

Drivers of the EUR/CHF exchange rate

Piotr Kotlarz

Michael Hanke

University of Liechtenstein

Overview

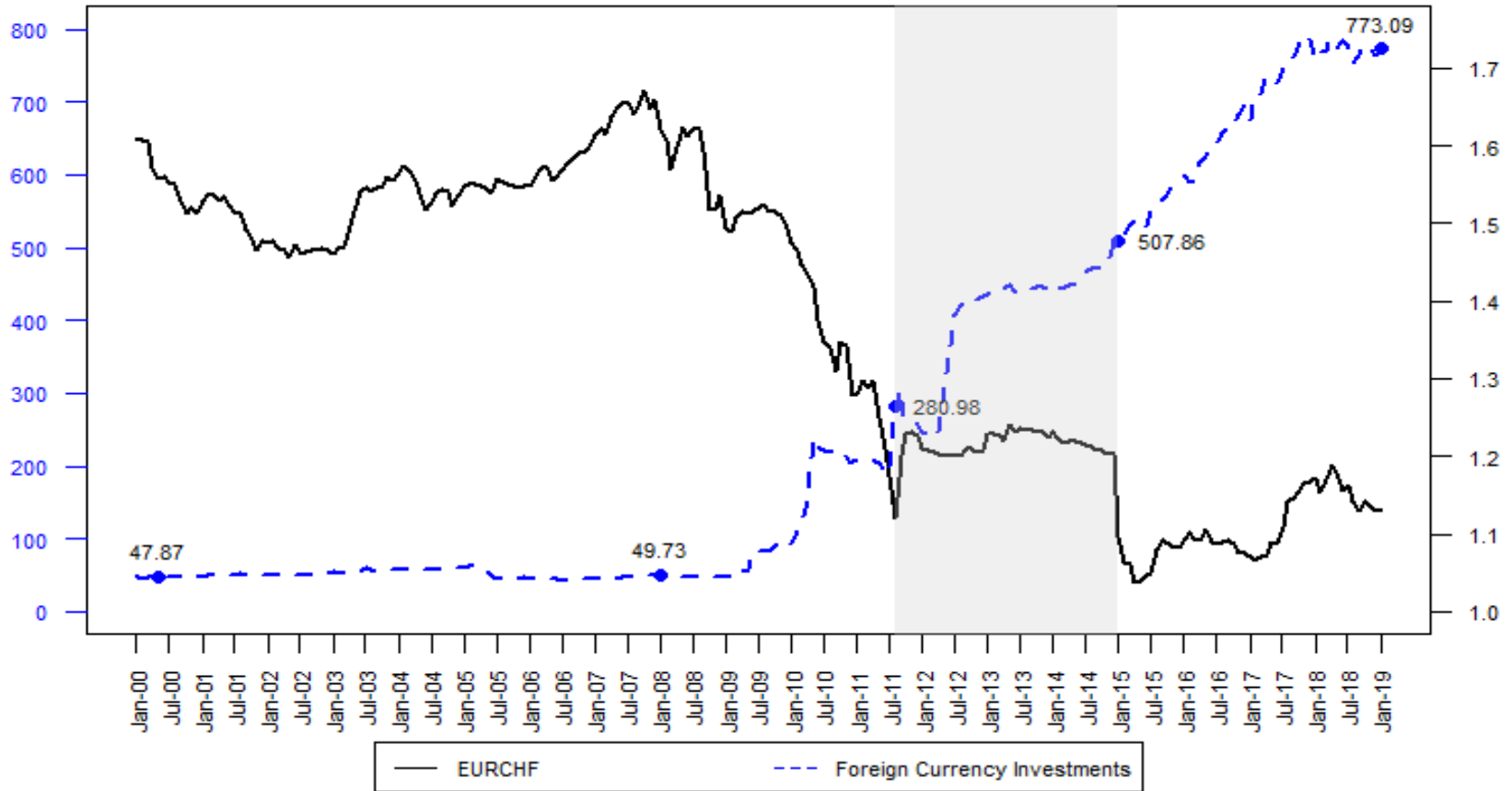
- Motivation
- Literature
- Data
- Methodology
- Empirical findings
- Conclusion

Motivation

- Unconventional monetary policy measures
 - Foreign currency interventions
 - Negative interest rates
- Small and relatively open economy
 - Highly oriented on the export
- Safe-haven characteristics of Swiss franc

