



## Effects of CNH Exchange Rate on Offshore RMB Interest Rate

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Since November 2014, the exchange rate of offshore RMB to USD (CNH exchange rate) has depreciated while choppy CNH HIBOR led to a significant increase in capital cost. This article will discuss whether this phase of RMB interest rate fluctuation has a causal relationship with the depreciation of RMB and the dynamics of such relationship.

### Effects of different sources of funds in offshore markets on RMB interest rates

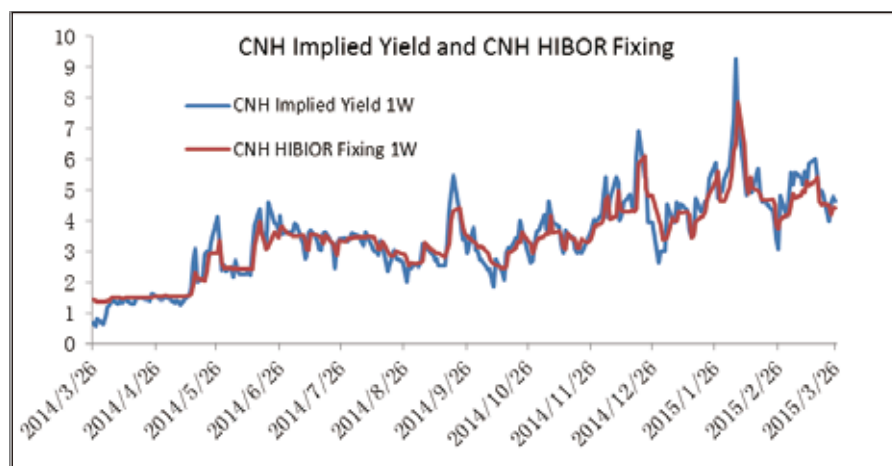
Interest rate is the cost paid by those who demand capital. Hence, in order to answer the first question, we have to understand the channels for obtaining RMB capital in the offshore market and their impact on interest rates.

Unlike onshore parties who gain liquidity mainly from repurchase agreement (Repo) and the interbank market, parties in the offshore market gained RMB liquidity from the following three ways, namely, CNH swaps, interbank lending and CNH CCS. These three channels have different impacts on offshore RMB interest rates.

**CNH swap** refers to the use of foreign currency (mainly USD) to swap with RMB, which is similar to using USD as collateral for RMB loans. Currently, RMB swaps average approximately USD 20 billion in daily trading volume, much higher than that of interbank lending (on average USD 5-8 billion per day), and are the main channel for obtaining capital in the offshore RMB market. The “CNH Implied Yield” from CNH swap trading has also become the unofficial benchmark rate in the offshore RMB market.

**Interbank lending** requires the lender to pre-approve a credit line to the borrower in advance. Since such lending is essentially unsecured loans, there are certain requirements for participating institutions, limiting the capital pool available for interbank lending. Therefore, interbank lending is not as active as CNH swaps. One should also note that the quotations of offshore interbank lending are calculated mainly using CNH Implied Yields of the corresponding tenor. Therefore, price changes in offshore RMB capital will first be reflected in CNH Implied Yield and then be transmitted to interbank lending rates. As shown in the diagram below, CNH Implied Yield and CNH HIBOR Fixing are closely correlated, but the

latter one is a bit less choppy as it is merely a daily fixing rate and does not represent actual market transactions.



Source: Bloomberg, BOCHK Research

**CNH CCS** is similar to CNH swap in that they both use foreign currency as collateral to obtain RMB. Yet they are different in the follow areas. Firstly, their trading structures vary as CCS usually involves regular interest rate swaps during the contractual period while CNH swaps only involve principal and interest swaps only at the end of the contract. Secondly, their durations are different. CCS tenors are mainly longer than 1 year and affect the offshore RMB yield curve in the middle and long end, while swaps' duration is mostly under a year and reflects short term interest rates. Thirdly, in terms of trading volume, the daily transaction volume for CCS is around USD 800 million<sup>1</sup>, much smaller than swap's. Therefore, it is obvious that CNH swap is the key determinant of offshore RMB interest rates, especially short term rates.

