Cross-country Exposures to the Swiss Franc

Agustín S. Bénétrix
Trinity College Dublin

Philip R. Lane
Trinity College Dublin and CEPR

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This paper

- Documents the foreign currency exposures of Switzerland in 2002-2012
- Quantifies the cross-border valuation effects generated by ER fluctuations
- Examines Swiss Franc holdings of ROW by looking at a sample of 116 advanced and developing/emerging countries

International Currency Exposures

International Currency Exposures
Source: Bénétrix et al (2014), "International Currency Exposures, Valuation Effects and the Global Financial Crisis," JIE forthcoming

- Foreign Assets
    - Equity/FDI: Geography determines currency exposure
    - Bank Loans/Deposits: BIS data
    - Bonds: CPIS; currency distribution of bond issuance and bond holdings
    - FXRES: National sources; Eichengreen/Mathieson model

- Foreign Liabilities
    - Equity/FDI: Domestic currency liabilities
    - Bank Loans/Deposits: BIS data
    - Bonds: Issuance data

International Currency Exposures

- Asset- and liability weights

$$\omega_{ijt}^A = \sum_{k=1}^{k=N} \lambda_{it}^{Ak} * \omega_{ijt}^{Ak}; \quad \omega_{ijt}^L = \sum_{k=1}^{k=N} \lambda_{it}^{Lk} * \omega_{ijt}^{Lk} \quad (1)$$

$$\omega_{ijt}^F = \omega_{ijt}^A s_{it}^A - \omega_{ijt}^L s_{it}^L \quad (2)$$

$$NETFX_{ijt}^{BILAT} = \omega_{ijt}^F * IFI_{it} \quad (3)$$

$$VALXR_{ijt}^{BILAT} = NETFX_{ijt}^{BILAT} * \%\Delta E_{ijt}$$

Financially-Weighted Exchange Rate Indices

- Asset and Liability Indices

$$I_t^A = I_{t-1}^A(1 + \sum \omega_{ijt-1}^A * \%\Delta E_{ijt}) \tag{4}$$

$$I_t^L = I_{t-1}^L(1 + \sum \omega_{ijt-1}^L * \%\Delta E_{ijt}) \tag{5}$$

- Net Financial Index

$$I_t^F = I_{t-1}^F(1 + \sum \omega_{ijt-1}^F * \%\Delta E_{ijt}) \tag{6}$$

- VALXR

$$VALXR_{it} = \%\Delta I_{it}^F * IFI_{it-1} \tag{7}$$

$$VALXR_{it} = \sum VALXR_{ijt}^{BILAT} = \sum NETFX_{ijt}^{BILAT} * \%\Delta E_{ijt} \tag{8}$$

- $IFI = (A + L)/GDP$

Aggregate Foreign Currency Position

- FXAGG: $(-1, 1)$

$$FXAGG_{it} = \omega_{it}^A s_{it}^A - \omega_{it}^L s_{it}^L \qquad (9)$$
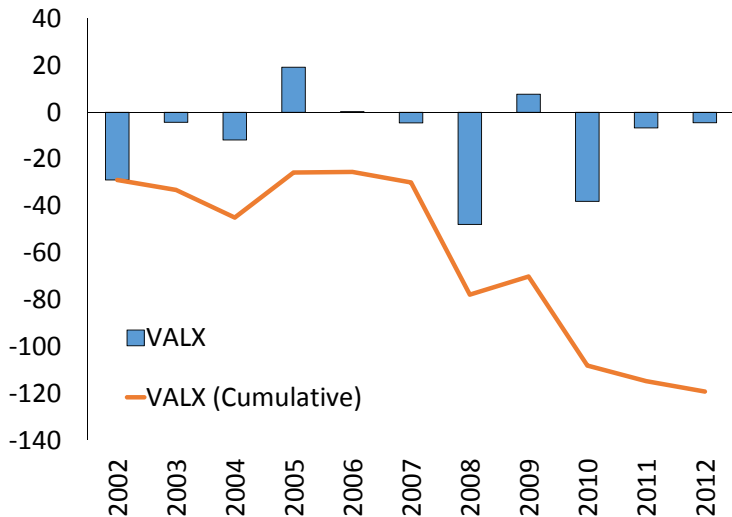
- NETFX

$$NETFX_{it} = FXAGG_{it} * IFI_{it} \qquad (10)$$

Swiss Currency Exposures and Valuation Effects

Decomposition of Swiss foreign currency exposure

|	2002	2007	2012
(1) $FXAGG$	0.32	0.31	0.41
(2) $(A - L)/(A + L)$	0.14	0.11	0.14
(3) $FXAGG^0$	0.18	0.20	0.26
(4) $(A_{NR} - L)/(A + L)$	0.13	0.10	0.07
(5) $FXR/(A + L)$	0.02	0.01	0.07
(6) $(PEQL + FDIL)/(A + L)$	0.17	0.20	0.23
(7) $DEBTL^{DC}/(A + L)$	0.03	0.02	0.07
(8) $A_{NR}^{DC}/(A + L)$	0.03	0.02	0.03
(9) $NETFX$	2.94	3.76	4.09
(10) $FXDEBT$	0.20	0.17	0.29

