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Co-movement between RMB and New Taiwan Dollars: Evidences from NDF markets

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ABSTRACT

This paper investigates the comovement and tail dependence between Chinese Yuan and New Taiwan Dollar non-delivery forward (NDF) rates against the U.S. dollar. We adopt the copula modeling approach to capture dynamics of correlation and tail dependence between two NDF rates. It is shown that the interdependence between two NDF rates strengthens as time elapses. In particular, the degree of correlation surges sharply after April 9, 2008 while the degree of tail dependence increases significantly after February 10, 2009. Each time point of change is shown to be close to economic and political events that are supposed to have a large impact on the relationship between Chinese Yuan and New Taiwan Dollar.

1. Introduction

After a rapid growth of Chinese economy in the past decades, and the subsequent exchange rate regime change and financial reform, academics have reported that Renminbi, the Chinese Yuan, started to function as more than a mere local currency.[1,2] Cockerell and Shoory (2012) report that Chinese

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[1] See, e.g., Herrmann and Winkler (2009) for more about the recent growth of Chinese economy.

[2] See, e.g., Ito (2006) for more about the importance of financial liberalization policy as a prerequisite for financial development.

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Yuan trade settlement during the first half of 2011 reaches around ten percent of China's total foreign trade in the same period, and the Chinese Yuan share of foreign currency deposits in Hong Kong is almost twenty percent as of the second half of 2011. Furthermore, Subramanian and Kessler (2012) argue that there already exists a Chinese Yuan bloc and Chinese Yuan has become the dominant reference currency in East Asia. They show that seven out of ten currencies in East Asia region move more closely with Chinese Yuan than with the U.S. dollar. When compared to an earlier study of Frankel and Wei (1994) who show that the U.S. dollar had been the dominant international currency in East Asian exchange rate policies during the 1980s and early 1990s, these findings imply that the rise of Chinese Yuan as the regional key currency has already begun.

Based on these facts, some recent papers try to investigate the mechanisms through which Chinese Yuan influence other Asian currencies. As pointed out by Shu, Chow, and Chan (2007), although it is relatively easier to verify that the relationship between Chinese Yuan and other Asian currencies became stronger, or simply suggest a possible factor which can strengthen the impact of Chinese Yuan (e.g., increased foreign trade between China and other East Asian countries),[3] it is more difficult to identify the processes through which Chinese Yuan influence the other currencies. To shed some light on this issue, Lien, Wu, Yang, and Zhou (2013) examine the non-delivery forward (hereinafter NDF) market and show that this market is a channel through which the dependence structure between Chinese Yuan and Asian currencies is developed. According to Lien et al. (2013), this is possible because enterprises in the Asia-Pacific region started to use NDF contracts of Chinese Yuan to hedge their currency exposure, after the Chinese government carried out a reform of currency regime in 2005. Since NDF contracts do not require an actual delivery of underlying commodity, firms can utilize these contracts without causing large capital flows.

This paper provides further evidence on how Chinese Yuan affects other Asian currencies through NDF market, by examining the correlation and tail dependence between Chinese Yuan and New Taiwan Dollar NDF rates against the U.S. dollar. We investigate whether the comovement has increased over time, and whether there exists a time point at which the degree of comovement changes significantly. We adopt copula modeling approach to describe the dynamics of comovement between two variables of interest, as well as the tail dependence. In recent years, many studies introduce the concept of copula into the field of financial econometrics to identify time-varying dependence among financial time series (e.g., Cherubini & Luciano, 2002; Cherubini, Luciano, & Vecchiato, 2004; Patton, 2006a, 2006b). With copula models, we assume that there exists an n-dimensional joint distribution function which can be decomposed into n marginal distributions, and a copula that defines the dependence structure among n variables. In addition, following Dias and Embrechts (2004), we introduce the concept of dynamic copula and use change-point techniques to find a time point at which the dependence structure changes significantly.

This paper focuses on the dynamic interdependence between Chinese Yuan and New Taiwan Dollar NDF rates against US dollar for two reasons. First, considering the distinctive relationship between China and Taiwan, the correlation between Chinese Yuan and New Taiwan Dollar exchange rates against the US dollars has a special meaning. As explained in Rosen and Wang (2011), while China has been generally open to Taiwanese products, investments and labor, Taiwan has been restrictive toward the reciprocal flows from China. This implies a possibility that the movement of two currencies will become more correlated once the effort for Chinese Yuan internationalization affects the cross-Straits relationship between China and Taiwan, thereby alleviating political barriers. Since Mr. Yingjiu Ma was elected as the president of Taiwan in 2008, the cross-Straits relationship is supposed to have improved and this further strengthens the possibility. Second, by investigating NDF rates, this paper examines the reaction of market participants more directly. Given that the Chinese government has reintroduced the dollar peg in July 2008 and maintained the policy for two years, an alternative form of exchange rate must be used to mitigate the impact of government intervention on exchange rates. We deal with this issue by using NDF rates. NDFs are forward foreign exchange contracts which do not require a physical delivery of currencies at maturity, but a net payment in a convertible currency.

[3] See, e.g., Ando (2006) for more about the increased role of China in East Asian trade integration.