemic risk in the European banking system. We also compare this contribution with that of other large European banks to assess the relative systemic importance of the Swiss companies. The analysis indicates that, in this particular dimension, the Swiss banks are among the most systemic in Europe.

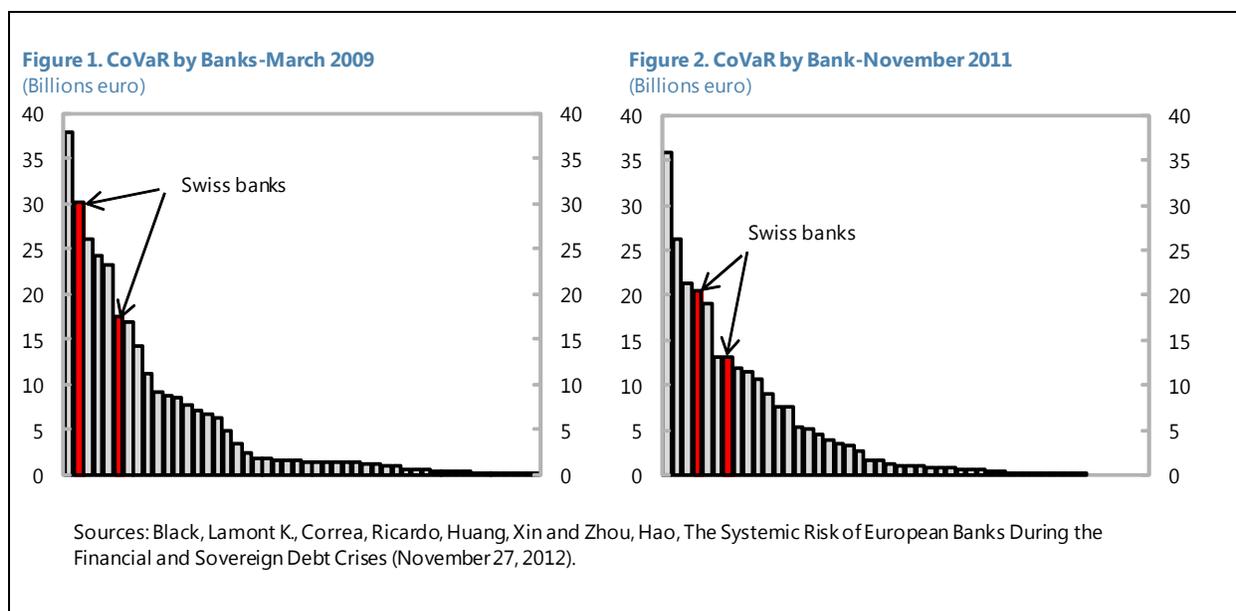
2. To measure the Swiss G-SIBs' contribution to systemic risk we use the marginal Conditional Value-at-Risk (CoVar) measure proposed by Adrian and Brunneimeier (2011).² Marginal CoVars for a sample of 48 large European banks are presented in Black et al. (2012).³ The marginal CoVar for a bank (relative to the whole banking system) is constructed in two steps. First, for the whole system the value-at-risk conditional on the bank being healthy is calculated. Second, the same measure is computed but conditional on the bank experiencing distress. The difference between these two values is the marginal CoVar. It is important to stress that the marginal CoVar should not be interpreted in a causal sense. The marginal CoVar may be large because the bank has large exposures to other banks in the system or because it is highly interconnected with the rest of the system, but also because it may be exposed to the same risk factors.

3. The values presented in Figure 1 and Figure 2 correspond to two periods of peak stress in European financial markets: March 7, 2009, and November 26, 2011. On the first date the stress resulted from the transmission of the U.S. subprime crisis to Europe, while on the second corresponded to the most acute phase of the Euro Area sovereign debt crisis.

¹ Prepared by Erik Lundback.

² See Adrian and Brunneimeier, "CoVar," unpublished manuscript, September 2011. If x is the 95 percent VaR for a portfolio of banks, then with 5 percent probability the return on that portfolio will be less than or equal to x over the relevant horizon. In a conditional VaR, the probability distribution used for the VaR calculation is a conditional distribution.

³ These are 95 percent CoVaRs at a daily frequency. The sample period is January 2000–March 2012. The CoVars are conditional on a set of state variables that capture liquidity conditions and risk appetite in asset markets, namely implied volatility (VIX), changes in the 3m government bill rate, changes in the 10y - 3m spread, and equity market returns.



Interestingly, at both dates the marginal CoVars for the two Swiss SIFI's are among the largest in the sample. The values are especially high at the earlier date, likely reflecting the large direct exposure of Swiss banks to the U.S. subprime crisis, but they remain high also in the second episode despite the relatively small direct exposure of the Swiss banks to sovereigns in the euro area periphery. This likely reflects their large size, but may also partly be due to their high leverage and large wholesale funding.⁴

⁴ For a sample of U.S. holding companies, Adrian and Brunnermeier (2011) find that bank assets, book value of equity/assets, and reliance on short-term debt are significant in explaining the cross-sectional variation in marginal CoVars.