EURCHF development over time

EURCHF vs. Foreign Currency Investments (FCI)



Literature I

- Swiss franc as one of the most prominent representatives of safe-haven currencies (Ranaldo and Söderling (2009), Grisse and Nitschka (2015), Fatum and Yamamoto (2016))
- Interest rate spreads associated with safe-haven status but not as a general fundamental (Habib and Stracca (2012))
- Interest rate parity and risk premia broadly discussed in the literature ((Fama (1984), Brunnermeier et al. (2008), Engel (2016), Du et al. (2018))
 - The risk-free CIP arbitrage opportunities could be exploited only by a narrow set of top-tier banks (Rime et al. (2019))
- The safe-haven status of the Swiss franc was frequently associated by financial press and international institutions with capital flows into Switzerland as an aftermath to the global financial crisis
- Yesin (2017) finds that the link between capital flows and Swiss franc was far weaker than expected

Literature II

- The SNB's promise to maintain the minimum exchange rate has been a subject of numerous debates (Hertrich and Zimmermann (2017) and Funke et al. (2017)).
- Official FX interventions as a powerful monetary policy instrument for central bank after the Plaza meeting in 1985 (Sarno and Taylor (2001), Reitz (2005), Engel and West (2006), Fratzscher et al. (2017)
 - Bank of Japan frequently intervened in the FX market to prevent deflation (Chaboud and Humpage (2005))
 - In the 1990s and 2000s, the Central Bank of China purchased large amounts of US dollars to devalue Chinese yuan (Staiger and Sykes (2009))
 - FX interventions conducted by SNB in 1980s and 1990s can be responsible for the failure of foreign exchange market efficiency models and their poor forecasting performance (Bieri (2001))

Data

- FX rates:
 - EURCHF (mid-rates)
- SNB balance sheet:
 - Foreign currency investments
- Short-term interest rates:
 - One-month interbank rates for CHF, EUR and USD
- Long-term interest rates:
 - 30-year German, Swiss and US government bonds
- Major equity indices:
 - Swiss: SIX, Swiss Performance index, UBS 100
 - European: FTSE 100, EuroStoxx50, Stoxx Europe 600 and FTSE Euro First 100
- Time-frame: February 2015 – January 2019 with monthly frequency
- Source: Bloomberg and SNB data portal

Methodology

- Log returns from exchange as a dependent variable:

$$r_{t,t+1} = s_{t+1} - s_t$$

- Independent variables:

- Logarithmic changes in the Foreign Currency Investments (FCI)

- First difference on the long- and short-term interest rate differentials

- Logarithmic returns from equity indices

- Predictive regression models

$$r_{t,t+1} = \alpha + \beta F_t + \varepsilon_{t+1}$$

where, α stands for an intercept, F_t represents vector of factors, ε_{t+1} are residuals

