BANK FOR INTERNATIONAL SETTLEMENTS

Currency forward pricing: five questions

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On the occasion of the BIS Symposium: CIP – RIP?

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Good afternoon, ladies and gentlemen. It is my pleasure to open this very timely event which will give us an opportunity to think about how covered interest parity (CIP) – one of the core theses of international finance – has been challenged in recent years. Our interest in this issue is multifaceted, because the persistence of a significant cross-currency basis raises questions regarding the constraints on banks, international financial integration and financial stability. Our goals in organising this symposium can be gleaned from five questions:

1. How do currency forwards figure in global portfolios?
2. Why has the currency basis opened up?
3. Is money being left on the table by those who do not arbitrage?
4. Why doesn't arbitrage force the basis to narrow?
5. How should we think about CIP deviations and financial stability?

1. How do currency forwards figure in global portfolios?

Before we try to understand the apparent deviation of forward rates from relative interest rates, it may be useful to remind ourselves of the huge role of foreign exchange swaps. According to the most recent BIS Triennial Survey, FX swaps account for close to 50% of global foreign exchange trading, and that share rises to over 60% once forwards and longer-term currency swaps are included. While daily transactions amount to about $3 trillion, the accumulated stock of outstanding positions, in terms of notional amounts, of FX swaps, forwards and currency swaps amounted to almost 20 times daily transactions (at $58 trillion in December 2016).[1] Short-term positions (at about $43 trillion) are double global trade in goods and services. Since these derivatives are used not only to hedge trade payments but also to transform financial assets and liabilities from one currency to another, it is worthwhile comparing them with underlying stocks of assets. On this view, the tail is almost as big as the dog. Swaps and forwards with the dollar on one side (at $52 trillion) are almost as large as **both** US non-financial debt ($47 trillion in the US flow of funds) **and** the $10 trillion in non-US resident debt in dollars (in the BIS global liquidity indicators).

We can safely infer that, globally, banks and institutional investors use swaps to fund assets across currencies in the order of trillions or tens of trillions of dollars. Hence, what we are really talking about is pricing relationships in very large markets.

[1] Bank for International Settlements, "OTC derivatives statistics at end-December 2016", May 2017.

Why do currency swaps and forwards matter for global portfolios? One way of thinking of them is that they serve as a means to reconcile the **home currency funding base** of banks, institutional investors and firms with **global diversification opportunities**, while keeping currency risk at a minimum.

2. Why has the currency basis opened up?

The failure of covered interest parity during the Great Financial Crisis (GFC) was attributed to strains in the wholesale US dollar funding market and counterparty risks in the interbank market. However, the widening of the basis in 2014–16 took place in fairly calm markets featuring better capitalised banks.

The widening of the basis in 2014–16 seems to reflect strong and one-sided demand for currency hedges. And in the eight papers presented at this symposium, a recurring underlying factor for such hedging demand is divergent monetary policies. Importantly, unconventional monetary policies do not just push down yields in general, they also compress term premia and credit risk spreads. When investors seek to escape from low yields, negative term premia and narrow credit risk spreads in the euro, yen and Swiss franc, they raise dollar funding costs in the FX swap market. By the same token, firms with dollar funding needs are drawn to borrow in currencies with low credit risk spreads and to swap the proceeds into the dollar. This too has put further widening pressure on the cost of borrowing dollars in the forward market. Indeed, the BIS global liquidity indicators show almost a doubling over five years in outstanding euro-denominated bonds issued by borrowers from outside the euro area, including from the United States.[2]

In this context, should we see the basis less as a dislocation and more as a natural response to vast differences in liquidity conditions, including term and credit premia, in core fixed income markets?

3. Is money being left on the table?

This is where we may want to pause and think carefully about what really constitutes arbitrage across currencies and what novel limits to arbitrage may have arisen since the GFC.

The answer needs to take into account a number of structural changes in financial markets over the past years, especially changes in the structure of money markets. For example, as secured funding has gained on unsecured funding, and as counterparties reduce counterparty risks by posting collateral, what does this mean for arbitrage? More generally, central bankers are wrestling with the interpretation of segmentation across money markets, asking about the implications for monetary transmission.[3]

Here, we are pleased to be joined by market practitioners with diverse and extensive expertise who will be able to shed further light on this matter.

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[2] See http://stats.bis.org/statx/srs/tseries/GLI/Q.GBNA.XM.33?t=e2&c=&p=20163&i=26.3.

[3] See eg S Potter, "Money markets at a crossroads: policy implementation at a time of structural change", remarks at the Master of Applied Economics Distinguished Speaker Series, University of California, Los Angeles, 4 April 2017; B Cœuré, "Bond scarcity and the ECB's asset purchase programme", speech at the Club de Gestion Financière d'Associés en Finance, Paris, 3 April 2017; and Committee on the Global Financial System, "Repo market functioning", *CGFS Papers*, no 59, April 2017 .