Swiss *VALXR*

Summary

- Switzerland has become increasingly long in 2002-2012
  - This was mainly driven by ↑ foreign liability positions in Swiss Francs
    - ↑ FDI and portfolio equity liabilities
    - ↑ Foreign debt liabilities in Swiss Francs

- *FXAGG* increase took place in 2007-2012
  - ↑ NFA position
    - ↑ Foreign reserve assets
  - ↑ Foreign liability positions in Swiss Francs
    - ↑ Foreign debt liabilities in Swiss Francs
    - ↑ FDI and portfolio equity liabilities (*smaller contribution*)

- Swiss long position in debt-only component fell from 2002 to 2007 and then increased in 2012

- Long position in foreign currency combined with appreciations of the Swiss Franc generated sizable valuation losses

Cross-country Exposures to the Swiss Franc

Exposures to Swiss Franc (2002-2012)
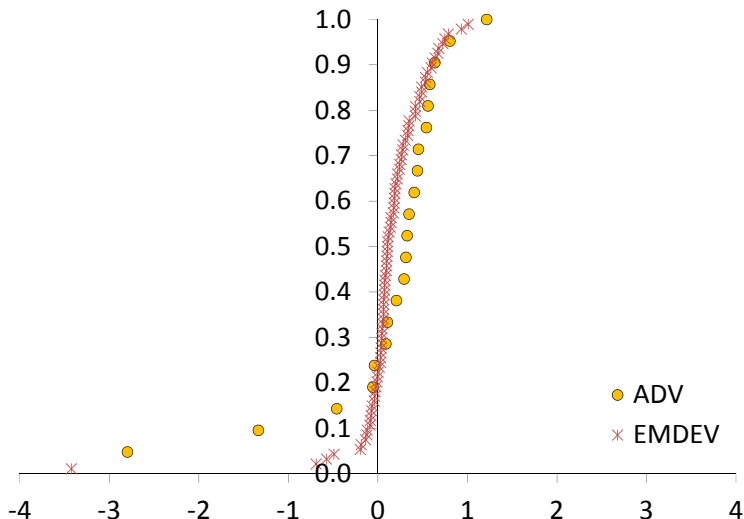
Exposures to Swiss Franc and other currencies
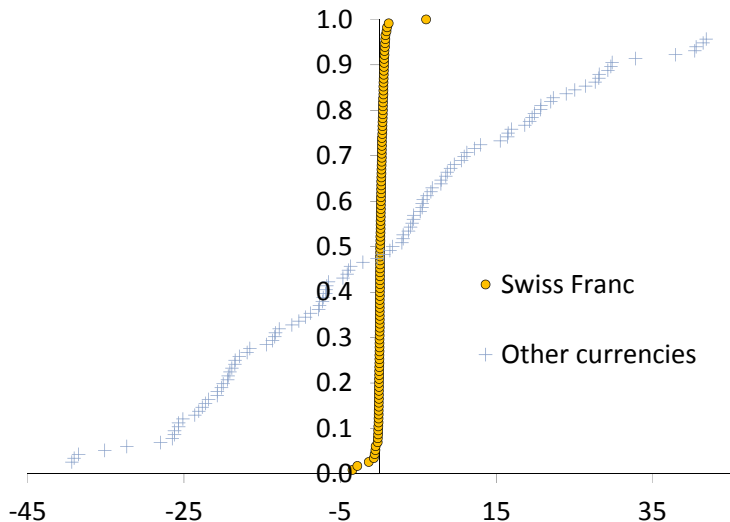
$FXAGG^{CHF}$ distribution

Group	Year	10th Percentile	Mean	Median	90th Percentile
ALL	2002	-0.29	0.07	0.07	0.59
	2007	-0.15	0.09	0.09	0.59
	2012	-0.10	0.37	0.12	0.82
ADV	2002	-0.21	0.01	0.22	0.80
	2007	-0.52	0.20	0.40	0.82
	2012	-0.33	0.18	0.24	0.82
EMDEV	2002	-0.29	0.08	0.07	0.47
	2007	-0.11	0.07	0.08	0.44
	2012	-0.004	0.41	0.11	0.77

