The long-run component of foreign exchange volatility and stock returns

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A R T I C L E  I N F O

Article history:
Received 24 October 2013
Accepted 14 April 2014
Available online 24 April 2014

JEL classification:
F31
G15

Keywords:
Foreign exchange volatility
Long-run component of foreign exchange volatility
Short-run component of foreign exchange volatility
Mimicking-factor portfolios

A B S T R A C T

The present paper explores the cross-sectional pricing power of foreign exchange volatility in the US stock market by decomposing it into short- and long-run components. Our approach is motivated by Bartov et al. (1996). Empirically, we find supporting evidence that the long-run component of foreign exchange volatility is priced in the US stock market. Our findings have important implications for international finance and empirical asset pricing.

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1. Introduction

The present paper hypothesizes that the long-run component of foreign exchange (FX) volatility is a Merton (1973) state variable in the US equity market. Our conjecture is motivated by the following observations.

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http://dx.doi.org/10.1016/j.intfin.2014.04.005
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First, theoretically models in Campbell (1993, 1996) and Chen (2002) suggest that stock market volatility is a cross-sectional asset-pricing factor with a negative risk premium, because increasing stock market volatility represents a deterioration in investment opportunities. Ang et al. (2006), Adrian and Rosenberg (2008), Da and Schaumburg (2011), and Moise and Russell (2012) provide supporting evidence. Menkhoff et al. (2012) (MSSS) concisely conclude that “volatility innovations emerge as a state variable.”

Second, there is empirical evidence suggesting that FX volatility spills over to stock market volatility. For instance, Francis et al. (2006) find that increasing FX volatility (except for the Japanese yen) leads to increasing volatility in the US stock market. “When (stock) market volatility is stochastic, intertemporal models predict that asset risk premia are not only determined by covariation of returns with the market return, but also by covariation with the state variables that govern (stock) market volatility.” (Adrian and Rosenberg, 2008, p. 2997) In this regard, FX volatility may be a Merton (1973) state variable in the equity market.

Third, two empirical studies imply that it might be the long-run component of FX volatility that matters for asset pricing. First, a recent study by Du and Hu (2012b) shows that FX volatility as a whole has very little pricing power in the US equity market. Second, Bartov et al. (1996) (BBK) find that the market risk of multinational firms increases with the increase in FX volatility when a longer-horizon (5 years) is focused on.

If only the long-run component of FX volatility matters for the cross-section of stock returns, using raw FX volatility, including both the short- and long-run components, can introduce significant noise and reduce the power of tests. Motivated by this observation, we intend to extend Du and Hu (2012b) by focusing on the long-run component of FX volatility in the present paper.

Empirically, we follow MSSS to construct the FX volatility and decompose it into short- and long-run components with the Hodrick and Prescott (1997) methodology. We measure FX volatility innovations in two ways. The first way is to take the first differences of the FX volatility as well as its components as in Ang et al. (2006), while the second way is to construct factor-mimicking portfolios along the same line as Hou et al. (2011). In terms of empirical implementation, we employ the standard two-pass regression methodology of Fama and MacBeth (1973).

Our findings can be easily summarized: the long-run component of FX volatility does have power to explain the cross-section of stock returns. Our findings have important implications for both international finance and empirical asset pricing. For international finance, we strengthen Francis et al. (2006) in that we also suggest researchers focus more on (the long-run component of) the second moment of exchange rates in understanding the linkages between FX and equity markets. For empirical asset pricing, we imply a fresh perspective of the state variables underlying the Fama–French–Carhart factors, namely (the long-run component of) FX volatility.

The remainder of the paper is organized as follows: Section 2 describes our data and empirical methodology. Section 3 reports empirical results when FX volatility innovations are measured by the first differences of FX volatility as well as its components. Section 4 presents the results when FX volatility innovations are measured by factor-mimicking portfolio returns. Section 5 concludes the manuscript.

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2 The empirical success of stock market volatility in pricing the cross-section of stock returns has motivated researchers to use foreign exchange volatility to explain carry trade returns in foreign exchange markets. The empirical evidence in Christiansen et al. (2011) and MSSS suggests that foreign exchange volatility is a priced risk factor in the currency market.

3 Müller and Verschoor (2009) also find that “stock return variability of US multinationals is positively related to exchange rate variability” (p. 1697).

4 Adrian and Rosenberg (2008) also find differential effects of the long-run and short-run components of stock market volatility on expected returns of stocks.

5 There is a huge literature that focuses on the first moment of exchange rates. See for instance Adler and Dumas (1983), Jorion (1990, 1991), Du and Hu (2012a), and Balvers and Klein (2014).
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