



Full length article

## On the predictability of carry trade returns: The case of the Chinese Yuan



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### ABSTRACT

The Chinese Yuan or Renminbi has not been given due attention in the literature despite its importance in providing stability in global FX markets and attaining IMF reserve currency status. Unlike other currencies, the Yuan is subject to strict monetary controls by the People's Bank of China. We explore factors that explain Yuan carry trade returns during the dollar-peg and managed float regimes by observing its response to the dollar risk factor, global FX volatility innovations and, liquidity. Using the traditional Fama and Macbeth (1973) two-pass ordinary least squares regression, we find that the effects of the dollar risk factor, global FX volatility innovations and liquidity on Yuan carry trade returns: (1) are unlike those on other currencies; (2) vary monotonically as the maturity of the carry trade position increases; and (3) are affected by the exchange rate regime in force. Our results suggest that short-term Yuan carry trade portfolios may serve as a hedge against market volatility. 1-year positions are far more resilient and deliver substantial returns especially during periods of low market volatility. Our results also exhibit the Yuan's dependence on the dollar in its valuation besides the transfer of wealth between U.S. equity markets and dollar-denominated assets to the Yuan and Yuan-denominated assets.

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### 1. Introduction

There is no shortage on studies that have examined the ability of forward exchange rates to be an unbiased predictor of future spot exchange rates. Often termed the “forward-premium puzzle”, foreign exchange (FX) market participants have long sought to exploit this ‘puzzle’ to earn excess returns with next-to-no risk at all; a strategy that has come to be known as carry trade. The carry trade strategy is designed to exploit deviations from uncovered interest parity (UIP). The theory posits that if UIP holds, the relative difference between the interest rates of two countries should be offset by a depreciation of equal magnitude in the currency with higher interest rates. This phenomenon of course, has been tested extensively across a wide range of currencies. Studies have shown (see [Bilson, 1981](#); [Fama, 1984](#); [Hodrick, 1987](#); [Engel, 1996](#)) that generally, UIP does not hold, at least empirically. It has often been observed that currencies with higher interest rates appreciate instead of depreciate. [Burnside et al. \(2011\)](#) as a consequence, found carry trade to provide excess returns and Sharpe ratios that were double that of the US stock market.

The literature in this regard, suggests that the sizeable carry trade returns do not come without a price; that the returns are the result of investors bearing commensurate risks. A number of studies have been conducted providing evidence to

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this effect. [Burnside et al. \(2011\)](#) argued that the sizeable carry trade returns are the result of what the authors termed, a peso problem i.e. a low probability of large negative payoffs. [Brunnermeier et al. \(2009\)](#) meanwhile believe that carry trade positions are exposed to crash risk, made worse by the sudden unwinding of positions whenever speculators are facing liquidity constraints. [Burnside \(2012\)](#) found that traditional risk factors used to price stock returns cannot explain the returns to carry trade while [Christiansen et al. \(2011\)](#) found that the level of FX volatility has an impact on carry trade return exposure towards stock and bond markets. Finally, [Menkhoff et al. \(2012\)](#) likewise found that carry trade investors are compensated for their exposure to global FX volatility risk through large carry trade payoffs.

Motivated by the findings of the above mentioned studies, this paper examines the behaviour of carry trade returns in the specific context of the Chinese Yuan (CNY), or often synonymously, the Renminbi. The specific CNY focus is driven by a few reasons. First, instead of mere currency controls as has been implemented by various countries throughout history, China's central bank – the People's Bank of China (PBC) – have been accused by various parties but chiefly the U.S. of extensively manipulating the direction of the CNY on many occasions. Various authors have found that the CNY was undervalued by up to 30 percent against the USD; attributing this as the primary reason for China's significant trade surplus (see [Goldstein, 2004](#); [Frankel, 2005](#); [Funke and Rahn, 2005](#)). Second, for the longest time, the CNY has only been convertible to the USD ([Makin, 2011](#); [Jaeger, 2010](#)). It is only in the last decade that the PBC has allowed the CNY to be convertible to other safe-haven currencies such as the British Pound (GBP), the Euro (EUR) and the Japanese Yen (JPY). Third, China's dominance in world trade resulted in the PBC's rapid accumulation of substantial foreign currency reserves; reserves that were allegedly used to keep a tight hold on the CNY during the Global Financial Crisis between 2007 and 2009, effectively preventing the contagion from spreading across Asia ([Sun and Zhang, 2009](#)). Finally, the carry trade literature including those published in recent years, have left the CNY out of the equation despite its dominance in global FX markets. It would thus benefit academics and practitioners alike to have a better understanding of the CNY's behaviour, especially since the International Monetary Fund's (IMF) has said that it will elevate the CNY to reserve-currency status in October 2016 ([Talley, 2015](#)).

