Hi, Rajesh! Can u hear me.

So basically, in the last few weeks, apart from the business week organized by the recruiter team. I mainly conduct two research projects for our trading Desk in SH.

The first research is about the Cross Currency Basis arbitrage and basis trading on USDCNY. It is also the project that I made presentation for APAC Global Markets last week. As you know, many of our peers and clients are very interested in the arbitrage opportunities as the basis of USDCNY

is hitting record lows every day. So zhanpei, wuhan and I think it’s a good idea to introduce this for other desks. If you’d like, I can share my screen with u so that I show u some work I have already finished.

This deck is quite introductory considering that many listeners of this project are from other desks, not only the FX trading desk, but also including equity, credit, prime financing and so on.

So first part is just a very quick introduction of the basis arbitrage process. I will go through this part very quickly.

At the beginning of the arbitrage, the arbitrager first borrows USD in the offshore market by, for example, making an overnight repo and then rolling over the repo till the end of the whole arbitrage period. Let’s assume it as one year. At the same time, in order to fix the funding cost, the arbitrager needs to pay an 1 year SOFR OIS. **(Next Page pls).**

The next step is to sell-buy an 1y USDCNY swap, selling the dollar just borrowed to obtain the CNY. Moreover, if the arbitrager wants to settle the arbitrage profits in USD at the end, it needs to buy an additional 1 year USD forward at the beginning. (**Next Page pls**).

For the last step, here I provide two approaches. So basically, the first approach is the mirror of step1. In step1, the arbitrager makes a USD repo and pays a 1year SOFR OIS. In step3 the arbitrager would make a reverse repo in CNY and receive a 1year CNY IRS to get a fixed lending yield. But also, there is another way which is much simpler. (**Next Page pls**)

The arbitrager can just buy 1-year zero-coupon CGB directly through Bond Connect or CIBM. Similarly, apart from the principal portion, the FX exposure of the arbitrage profits left at the end of the arbitrage can be closed by buying additional amounts of forward USD at the beginning, just as shown in Step2. In this case, we can write down the formula of the arbitrage profit as shown in the slide. The arbitrage profit from lowercase t to Uppercase t can be expressed as basis in the second and third formula. The point I want to emphasize here is that the arbitrage profit doesn’t count on the narrowing or widening of Basis in the future, but the absolute value of Basis at the beginning of the arbitrage. As long as the Basis is not zero, the Arbitrage can be conducted. The only pressure is that the MtM value of the portfolio may temporarily be negative, but it will be able to make a definite return at the end of the period. (**Next Page pls**)

But in practice, the basis arbitrage cannot be conducted by onshore institutions because we don’t have direct access to USD funding for the arbitrage purpose. But still we can bet on the basis narrowing by conducting basis trading. So the first step of basis trading is to sell-buy a long term, like a year, swap. (**Next Page pls**)

The second step is to buy-sell a short-term swap and roll over it till the end of the year with the same notional amount, so that the inflow and outflow of USD in each period can just be completely hedged, while for cash flow of CNY, the difference between the far leg of the old swap and the near leg of the new one just would become the profit and loss during the process of basis trading. **(Next Page pls)**

What’s more, in order to conduct a basis trading, there is still a step that we need to do. That is to hedge the rates risk of both USD and CNY by paying a USD IRS and receiving a CNY IRS. **(Next Page pls)**

Let me just show you the result of cash flow calculation. You can just focus on the third line, the total cash flow in . So basically, as the current basis is negative, so if the Basis narrow in the future, we can gain profits. Otherwise, we may encounter a loss with the Basis widening further. And although the double IRS has largely reduced the rates risk of USD and CNY, the risk exposure of rates cannot be perfectly hedged, as shown in the blue terms. As for the unhedged spot risk, if we ignore the effect of discounting factor and sum the total cash flows for each period, then the last term will be just minus , which is just the opposite of the swap point at the beginning of the period. **(Next Page pls)**

Ok, let’s move to the last section—the Basis Analysis. This plot is the time series of USDCNY xccy basis since 2015. The difference between the blue line and the red one is the selection of CNY real rate. The former one used the 7D Fixing Repo rate while the latter one used the 1 year CGB yield to maturity. You can find that the basis has turned negative since march last year. **(Next Page pls)**.