$NETFX^{CHF}$ distribution

Group	Year	10th Percentile	Mean	Median	90th Percentile
ALL	2002	-0.43	0.09	0.11	1.60
	2007	-0.21	0.29	0.10	1.71
	2012	-0.04	1.37	0.17	2.20
ADV	2002	-0.67	0.10	0.72	2.72
	2007	-3.98	1.21	1.50	4.91
	2012	-1.73	1.86	1.21	6.65
EMDEV	2002	-0.36	0.09	0.07	0.70
	2007	-0.20	0.08	0.07	0.73
	2012	-0.002	1.26	0.14	1.55

$FXDEBT^{CHF}$ distribution

| Group	Year	10th Percentile	Mean	Median	90th Percentile
ALL	2002	-1.20	0.08	0.24	1.19
	2007	-0.76	-0.05	0.10	0.66
	2012	-0.95	0.13	0.13	1.21
ADV	2002	-2.11	-1.25	-0.69	-0.10
	2007	-1.28	-0.84	-0.64	0.06
	2012	-1.40	-0.72	-0.50	0.21
EMDEV	2002	-0.38	0.43	0.35	1.49
	2007	-0.09	0.17	0.17	0.86
	2012	-0.01	0.35	0.21	1.22

$NETFXDEBT^{CHF}$ distribution

| Group	Year	10th Percentile	Mean	Median	90th Percentile
ALL	2002	-2.15	-0.33	0.15	1.08
	2007	-2.91	-0.57	0.05	0.55
	2012	-1.58	-0.05	0.09	1.38
ADV	2002	-4.59	-2.99	-1.59	-0.15
	2007	-4.92	-2.74	-1.51	0.19
	2012	-7.25	-1.45	-0.84	0.72
EMDEV	2002	-0.31	0.38	0.29	1.20
	2007	-0.05	0.002	0.07	0.67
	2012	-0.004	0.33	0.12	1.38

Summary

- The average exposure across advanced countries was a long position in Swiss Francs for the whole international balance sheet, but a short position for the debt component
  - After the crisis the overall long position became less positive and the short debt position became less negative

- The average exposure across emerging and developing countries was a long position for the whole international balance sheet and also for the debt component
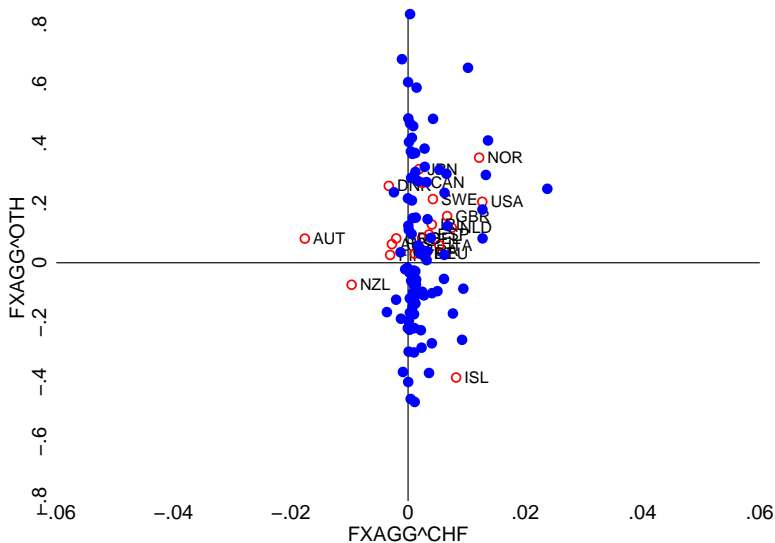 - These long positions became more positive after the crisis