In addition to the 3 channels above, the HKMA and the Clearing Bank also provide participating banks with RMB capital through Repo, within a certain limit. The Repo rate for the HKMA is the average of previous three CNH HIBOR Fixing rates plus 50 basis points. The Clearing Bank provides an interest-free intraday Repo. As a result, these two Repo trades do not create a new capital price nor directly determine offshore RMB interest rates. Nevertheless, it goes without saying that the capital from Repo can ease offshore RMB liquidity, mitigates rapid increases in capital cost and thus has an indirect impact on RMB interest rates.

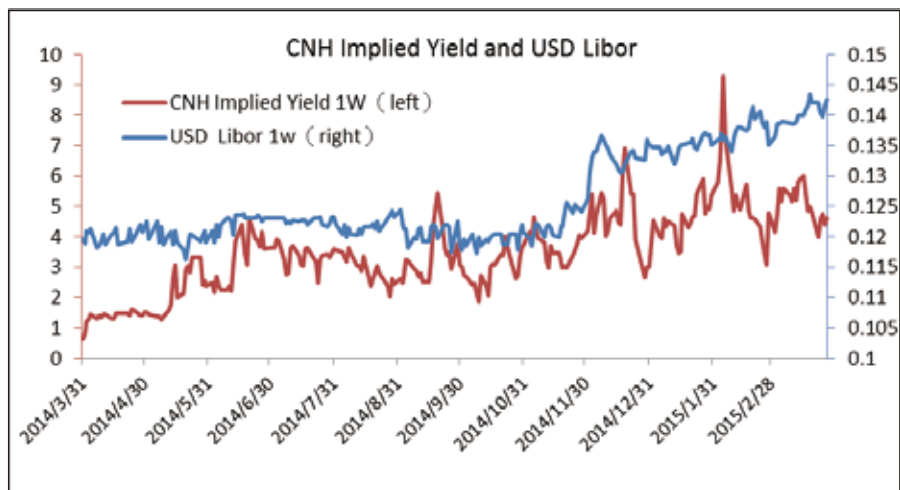
## Impacts of CNH exchange rates on CNH Implied Yield

Since CNH swaps are collateralized by USD, RMB funding costs indicated by CNH

<sup>1</sup> CNH Swap, interbank lending and CNH CCS are all trading in OTC form and has no authoritative statistic. The trading volume referred is an estimation according to market situation

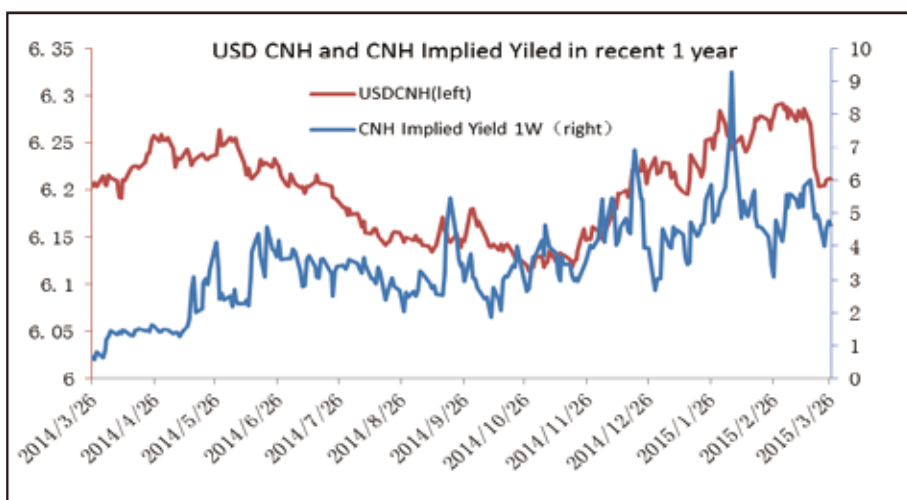
Implied Yield are not only affected by the fundamental factor of offshore RMB liquidity but also factors relating to USD listed below.