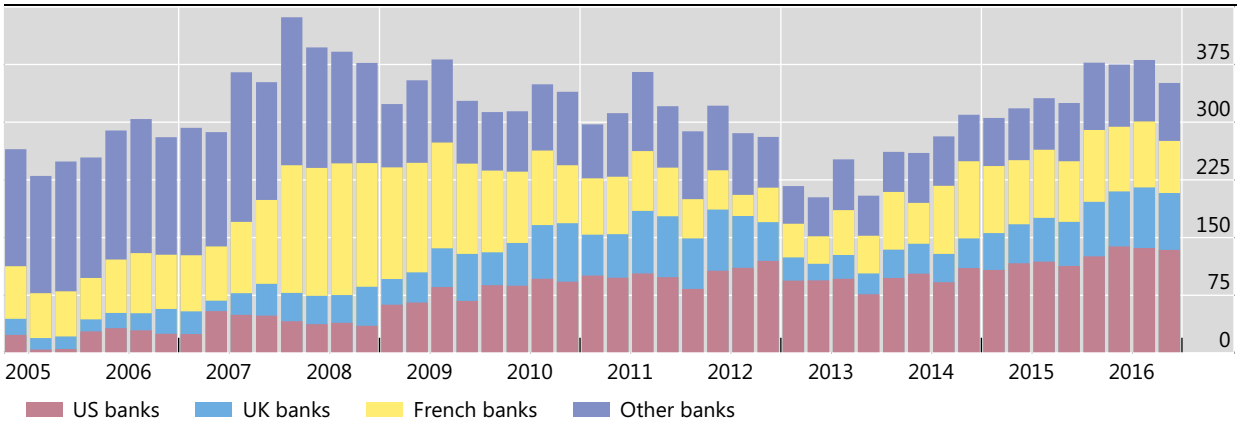
4. Why doesn't arbitrage force the basis to narrow?

There are different views about what constrains bank arbitrage. Some point to the simple leverage ratio, some to risk-weighted capital requirements, and others to the cost of funding and liquidity management. A difficulty is figuring out what evidence distinguishes between these views. For example, what do the month- and quarter-end turn in FX swap markets, as well as other short-term funding markets, tell us in this regard? And how does one explain the recent predominance of US, French and UK banks in arbitraging the yen/dollar basis, as suggested by the BIS consolidated banking statistics? Graph 1 shows the distribution across bank nationality of claims on the Ministry of Finance and the Bank of Japan, as a proxy for arbitrage through swaps of dollars for yen and placement of the yen proceeds with the official sector.

Foreign banks' claims on the Japanese official sector[1]

In billions of US dollars

Graph 1



[1] Non-Japanese banks' consolidated claims on an ultimate risk basis, including yen denominated claims booked in Japan, on the official sector, which includes the Ministry of Finance and the Bank of Japan. There was a series break in Q1 2009, when two US securities firms started to report as bank holding companies.

Source: BIS consolidated banking statistics on an ultimate risk basis.

Then there is the observation that, at the consolidated level, many banks seem to be at quite a distance from binding capital or liquidity constraints. Do stress tests make the otherwise non-binding constraints a greater concern to bank management? Or, are there constraints in banks' internal funding markets and capital management across units and business lines?

Beyond that, there is an open question as to why more non-banks, such as hedge funds or asset managers, do not step in to do arbitrage. Are we seeing "slow-moving capital"? Or, do rigid investment mandates and business models keep non-banks largely out of this game?