In the empirical findings, we follow much of the recent literature by constructing portfolios of carry trade returns. The portfolios are constructed on the basis of either buying or selling the CNY forward against a unit of safe-haven currency (i.e. USD, GBP, EUR and JPY) on a 1-month, 3-month, 6-month and 1-year basis for a total of 4 portfolios. This is in contrast to [Lustig and Verdelhan \(2007\)](#), [Lustig et al. \(2011\)](#) and [Menkhoff et al. \(2012\)](#) whom sorted global currency portfolios according to their forward discount (i.e. interest rate). The reason behind the method of construction in this paper is so that the Yuan's movement patterns throughout the sample period can be isolated and directly observed, rather than be confounded by the movements of a wide range of other currencies.

This paper examines CNY behaviour through carry trade returns and its response to established FX risk factors mainly, the dollar risk factor ([Lustig et al., 2011](#)) and volatility innovations ([Menkhoff et al., 2012](#)). This paper also examines other possible predictors to the movements in CNY carry trade returns such as the excess returns to the value-weighted U.S. stock market, excess returns to the value weighted Chinese stock market, [Carhart's \(1997\)](#) four factors, U.S. GDP growth, China GDP growth and U.S. industrial production growth. [Brunnermeier et al., 2009](#) argue that liquidity is a key factor in a currency crash since currencies take massive hits whenever liquidity runs out. As [Menkhoff et al. \(2012\)](#) argue, liquidity may also be an important factor in understanding the cross-section of carry trade returns. Our analysis thus includes the [Pástor and Stambaugh \(2003\)](#) liquidity measure as another predictor for the movements of CNY carry trade returns.

Using the traditional [Fama and Macbeth \(1973\)](#) (hereafter FMB) two-pass ordinary least squares (OLS) regression over a 15-year sample period from 2000 to 2014, our results show 1-month CNY carry trade returns to exhibit movement behaviour similar to those found by [Lustig et al. \(2011\)](#) and [Menkhoff et al. \(2012\)](#). That is to say, 1-month carry trade returns provided a form of hedge for investors during times of high market volatility. Having accounted for transaction costs, we also provide evidence that 1-year CNY carry trade positions were able to earn investors substantial excess returns regardless of market volatility conditions. This result corroborates the views of some commentators who believed that over the longer term, the PBC's tight control over the CNY may have provided some form of stability in world asset markets following the recent financial crisis. We also find that liquidity can be attributed as one of the factors that contribute to the excess returns from CNY carry trade, irrespective of maturity. Finally, we find that the factors contributing to CNY carry trade returns behaviour is contrary to that of other currencies. We show that cross-sectional variation in CNY carry trade excess returns can be mostly explained by the dollar risk factor instead of global FX volatility innovations. In fact, our results show global FX volatility innovations ranks behind liquidity in explaining variations in CNY carry trade returns.

From 1997, the CNY was pegged to the USD at a rate of 8.27 Yuan per USD until July 21, 2005 when the PBC lifted the peg causing a Yuan revaluation to about 8.11 per USD. Following the lifting of the peg, the PBC allowed the Yuan to appreciate against the dollar at a controlled pace before exercising tighter currency controls as the effects of the financial crisis started to be felt around the world ([Robb, 2010](#)). Although we excluded 2015 from our sample period, the market commentary on the CNY suggests that the PBC, despite its currency liberalization plans, still maintains a tight rein on the CNY as it held steady in spite of the huge Chinese stock market selloff in August. Consequently, this study also examines the impact of exchange rate regime changes on the CNY's behaviour. Our results show that during the dollar-peg period of our sample (January 2000–July 2005), CNY carry trade returns were indeed compensation for global FX volatility, irrespective of maturity. But during the managed float period of our sample (August 2005–December 2014), we only find 1-month returns to exhibit such behaviour. In contrast to that which is commonly presumed under UIP, our results show that a stable currency does not in fact, make carry trade more lucrative.

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