

Essays on Price Discovery and Volatility Dynamics in the Foreign Exchange Market

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Declaration of Authorship

I, Fei Su, clarify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text. I also clarify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Moreover, I declare that one paper titled “Global Price Discovery in the Australian Dollar Market and Its Determinants”, which is drawn from Chapter 2, has been accepted for publication and is forthcoming in *the Pacific-Basin Finance Journal*. This chapter is a collaboration work with Jingjing Zhang from Nanjing Audit University, China. I contribute by developing research ideas, conducting empirical analyses, and writing up. My co-author contributes by providing constructive comments and improving the writing.

Signature_____

Date_____

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Abstract

This dissertation consists of three independent essays that explore different aspects of price discovery and volatility dynamics in the FX market. In the first essay, I estimate daily information shares of different trading sessions (namely, Asia, Europe, and U.S.) in the global foreign exchange market, and more importantly, I examine their determinants, i.e. when and how a market contributes more to the price discovery of the exchange rates. Specifically, I study the short- and long-run price discovery in the FX market on a global basis and their determinants by taking the AUD as an example. Interestingly, I find that more favourable market states contribute to price discovery in the short-run, while the capital market openness and financial liberalization, as measured by the Chinn-Ito Index, have a strong impact on the long-run variations in price discovery. The empirical results presented in this essay provide a better understanding of the global information distribution in the FX market and contribute to the literature on the determinants of price discovery. Furthermore, I provide important policy implications regarding international financial competitiveness and market development.

In the second essay, I revisit the meteor showers and heat waves effects (namely, the inter- and intra-regional volatility spillovers) in the FX market, which have been extensively recorded and examined in the previous studies. The main methodological tools used in this essay are the heterogeneous autoregressive model (HAR) and the Shapley-Owen R^2 decomposition techniques. By examining the dynamic patterns of volatility spillover for exchange rates of AUD/USD, GBP/USD, EUR/USD, and USD/JPY spanning the period of January 1999 (January 2000 for EUR/USD) to December 2013, I confirm the presence of both meteor showers and heat waves effects, however, the meteor showers effect has been increasing steadily and predominated over heat waves effects with the trend toward global trading and correlated common shocks of the financial markets. Furthermore, I explicitly examine the role of changing market states in determining volatility spillover in the foreign exchange market. Unlike the

conventional information-based models, such as the mixture of distribution hypothesis (MDH) theory, the empirical results suggest that the volatility spillover is attributed to not only exogenous information shocks, but also endogenous information arrivals and price discovery process, which resolves uncertainty and therefore mitigates information propagation. In sum, this essay presents new evidence on the patterns and economic mechanisms of volatility spillover and contributes to the relevant literature on volatility modelling in the FX market by proposing the time-varying volatility spillovers in different regions and suggesting the segment-wise properties of FX volatility modelling.

The last essay focuses on the statistical significance and economic value of the Conditional Volatility Persistence (CVP) model as proposed in Wang and Yang (2017). Namely, the CVP model calibrates future volatility persistence base on the observed market states as captured by return and volatility. Then, I compare the economic gains of a variety of RV-based HAR models by developing a volatility-timing strategy based on the signal of predicted volatility. By applying the CVP model to the spot exchange rates of AUD/USD, GBP/USD, EUR/USD, and USD/JPY, I confirm both the statistical and economic significance of the CVP model in the FX market. Namely, the CVP model can improve the forecasting performance and generate moderate economic gains. For example, under empirically reasonable assumptions, the CVP model I use in this thesis can gain an estimated 1.26% of total wealth on an annual basis, or 0.51% of total wealth relative to a static model. Furthermore, it achieves higher Sharpe ratios, especially during the turmoil period. The gains in using CVP model remain positive and significant after controlling for the transaction costs and market microstructure noise.