Swiss Franc vs. Other currencies (2002)
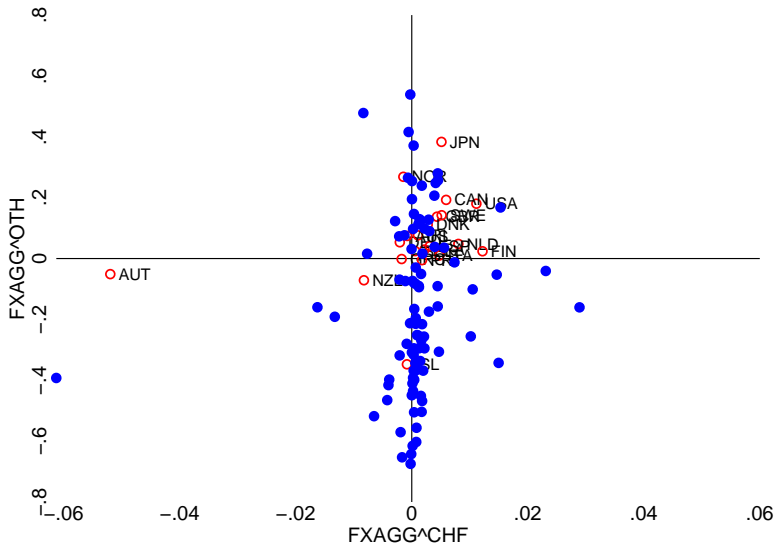
Swiss Franc vs. Other currencies (2007)
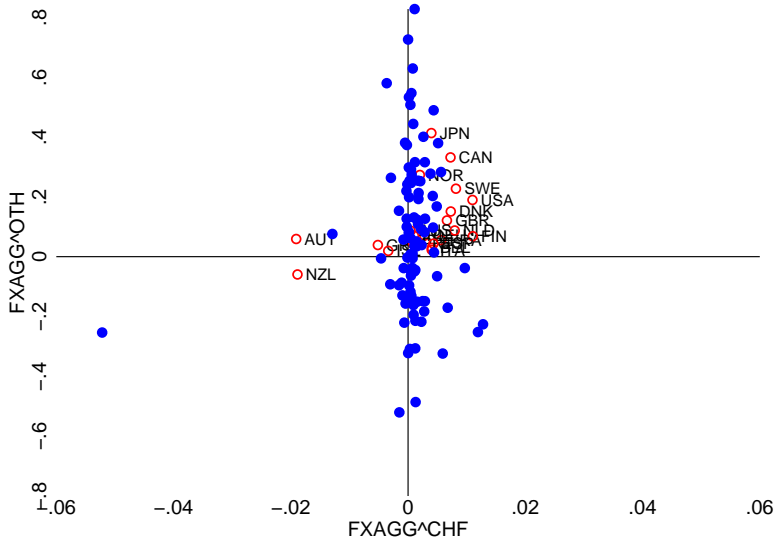
Swiss Franc vs. Other currencies (2012)

Regression model
Pooled OLS for 1996, 2002, 2007 and 2012

$$FXAGG_{it}^{CHF} = \alpha FXAGG_{it}^{OTH} + \beta_1 TRADE_{it} + \beta_2 VOL_{it} + \beta_3 COV_{it} + \gamma Z_{it} + \lambda_1 GDP_{it}^{PC} + \lambda_2 SIZE_{it} + \theta Y_t + \varepsilon_{it}, \qquad (11)$$

- $FXAGG_{it}^{OTH}$ it exposure to other foreign currencies
- $TRADE_{it}$ is bilateral trade with Switzerland scale by GDP
- VOL_{it} is a vector that includes the volatility of GDP, inflation and bilateral exchange rate
- COV_{it} is the covariance between the change in the exchange rate and GDP growth
- Z_{it} is a vector the includes institutional quality, capital controls, Peg and EMU
- GDP_{it}^{PC} is GDP scaled by population
- $SIZE_{it}$ is the logarithm of population
- Y are year dummies for 1996, 2002, 2007 and 2012