**1. USD interest rate: Increases in USD interest rates would increase the yields of related offshore investment products.** Hence, CNH lenders would require higher returns. LIBOR has climbed since November 2014, which was one of the factors explaining the increase in CNH Implied Yield. However, they are not highly correlated, implying there are more important factors affecting CNH Implied Yield.



Source: Bloomberg, BOCHK Research

**2. Exchange rate of CNH to USD is the key determinant of CNH Implied Yield.** When RMB depreciates against USD or depreciation expectation emerges, the value of RMB repayment when swap transactions mature will be less than that at the time of borrowing. As a result, CNH borrowers need to pay a higher cost (i.e. higher interest rate). The following chart shows that in the recent year, in particular since November 2014, exchange rate of CNH to USD and CNH Implied Yield are highly correlated. The depreciation of RMB against USD since November 2014 is the major factor of higher CNH Implied Yields. In contrast, CNH Implied Yield has declined since March 2015 as RMB appreciated against USD.



Source: Bloomberg, BOCHK Research

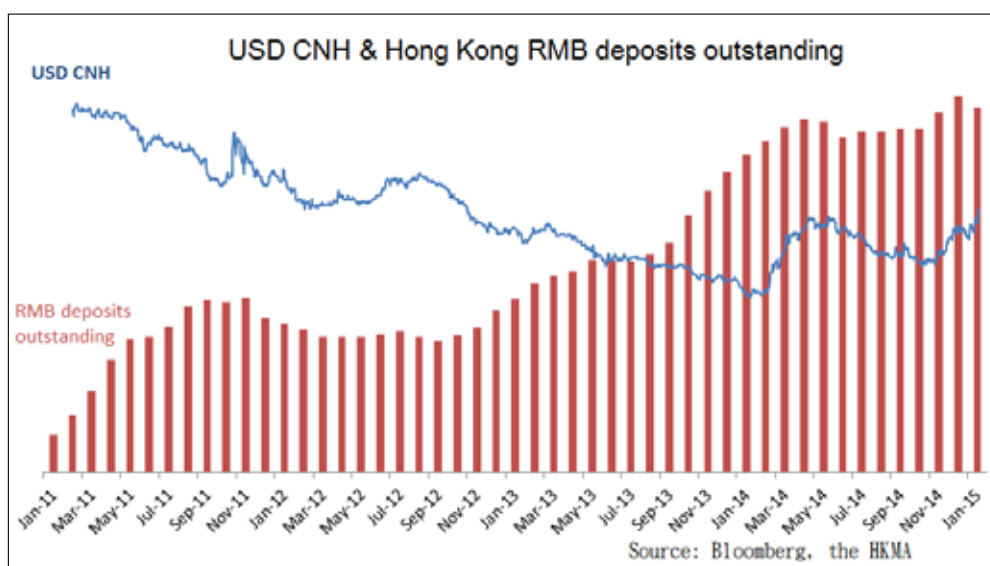
## **Exchange rate of CNH influences interest rate through its Impact on offshore RMB liquidity pool**

The aforementioned mechanism describes how CNH exchange rate affects offshore RMB interest rates through CNH swap transactions. From a macro perspective, the fluctuation of CNH exchange rates influences interest rate through its impact on offshore RMB liquidity pool.