Econometric Models

➤ Bivariate framework

$$r_{t,t+1} = \alpha + \beta F_t + \epsilon_{t+1}$$

where, F_t represents all factors from the sample

➤ Two-factor framework

$$r_{t,t+1} = \alpha + \beta_1 FCI_t + \beta_2 F_T + \epsilon_{t+1}$$

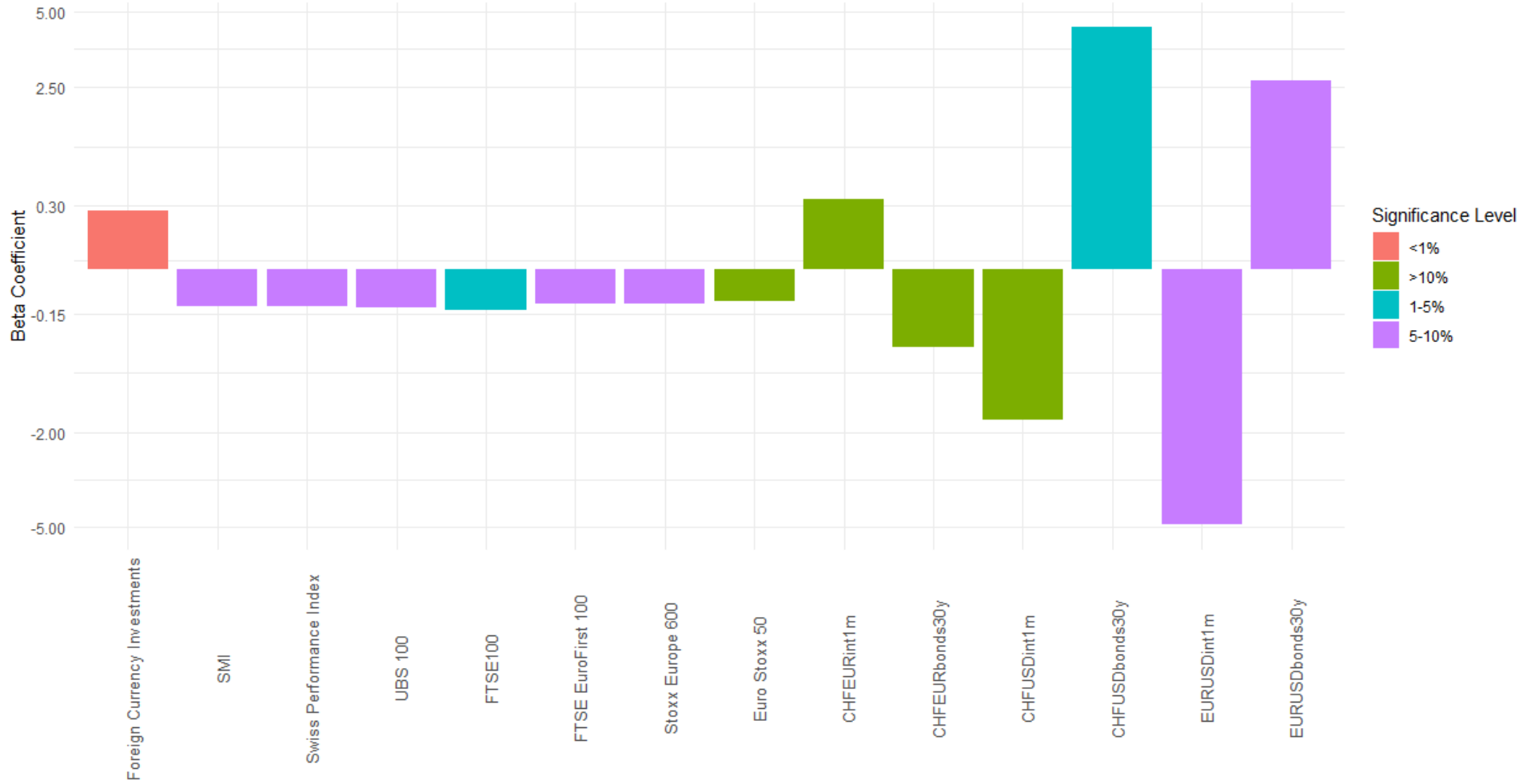
where, F_t represents all remaining variables

➤ Three-factor framework

$$r_{t,t+1} = \alpha + \beta_1 FCI_t + \beta_2 IntDiffEURUSD30y_t \\ + \beta_3 F_t + \epsilon_{t+1}$$

