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On financial risk and the safe haven characteristics of Swiss franc exchange rates

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ABSTRACT

We analyse bilateral Swiss franc exchange rate returns in an asset pricing framework to evaluate the Swiss franc's safe haven characteristics. A "safe haven" currency is a currency that offers hedging value against global risk, both on average and in particular in crisis episodes. To explore these issues we estimate the relationship between exchange rate returns and risk factors in augmented UIP regressions, using recently developed econometric methods to account for the possibility that the regression coefficients may be changing over time. Our results highlight that in response to increases in global risk the Swiss franc appreciates against typical carry trade investment currencies such as the Australian dollar, but depreciates against the US dollar, the Yen and the British pound. Thus, the Swiss franc exhibits safehaven characteristics against many, but not all other currencies. We find statistically significant time variation in the relationship between Swiss franc returns and risk factors, with this link becoming stronger in times of stress.

1. Introduction

The recent crisis in the euro area has led to a massive appreciation of the Swiss franc, prompting the Swiss National Bank (SNB) to implement unconventional policy measures, including foreign exchange interventions and the introduction of an exchange rate floor against the euro.[1] In this context, the usual explanation put forward for the strong Swiss franc appreciation is the status of the Swiss franc as the typical safe haven currency.[2] Safe haven assets provide a hedge against risk on average. This characteristic is amplified in severe crises episodes during which safe haven assets particularly gain in value. High frequency analysis of Swiss franc exchange rate movements indeed leaves the impression of safe haven characteristics of the Swiss franc in several crises events (Ranaldo and Söderlind, 2010).

In this paper we argue that the Swiss franc exhibits safe haven asset characteristics against some currencies but not against other major currencies, such as the US dollar and the Yen. We draw this conclusion from studying Swiss franc exchange rate changes in an asset pricing framework, using recently developed econometric methods to assess time variation in the relation between exchange rates and risk factors. A steadily growing literature argues that (ex post) deviations from the uncovered interest rate parity (UIP) condition can be rationalized by the covariation of exchange rate changes with risk factors (e.g. Lustig

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[1] In the 3 years leading up to the introduction of the exchange rate floor against the euro in September 2011 the Swiss franc appreciated almost 40% against the euro.

[2] See Habib and Stracca (2012) for an empirical assessment of the factors that determine a safe haven.

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and Verdelhan, 2006, 2007; Ranaldo and Söderlind, 2010; Verdelhan, 2010, 2012; Farhi and Garbaix, 2011; Lustig et al., 2011; Menkhoff et al., 2012; Sarno et al., 2012; Bansal and Shaliastovich, 2013). Safe haven characteristics imply a close link to financial risk factors. It is hence natural to analyse Swiss franc exchange rate changes in this framework. We adopt the asset pricing framework of Verdelhan (2012), based on Backus et al. (2001) and Lustig et al. (2011), to analyse 11 bilateral Swiss franc exchange rate pairs during the time period from January 1990 to August 2011. This framework features one Swiss franc-specific and one global risk factor.

Consistent with Lustig et al. (2011) and Verdelhan (2012) we find that exposure to the Swissfranc -specific risk factor explains most of the time variation in Swiss franc returns. However, it is the sensitivity to global risk that reveals the safe haven characteristic of a currency. A safehaven currency gains in value (appreciates) relative to other currencies when global risk, risk that affects all currencies, materializes. Our results highlight that the Swiss franc is indeed a safe haven relative to many, but not all currencies: in response to increases in global risk the franc appreciates against typical carry trade investment currencies such as the Australian dollar, but depreciates against the US dollar, the Yen and the British pound. Exploiting insights of Müller and Petalas (2010) on the estimation of time-varying regression coefficients we find statistically significant time variation in the relationship between Swiss franc returns and risk factors, with this link becoming stronger in times of stress. For instance, on average a one percent increase in the VIX index — our baseline proxy for global risk — is associated with 0.04% Swiss franc appreciation against the Australian dollar, and a 0.03% depreciation against the US dollar. Around the period of the Lehman bankruptcy, the change in the VIX index was associated with a more than 0.2% appreciation against the Australian dollar, and a more than 0.2% depreciation against the US dollar.

The remainder of the paper is organized as follows. Section 2 provides information about the conceptual background of this study. Section 3 describes the data sources. Section 4 presents the econometric framework and the main empirical results. Section 5 concludes.

2. Conceptual background

This section motivates the use of an asset pricing framework to explain exchange rate changes. It provides some basic, theoretical background and introduces recent advances in the formulation of empirical currency risk models that form the backbone of our empirical analysis.

2.1. UIP regressions

UIP states that under the assumption of rational expectations and risk-neutrality the expected exchange rate change reflects the previous period's interest rate differential between the home and foreign country, i.e.

$$E_t\left(s_{t+1}^k\right)-s_t^k = i_t^k-i_t + \xi_{t+1} \tag{1}$$

where ξ_{t+1} is a risk premium, i_t^k is the country k interest rate, i_t its home country counterpart, s_{t+1}^k the log spot exchange rate of the home country relative to country k and E is the expectation operator. An increase in s corresponds to an appreciation of the home and depreciation of the foreign (country k) currency.

Interest rate differentials are approximately equal to forward discounts at least at the monthly frequency that we consider (e.g. Akram et al., 2008), such that

$$i_t^k-i_t \approx f_t^k-s_t^k \tag{2}$$

with f_t^k the log forward exchange rate. Under the assumption or rational expectations we have

$$E_t\left(s_{t+1}^k\right) = s_{t+1}^k + u_{t+1}^k \tag{3}$$

where the forecast error u_{t+1}^k is white noise. In particular, u_{t+1}^k is uncorrelated with any information that is available in period t. Substituting this expression for the expectation of the future spot rate in Eq. (1) gives

$$\Delta s_{t+1}^k = \left(f_t^k-s_t^k\right) + \xi_{t+1} + u_{t+1}^k. \tag{4}$$

The standard UIP regression for the bilateral exchange rate with country k then has the following form:

$$\Delta s_{t+1}^k = \alpha^k + \beta^k\left(f_t^k-s_t^k\right) + \varepsilon_{t+1}^k. \tag{5}$$

According to the UIP condition, the regression coefficient β should be equal to unity and the constant term, α, should be equal to zero. The error term ε_{t+1}^k reflects both forecast errors and the risk premium.