CNH depreciation leads to contraction of offshore RMB liquidity pool. Since the launch of RMB cross-border trade settlement in 2009, outflow of RMB through the goods trade channel became the major source of funds for offshore RMB liquidity the pool. When RMB appreciation expectation emerges or the currency appreciates, offshore entities become inclined to receive RMB and pay in foreign currencies when they trade with their mainland counterparts, facilitating the expansion of the offshore RMB liquidity pool. However, if RMB depreciation expectation emerges, offshore entities will be more inclined to receive foreign currencies and pay in RMB. This will cause a decline in RMB liquidity outflow through goods trade or even net RMB capital inflow to the mainland. In the meantime, market players in the offshore market would prefer to hold less RMB assets and increase RMB liabilities. As a result, offshore RMB liquidity pool shrinks while demand for loan increases, leading to changes in the supply and demand fundamentals of offshore RMB funds. This situation tightens offshore RMB liquidity and hence pushes up CNH interest rates. Historically, Hong Kong RMB deposits contraction lag behind the start of RMB exchange rate depreciation by two to three months.

For example, in September 2011, CNH exchange rate depreciated substantially within a short period of time. In the next few months, although the CNH exchange rate gradually appreciated, substantial two-way fluctuation persisted. The volume of RMB deposits in Hong Kong decreased for 5 consecutive months since December 2011. This round of exchange rate fluctuation ended in July 2012, and CNH appreciation resumed. However, growth in Hong Kong's RMB deposits only resumed in October 2012.

Similarly, CNH started its depreciation trend in February 2014. From May to October 2014, Hong Kong's RMB deposits recorded negative growth or slow growth in these 6 consecutive months. Starting from November 2014, the CNH consistently depreciated, and Hong Kong's RMB deposits decreased by RMB 22.1 billion MoM and RMB 8.4 billion MoM in January and February 2015, respectively.



**The exchange rate differential between CNH and CNY would also lead to more RMB funds flowing into the mainland, which led to higher interest rates in the offshore RMB market.** As CNH was comparatively cheaper than CNY, this would attract more cross-border settlement funds to buy RMB in Hong Kong, remit the RMB funds into the Mainland and exchange the funds in order to obtain a risk-free return arising from exchange rate differentials. These arbitrage activities would contribute to RMB inflow, tightening the offshore RMB market liquidity and pushing offshore interest rates higher. Meanwhile, these arbitrage activities also caused the CNH exchange rate to appreciate (more buying orders) and CNY exchange rate to depreciate (more selling orders), which reduced the pricing differential in these two markets and compressed the room for arbitrage. If CNY depreciation reached the daily trading limit in the mainland FX market, the effect of arbitrage on reducing pricing differentials would be weakened. Thus offshore RMB funds would further flow into the mainland and offshore RMB interest rates would surge.

### **Implications on the offshore RMB market development**

In the environment of free flow of funds in the offshore market, following the development of interest rate and exchange rate derivative products, the interest rate parity mechanism has already played an important role in offshore RMB interest rate determination. Therefore, a relatively stable RMB exchange rate is one of the prerequisites of stable offshore market interest rates as well as one of the fundamentals for the overall healthy development of the offshore RMB market. In a recent example, due to the impact of high CNH interest rates, the issuance volume of dim sum bonds contracted significantly in early 2015. The issuance volume for the first two months was less than RMB 8 billion, only 20% of the volume in the same period last year.

Without external liquidity support, offshore interest rates may experience large volatilities

when RMB depreciates. The HKMA and Hong Kong's Clearing Bank have already injected RMB liquidity to the market through their own channels. However, as the offshore market continues to grow, more initiatives should be introduced to satisfy market demand for liquidity. Therefore, under the existing mechanisms, the regulators in the mainland and Hong Kong are recommended to roll out additional measures to support RMB liquidity in the offshore market, in order to prevent violent fluctuation of RMB interest rates and safeguard the steady growth of the offshore market. This could enable the interest rate and exchange rate differentials between the two markets be kept within a reasonable level, reducing the impacts of arbitrage activities on the mainland market.