where, F_t represents all remaining variables

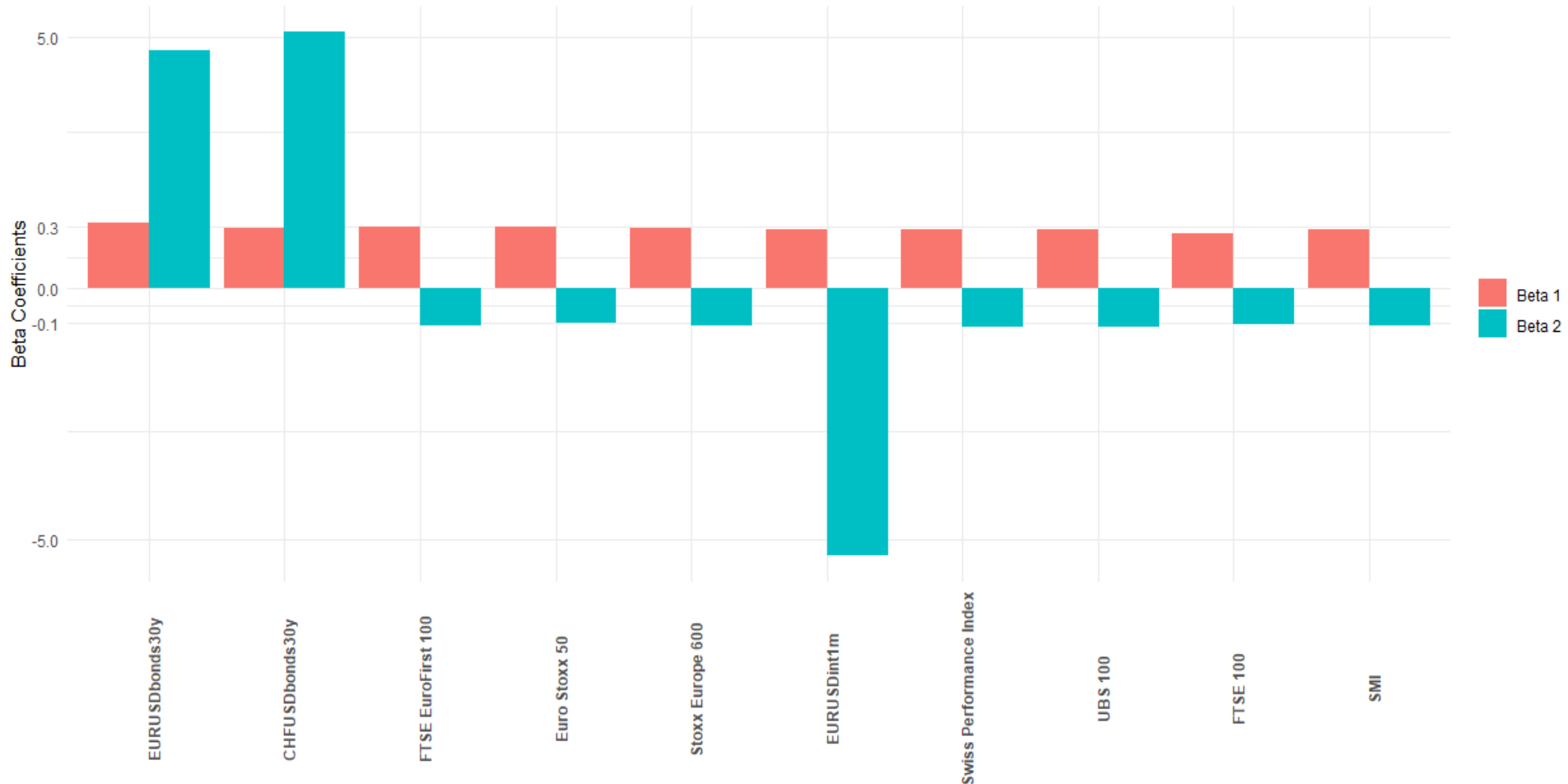
Bivariate Models



Bivariate Models - Summary

Variable	α	β	R^2
Assets foreign currency investments	-0.001	0.261***	0.164
FTSE100	0.001	-0.123**	0.081
CHFUSDbonds30y	0.002	4.387**	0.073
FTSE EuroFirst100	0.001	-0.091*	0.056
EURUSDint1m	-0.002	-4.920*	0.044
EURUSDbondsDE30y	0.002	2.663*	0.044
UBS 100	0.001	-0.113*	0.041
StoxxEurope600	0.001	-0.089*	0.041
Swiss Performance Index	0.002	-0.105*	0.039
SMI	0.001	-0.107*	0.039
EuroStoxx50	0.001	-0.075	0.037
CHFUSDint1m	0.000	-1.717	-0.002
CHFEURbondsDE30y	0.001	-0.464	-0.021
CHFEURint1m	0.001	0.365	-0.022