5. How should we think about CIP deviations and financial stability?

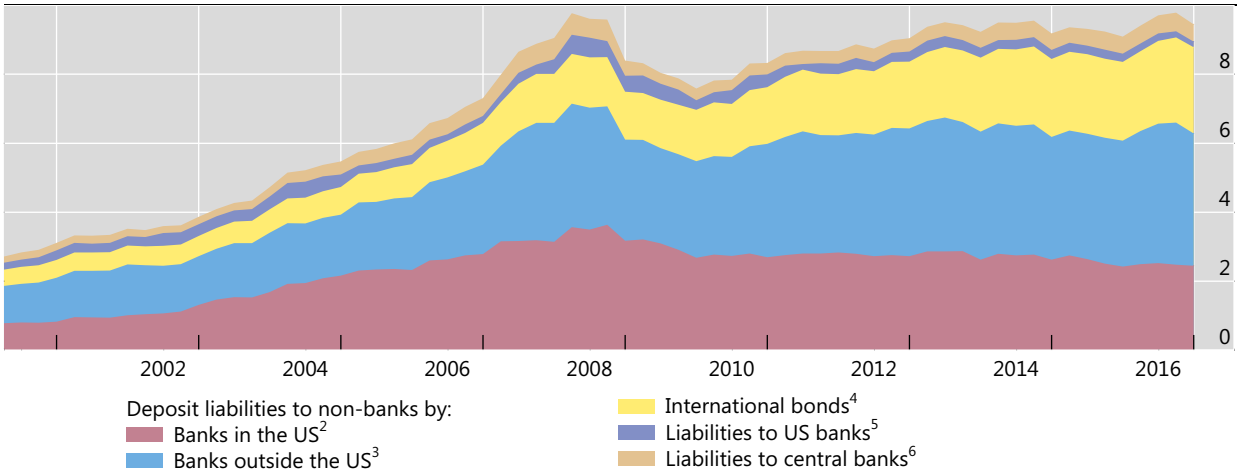
The received wisdom once was that the basis could move in a 50 basis point range around parity; but then, from the 1970s onwards, we grew accustomed to a very narrow basis. Was the law-like parity relationship that lasted for a generation predicated on unconstrained bank leverage? Is it clear what is the anomaly and what is the norm?

One benign view is that the observed deviations from parity ultimately reflect mainly a keener awareness of the risks involved in arbitrage under conditions of one-sided demand for hedging. On this view, if, say, monetary policies diverge less, pricing would tend to normalise. Indeed, even with little monetary policy convergence in 2017, Japanese investors' selling of hedged US and French bonds seems to have narrowed the yen and euro basis. On this view, the mere fact that prices seem to respond to the aggregate amount of cross-currency funding and hedging need not be a bad thing.

Another benign view is that we are in a transition period. As banks become more comfortable with their capital levels, their behaviour may change and the basis may narrow. Meanwhile, other players are finding ways to profit from the basis, eventually pushing in the same direction. This benign view could cite the apparent ease with which non-US banks found offshore deposits to replace a loss of $400 billion in funding from US money market funds, owing to reform.[4, 5] Looking at a broad measure of non-US banks' on-balance sheet dollar liabilities, we see fairly stable total funding in excess of $9 trillion, and nothing like the decline witnessed in 2008–09 (Graph 2).

On-balance sheet dollar funding of non-US banks[1]

Amounts outstanding, in trillions of US dollars — Graph 2



[1] Excluding positions reported by China and Russia, both of which started reporting to the locational banking statistics as from Q4 2015. [2] US dollar-denominated local liabilities (total) plus US dollar-denominated cross-border liabilities to non-banks by foreign affiliates in the United States; local liabilities are sourced from consolidated banking statistics on an immediate counterparty basis. [3] US dollar-denominated liabilities to non-banks by non-US banks located outside the United States. [4] US dollar denominated issuance by non-US public and private banks; includes bonds, medium term notes and money market instruments. [5] US dollar-denominated interbank claims of US banks. [6] US dollar-denominated liabilities to official monetary authorities (central banks) of non-US banks.

Sources: Dealogic; Euroclear; Thomson Reuters; Xtrakter Ltd; BIS consolidated banking statistics (immediate counterparty basis); BIS locational banking statistics.

A less benign view is that the basis may show that banks have limited capacity to expand balance sheets. This could be taken to suggest that banks could amplify rather than absorb shocks in times of stress. For

[4] See I Aldasoro, T Ehlers, E Eren and R McCauley, "Non-US banks' global dollar funding grows despite US money market reform", *BIS Quarterly Review,* March 2017, pp 22–23.

[5] H Nakaso, "Monetary policy divergence and global financial stability: from the perspective of demand and supply of safe assets", speech to the International Bankers Association of Japan, 20 January 2017, reports data for Japanese banks consistent with this more general observation.

instance, would renewed strength of the US dollar further constrain bank balance sheets and keep them from performing their job as shock absorbers in times of stress? This concern arises especially if banks and investors hedge long-term assets using short-term swaps that need to be rolled over every month or every quarter. This risk may be still higher if the bulk of intermediation and warehousing of risks in these markets rests with an ever smaller set of banks.

In sum, balance sheet exposures to cross-currency funding with FX swaps are large and prices seem out of line with covered interest parity. At the moment, there is no sign of a dollar liquidity shortage in the sense of acute funding problems. Should we be concerned that, with such initial conditions, strains in markets could take the basis to as yet unseen extremes? If that happens, counterparty credit exposures would surely rise, subjecting markets for high-quality collateral to further pressure.

With these and doubtless other questions in mind, this day and a half of brainstorming has many answers to find. I trust that, with the range of experience, perspective and talent represented here, we will make progress in understanding the many-faceted puzzle.