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Characterizing information flows among spot, deliverable forward and non-deliverable forward exchange rate markets: A cross-country comparison ☆

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ABSTRACT

Using an innovative GMGARCH-MSKST model that allows for asymmetric generalized dynamic conditional correlation, this paper analyzes return and volatility interactions among spot, non-deliverable forward (NDF) and deliverable forward (DF) exchange rate markets for Korea and Taiwan. With the backdrop of these two very different regulatory and institutional regimes we examine how the inter-temporal dynamics of forward-directed currency market instruments are both influenced by, and influence, spot market exchange rates.

1. Introduction

Most research on exchange rate market behavior tends to focus on the spot market and its relationship to price revelation mechanisms operating in the deliverable forward (DF) markets. However, there is increasing interest in exploring non-deliverable forward (NDF) market behavior and its relationship to returns and volatility in the spot market. Despite targeting the same currency, DF and NDF markets exhibit important differences. DF pricing is theoretically governed by interest-rate parity conditions in which

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equivalent returns are measured over a set period according to their respective interest rates and current spot market exchange rates (Akram et al., 2008; Baba and Packer, 2009; Della Corte et al., 2011; Ahmad et al., 2012). Specifically, the forward premium is dictated by the interest rate differential between the two currencies. In most cases, covered interest rate parity holds true because it reflects a no-arbitrage condition between onshore and offshore currency markets in the absence of capital controls. However, when some forms of capital controls are adopted, non-residents may be restricted from full access to onshore currency markets. Dooley and Isard (1980) report that deviations from covered interest parity conditions can be partially explained by the existence of capital controls. Furthermore, Frankel and MacArthur (1988) discovered that the covered interest rate parity condition does not always hold for emerging market currencies. In order to more fully explore possible currency market misalignment with the covered interest rate parity condition (Fama, 1984), our research proposes a direct market information approach to gauge the influence of offshore non-deliverable forward (NDF) markets on onshore currency markets. Offshore trading has emerged as an important market phenomenon that is reflected in an increasing number of offshore foreign exchange transactions in NDF markets. This is particularly apparent in the cross-border flow of investment and trade in emerging economies, such as Asia, Latin America, and Eastern Europe, where restrictions on currency convertibility and controls on capital remain in effect (McCauley and Scatigna, 2011). This has led monetary policymakers to speculate that price movements in the NDF market could be a useful tool to monitor market expectations and uncover information about percolating pressure on an exchange rate regime that may not be fully manifested through traditional tools available in a country with capital controls.

In contrast to the central role of interest rate parity in pricing most forward currency exchange contracts, there are several conflating factors that undergird NDF pricing. These include such things as structural market frictions, trading restrictions, market segmentation, margin payment requirements, and market regulations. One of the key differences between the NDF market and more traditional DF forward contracts is that NDF markets are cash settled. This cash settlement feature reflects the fact that NDF markets are contracted offshore and is virtually beyond the direct jurisdiction purview of domestic monetary authorities that seek to impose currency convertibility restrictions. While offshore investors have only limited access to onshore interest markets, NDF prices are derived mainly from expectations regarding future spot exchange rates (Lipscomb, 2005). Recent estimates have indicated that a large proportion of NDF transactions are generated by speculative interest, and this purportedly reflects the growth of international hedge funds participating in NDF markets. NDF markets are structurally consistent with trades that both limit the exposure inherent in hedging strategies as well as attract traders speculating on currency movements.

Kong and Shao (2010) reported that DF markets are more heavily constrained by trade regulations and cost considerations, resulting in a slow reaction to information from NDF markets. Conversely, NDF markets are expected to react rapidly to information from DF markets due to the flexibility they provide in aligning price expectations with new market information. Discrepancies in pricing have been linked to the degree to which regulations impede the flow of information between markets. The less restrictive environment of NDF markets appears to incorporate a more robust set of information into currency exchange markets, suggesting the greater the extent to which NDF prices reflect spot prices. Maziad and Kang (2012) reported that developments in offshore markets could influence onshore spot markets in terms of level and volatility during periods of offshore market dislocation. They attributed this to the generally held belief by market participants that prices in the offshore market are likely to better reflect global market conditions. From a policy execution perspective, where NDF market returns exhibit a leading role in spot market pricing, Central Bank foreign exchange policy that is triggered by movements in spot market prices may be misaligned with the exchange rate generation mechanism that is actually occurring in the market. It is our hypothesis that policymakers and investors who employ global hedging strategies will benefit from a better understanding of the complex information flows in exchange rate markets that are governed by different regulatory regimes and institutional structures. Increasingly sophisticated empirical methods can be used to evaluate information transmission mechanisms that underlie price movement in exchange rate markets, however, such innovations are still quite rare in capturing a more comprehensive view of information flows between spot, DF and NDF currency markets.

With increased capital flows to emerging countries in the 1990s, the NDF market became more popular with Asian countries. In contrast to standard forward markets, Asian NDF markets are generally developed in offshore financial centers, primarily located in Singapore and Hong Kong, followed by London and Tokyo. An