Two-Factor Models



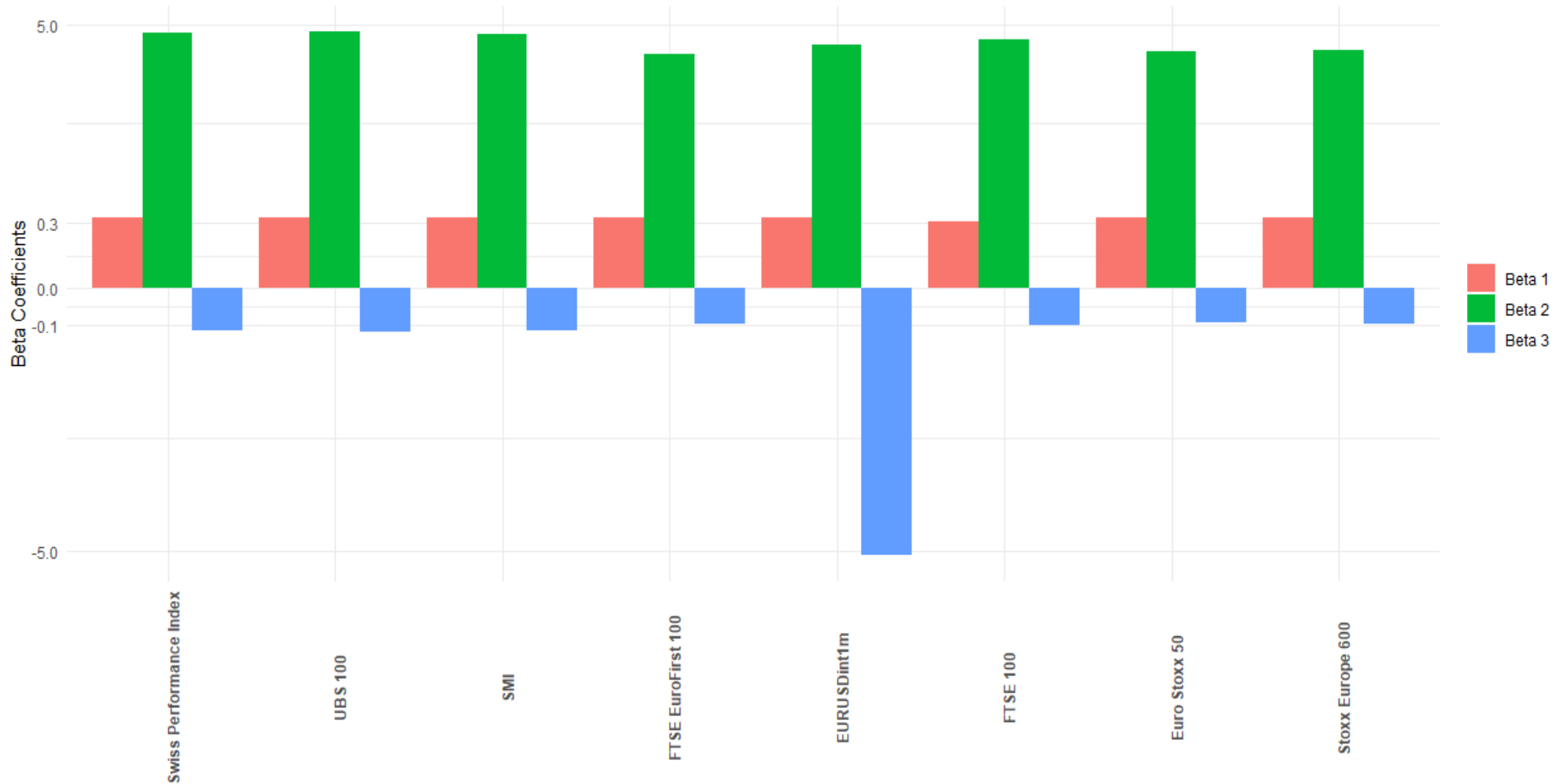
Red bars report beta coefficients for Foreign Currency Investments and blue bars for other factors listed in the graph

Two-Factor Models - Summary

Variable nr 2	α	β_1	β_2	R^2
EURUSDbondsDE30y	-0.001	0.340	4.462	0.316
CHFUSDbonds30y	0.000	0.287	5.190	0.279
FTSE EuroFirst100	-0.001	0.292	-0.114	0.267
EuroStoxx50	-0.001	0.293	-0.100	0.249
StoxxEurope600	-0.001	0.287	-0.112	0.245
EURUSDint1m	-0.004	0.276	-5.687	0.236
Swiss Performance Index	-0.001	0.272	-0.118	0.224
UBS 100	-0.001	0.269	-0.123	0.222
FTSE100 UK	-0.001	0.240	-0.104	0.219
SMI	-0.001	0.269	-0.117	0.219

The dependent variable is the first difference of the logarithm of the EUR/CHF exchange rate. The first independent variable is always Foreign Currency Investments (FCI). The table summarizes results of predictive two-factor regressions with intercept and lag one month. The estimation method is ordinary least squares. *** denotes significance at 1%, ** denotes significance at 5% and * denotes significance at 10%

Three Factor Models



Red bars report beta coefficients for FCI, green bars show beta coefficients for the long-term interest rate differentials between EUR and USD and blue bars for other factors listed in the graph