Currently, due to the limited scale of the offshore RMB liquidity pool, market liquidity and interest rates could be rather volatile and are easily affected by different kinds of arbitrage activities in exchange rates and interest rates. Meanwhile, as the money market (lending/Repo) is less developed than the FX market (CNH swap), the impact of inter-bank lending transactions on interest rates is not as strong as that from CNH swap. As a result, in the long term, there is a need to further liberalize the channels for RMB outflow, enrich investment product offerings in the offshore market, and improve the circulation of RMB in the offshore regions. This will further stabilize and expand the scale of offshore RMB liquidity pool and thus prevent RMB shortages in the market. Market participants can then easily obtain RMB funds through interbank lending or repo. Eventually, RMB interest rates could be largely determined by the demand and supply of funds.



# 主要經濟指標 (Key Economic Indicators)

一. 本地生產總值 GDP	2013	2014	2014/Q3	2014/Q4
總量 (億元) GDP(\$100 Million)	20,961	21,446	5,456	5,733
升幅 (%) Change(%)	2.9	2.3	2.7	2.2
二. 對外貿易 External Trade	2013	2014	2015/2	2015/1-2
外貿總值 (億元) Total trade(\$100 Million)				
港產品出口 Domestic exports	544	553	29	74
轉口 Re-exports	35,053	36,175	2,254	5,327
總出口 Total exports	35,597	36,728	2,283	5,401
進口 Total imports	40,607	42,190	2,642	6,127
貿易差額 Trade balance	-5,010	-5,463	-359	-726
年增長率 (%) YOY Growth(%)				
港產品出口 Domestic exports	-7.6	1.7	-10.9	-2.5
轉口 Re-exports	3.8	3.2	7.5	4.7
總出口 Total exports	3.6	3.2	7.2	4.6
進口 Imports	3.8	3.9	-0.9	3.9
三. 消費物價 Consumer Price				
綜合消費物價升幅 (%) Change in Composite CPI(%)	4.3	4.4	4.6	4.3
四. 樓宇買賣 Sale & Purchase of Building Units				
合約宗數 (宗) No. of agreements	70,503	81,489	8,060	16,370
年升幅 (%) Change(%)	-29.9	15.6	102.2	67
五. 勞動就業 Employment			2014/11-2015/01	2014/12-2015/02
失業人數 (萬人) Unemployed(ten thousands)	11.84	14.95	12.1	12.2
失業率 (%) Unemployment rate(%)	3.4	3.2	3.3	3.3
就業不足率 (%) Underemployment rate(%)	1.5	1.5	1.6	1.5
六. 零售市場 Retail Market			2015/2	2015/1-2
零售額升幅 (%) Change in value of total sales(%)	11.0	-0.2	14.9	-2.0
零售量升幅 (%) Change in volume of total sales(%)	10.6	0.6	18.2	-0.3
七. 訪港遊客 Visitors				
總人數 (萬人次) arrivals (ten thousands)	5,430	6,077	541	1,102
年升幅 (%) Change(%)	11.7	11.9	22.4	11.6
八. 金融市場 Financial Market			2015/1	2015/2
港幣匯價 (US\$100=HK\$)	775.4	775.6	775.3	775.4
H.K. Dollar Exchange Rate (US\$100 = HK\$)				
貨幣供應量升幅 (%) change in Money Supply(%)				
M1	9.7	13	18.3	4.2
M2	12.3	9.5	10.3	8.3
M3	12.4	9.6	10.4	8.3
存款升幅 (%) Change in deposits(%)				
總存款 Total deposits	10.6	9.7	10.9	8.8
港元存款 In HK\$	5.1	9.3	11.4	6.3
外幣存款 In foreign currency	16.2	10.1	10.5	11.2
放款升幅 (%) in loans & advances(%)				
總放款 Total loans & advances	16.0	12.7	10.0	6.6
當地放款 use in HK	13.8	12.1	9.3	4.3
海外放款 use outside HK	21.4	14.2	11.6	12.1
貿易有關放款 Trade financing	43.8	-1.4	2.3	-6.7
最優惠貸款利率 (%) Best lending rate (%)	5.0000	5.0000	5.0000	5.0000
恆生指數 Hang Seng index	23,306	23,605	24,507	24,823