Determinants of Exposures to the Swiss Franc

$FXAGG^{CHF}$	ALL		ADV		EMDEV	
	(1)	(2)	(3)	(4)	(5)	(6)
$FXAGG^{OTH}$	0.002	0.002	0.01	0.02**	0.001	0.001
	(0.002)	(0.002)	(0.01)	(0.01)	(0.002)	(0.002)
Trade	-0.01	-0.02	-0.63***	-0.69***	0.06*	0.04
	(0.04)	(0.04)	(0.19)	(0.20)	(0.03)	(0.03)
Vol(GDP)	0.01	0.01	0.52**	0.49**	-0.00	0.01
	(0.01)	(0.01)	(0.21)	(0.19)	(0.01)	(0.01)
Vol(π)	0.001	0.002	-0.58	-0.56	0.003	0.004
	(0.004)	(0.004)	(0.49)	(0.38)	(0.003)	(0.004)
Vol(E)	0.02*	0.01	-0.30*	-0.40**	0.01	0.01
	(0.01)	(0.01)	(0.16)	(0.17)	(0.01)	(0.01)
Cov(GDP,E)	-0.0003	-0.0003	0.04**	0.05***	-0.0003	-0.0003
	(0.0004)	(0.0004)	(0.01)	(0.02)	(0.0004)	(0.0004)
Institutions		-0.02		0.09		0.12
		(0.06)		(0.37)		(0.09)
Capital controls		0.03		-0.80***		0.03
		(0.04)		(0.18)		(0.04)
Peg		-0.21**		-0.11		-0.22**
		(0.09)		(0.30)		(0.09)
EMU		-0.12		0.55		-0.03
		(0.21)		(0.45)		(0.32)
GDP^{PC}	0.08	0.07	0.71	0.81	0.14*	0.07
	(0.05)	(0.06)	(0.48)	(0.50)	(0.08)	(0.06)
Size	0.05**	0.04**	0.27***	0.31***	0.02	0.02
	(0.02)	(0.02)	(0.08)	(0.10)	(0.02)	(0.02)
Observations	569	569	105	105	464	464
R^2	0.04	0.05	0.44	0.52	0.05	0.06

Determinants of Exposures to the Swiss Franc (debt only)

$NETFXDEBT^{CHF}$	ALL		ADV		EMDEV	
	(1)	(2)	(3)	(4)	(5)	(6)
$FXDEBT^{OTH}$	0.001	-0.001	0.01	0.04***	-0.003	-0.004
	(0.005)	(0.006)	(0.01)	(0.01)	(0.005)	(0.006)
Trade	-0.16	-0.08	-1.06***	-1.25***	0.03	0.07
	(0.12)	(0.09)	(0.34)	(0.36)	(0.04)	(0.06)
Vol(GDP)	0.05*	-0.00	0.99**	0.90**	0.01	-0.01
	(0.02)	(0.03)	(0.39)	(0.35)	(0.02)	(0.03)
Vol(π)	0.12***	0.14***	-0.22	-0.73	0.12***	0.13***
	(0.04)	(0.04)	(0.83)	(0.62)	(0.04)	(0.04)
Vol(E)	-0.02	-0.04	0.06	-0.30	-0.05	-0.05*
	(0.03)	(0.03)	(0.27)	(0.27)	(0.03)	(0.03)
Cov(GDP,E)	-0.001	-0.001	0.01	0.03	-0.001	-0.001
	(0.001)	(0.001)	(0.03)	(0.02)	(0.001)	(0.001)
Institutions		-0.61***		-0.44		-0.36*
		(0.18)		(0.62)		(0.21)
Capital controls		-0.04		-1.50***		-0.00
		(0.05)		(0.27)		(0.05)
Peg		-0.08		-0.51		0.05
		(0.16)		(0.47)		(0.15)
EMU		-0.54		0.58		0.45*
		(0.33)		(0.65)		(0.24)
GDP^{PC}	-0.22***	0.18	-1.53**	-0.36	0.03	0.17
	(0.08)	(0.15)	(0.74)	(0.90)	(0.10)	(0.15)
Size	-0.04	-0.08*	0.21	0.20	-0.04	-0.06
	(0.04)	(0.04)	(0.16)	(0.17)	(0.05)	(0.05)
Observations	503	503	105	105	398	398
R^2	0.10	0.14	0.46	0.57	0.05	0.06

Conclusions
Swiss Currency Exposures and Valuation Effects

- Switzerland has become increasingly long in foreign currency (in part driven by the thirst of foreign investors for Swiss Francs assets)
- We quantify the adverse valuation impact generated by the appreciation of the Swiss Franc and find that this is large relative to GDP

Conclusions
Cross-country Exposures to the Swiss Franc

- We find that the average exposure across advanced economies was a long position in Swiss Francs for the whole international balance sheet but a short position for the debt component
  - These positions became less positive and less negative after the crisis, respectively
- For emerging/developing countries we find that the position was long for the whole international balance sheet and also for the debt component
  - These long positions became more positive after the crisis

Conclusions
Cross-country Exposures to the Swiss Franc

Our study of the determinants of cross-country exposures to the Swiss Franc produced several findings:

- Bilateral trade, GDP volatility and capital controls are important determinants for the overall and the debt-only exposures in advanced countries

- Exchange rate risk, country size and the covariance between the exchange rate appreciation and GDP grow are relevant factors determining the exposure of the whole international balance sheet of advanced countries

    - However, this is not the case for the debt subcomponent

- The exchange rate regime is important for the overall exposure while domestic inflation and EMU membership are relevant for debt-only exposures in emerging and developing countries