Three-Factor Models - Summary

Variable nr 3	α	β_1	β_2	β_3	R^2
Swiss Performance Index	-0.001	0.357	4.685	-0.130	0.398
UBS 100	-0.001	0.354	4.704	-0.137	0.398
SMI	-0.001	0.352	4.636	-0.127	0.389
FTSE EuroFirst100	-0.001	0.357	3.949	-0.095	0.384
EURUSDint1m	-0.004	0.351	4.244	-5.132	0.375
FTSE100	-0.001	0.319	4.429	-0.102	0.373
EuroStoxx50	-0.001	0.360	4.039	-0.083	0.372
StoxxEurope600	-0.001	0.355	4.078	-0.094	0.371

The dependent variable is the first difference of the logarithm of the EUR/CHF exchange rate. The first independent variable is always Foreign Currency Investments (FCI) and the second long-term interest rate differentials between EUR (Germany) and USD. The table summarizes results of predictive three-factor regressions with intercept and lag one month. The estimation method is ordinary least squares. *** denotes significance at 1%, ** denotes significance at 5% and * denotes significance at 10%

Conclusion

Major drivers of the EURCHF exchange rate:

- Monetary actions of the SNB as a major driver
 - Foreign currency investments as a measure of FX interventions
 - Changes in long- and short term interest rate differentials
- Performance of major European and Swiss equity indices

*Thank you
for your attention*

Piotr Kotlarz

University of Liechtenstein

piotr.kotlarz@uni.li

pkotlarz@mail.ch

References I

- Bieri, D. (2001). Central bank intervention and risk premia in foreign exchange markets: Evidence of daily effects: Switzerland 1986, 1995, SSRN Electronic Journal
- Brunnermeier, M. K., Nagel, S., and Pedersen, L. H. (2008). Carry trades and currency crashes. NBER Macroeconomics Annual 2008
- Du, W., Tepper, A., and Verdelhan, A. (2018). Deviations from covered interest rate parity. *The Journal of Finance*, 73(3)
- Engel, C. (2016). Exchange rates, interest rates, and the risk premium. *American Economic Review*, 106(2)
- Engel, C. and West, K. (2005). Exchange rate and fundamentals. *Journal of Political Economy*
- Fama, E. F. (1984). Forward and spot exchange rates. *Journal of Monetary Economics*, 14(3)
- Fatum, R. and Yamamoto, Y. (2016). Intra-safe haven currency behavior during the global financial crisis. *Journal of International Money and Finance*, 66:49- 64
- Foellmi, R., Fuest, A., Meulen, P., Micheli, M., Schmidt, T., and Zwick, L. (2018). Openness and productivity of the swiss economy. *Swiss Journal of Economics and Statistics*, 154

References II

- Fratzscher, M. (2009). What explains global exchange rate movements during the financial crisis? *Journal of International Money and Finance*, 28:1390-1407
- Funke, M., Loermann, J., and Moessner, R. (2017). The discontinuation of the EUR/CHF minimum exchange rate in January 2015: was it expected? *BIS Working Papers 652*, Bank for International Settlements
- Grisse, C. and Nitschka, T. (2015). On financial risk and the safe haven characteristics of Swiss franc exchange rates. *Journal of Empirical Finance*, 32:153 – 164
- Habib, M. M. and Stracca, L. (2012). Getting beyond carry trade: What makes a safe haven currency? *Journal of International Economics*, 87(1):50 - 64. *Symposium on the Global Dimensions of the Financial Crisis*
- Hertrich, M. and Zimmermann, H. (2017). On the credibility of the euro/swiss franc floor: A financial market perspective: *Money, credit and banking*. *Journal of Money, Credit and Banking*, 49:567-578
- Magnus, D. and Penasse, J. (2017). The Missing Risk Premium in Exchange Rates. *Swedish House of Finance*, Research Paper No. 17-18
- Rinaldo, A. and Söderlind, P. (2009). Safe haven currencies. *Review of Finance*, 14

References III

- Rime, D., Schrimpf, A., and Syrstad, O. (2019). Covered interest parity arbitrage. SSRN Electronic Journal
- Yesin, P. (2015). Capital flow waves to and from Switzerland before and after the financial crisis. Working Papers 2015-01, Swiss National Bank
- Yesin, P. (2017). Capital flows and the Swiss franc. Swiss Journal of Economics and Statistics, 153(4):403-436