This plot is the trends of basis in different terms. The plot below zooms up the movement of Basis after it entered the sub-zero range starting in March last year. It can be noticed that since September last year, the 1-year basis has become the lowest one of all terms, lower than both its longer-term and shorter-term basis. Therefore, it is reasonable to assume that this could be caused by the PBoC's intervention in the FX market through 1-year forwards. **(Next Page pls)**.

We can see more evidence by comparing the basis with the spread between CNH and CNY 1 year swap point. We can see from the plot that the two show a high correlation. **(Next Page pls)**.

This chart shows how the 1 year Xccy basis and the Swap point move along with the US/China rates spread. We can find that Basis widening tends to occur when spreads remain high for a long period of time. At the same time, swap points and Basis show consistency in their movements. **(Next Page pls)**.

**Q: What’s the definition of CCS basis?**

There are a lot of ways to calculate the cross-currency basis of a currency pair. The cross-currency basis can just be defined as the deviation of Covered Interest Parity. The difference between implied yield of CNY and real rates of CNY, like CGB rates. But also, the implied yield of CNY is also derived from the interest rate parity formula.

**Q: Basis为什么存在？**

总的来说，Basis的存在主要是由于美元市场的供需不平衡等导致的。这种不平衡的背后往往有国际资本流动的结构性原因。经典的两个例子是USD/JPY和AUD/USD。日本是境外投资大国，拿日元换美元的需求很大，因此USD/JPY的Basis Swap常年为负数；澳大利亚本土资本市场容量不足，澳洲企业常常在境外发行美元债券再换回澳元使用，因此AUD/USD的Basis Swap常年为加点。

In general, the existence of Basis is mainly due to the imbalance between supply and demand of USD in the offshore dollar market. There are often structural causes of international capital flows behind such imbalances. Two classic examples are USD/JPY and AUD/USD. Japan has a strong long-term demand for overseas investment, so there is a great demand to exchange yen for dollars, so the Basis Swap of USD/JPY is negative for a long time. Australia's local capital market is insufficient, and Australian enterprises often issue US dollar bonds overseas and then exchange them for Australian dollars, so the Basis Swap of AUD/USD is always positive.

同样的，在持续的人民币贬值压力下和境内人民币资产回报长期较低的情况下，中国的出口企业和金融机构有很强的动力进行保留更多的美元或进行美元资产的投资。尽管经常项目下的进出口仍然维持顺差，但我们可以看到企业进行结汇的意愿明显下降了。可以从结售汇数据的差额得到。

Similarly, with continued depreciation pressure on the renminbi and low returns on onshore renminbi assets, China's exporters and financial institutions have a strong incentive to retain more dollars or invest in dollar assets.

Although exports and imports under the current account are still in surplus, we can see a marked decline in the willingness of enterprises to settle foreign exchange, which can be observed in the official statistics.

但我认为当前USDCNY的basis走阔还有具体的原因。让我将幻灯片翻到XX页。你可以看到，从去年9月份开始，1年期的basis成为所有期限中最低的，而去年9月份正好是PBoC开始通过抛售1年远期干预外汇的时间。这一点可以通过Agent Bank每日在市场上Buy-Sell的美元掉期量得出，我没有在这里放更多的图表，但我研究过CFETS提供的数据。

But I think there are specific reasons why the current USDCNY basis has widened. Let me turn the slide to page XX. You can see that the 1-year basis became the lowest of all maturities starting last September, which is exactly when the PBoC started intervening by selling 1-year forwards. This can be shown by the amount of dollar swaps Agent Bank buys and sells in the market on a daily basis, I have not put any more charts here, but I have studied the data provided by CFETS.

**Q: 为什么不直接交易Cross Currency Basis?**

Because there are no actively traded Cross-Currency basis products in the onshore market. But the effect of trading a basis through a swap is the same.

**Q: 你认为导致当前导致人民币Cross Currency Basis走宽的核心因素是什么？**

Because the interest rates spread between the yuan and the dollar persisted after the Fed began its current round of rate hikes last year, many Chinese exporters chose to delay foreign exchange settlements and hold more dollars in their accounts. At the same time, there are a large number of foreign institutions conducting carry trades.

Under normal circumstances, these carry trade flows, as we have just shown, can restore the basis to a normal level.