

# **The XVA Debate, Past and Future**

Mario Cerrato

University of Glasgow

Adam Smith Business School

16<sup>th</sup>, April 2024

## 1. The XVA Debate: The Industry 's Tale

Following the 2008 financial crisis, banks have started to price derivatives contracts taking into account funding costs, credit risk and regulatory capital charges, and to hedge these exposures.

The new regulations within the framework of the Fundamental Review of the Trading Book have led to a stricter separation of positions between the trading desk on one side, and the banking book on the other.

Valuation adjustments have been introduced following this new regulatory framework and, today, accounting bodies recognise these adjustments and expect large banks to accomplish with them.

These valuation adjustments related to derivative contracts, take different forms. For example, Credit Valuation Adjustments (CVA) are related to counterparty credit risk. Kapital Valuation Adjustments (KVA) are instead related to the cost of regulatory capital to maintain a trading position. Finally, Funding Value Adjustments (FVA) are related to the cost of funding a position via uncollateralised credit market.

Funding cost and funding risk, and the related funding value adjustment, is probably the risk that offers very significant challenges to dealers' banks.

### 1.1 Why is funding risk so challenging?

Banks have lost a significant amount of money in 2020 during the COVID-19 shock due to hedging funding risk. For example, JP Morgan reported a \$951 million loss in its corporate and investment bank in its first-quarter earnings call on April 14, stating that losses are related to the loss of "funding spread widening on derivatives" , Risk, April, 2020.

Bank of America followed reporting a \$492 million loss on April 15 that it said was largely caused by "certain valuation adjustments", Risk, April, 2020.

The financial industry had already been hit by losses related to funding risk in 2014. JP Morgan reported \$1.5 billion losses in that year.

In sum, XVAs adjustments are having a genuine impact on earnings across the industry contributing to impair assets' intermediation.

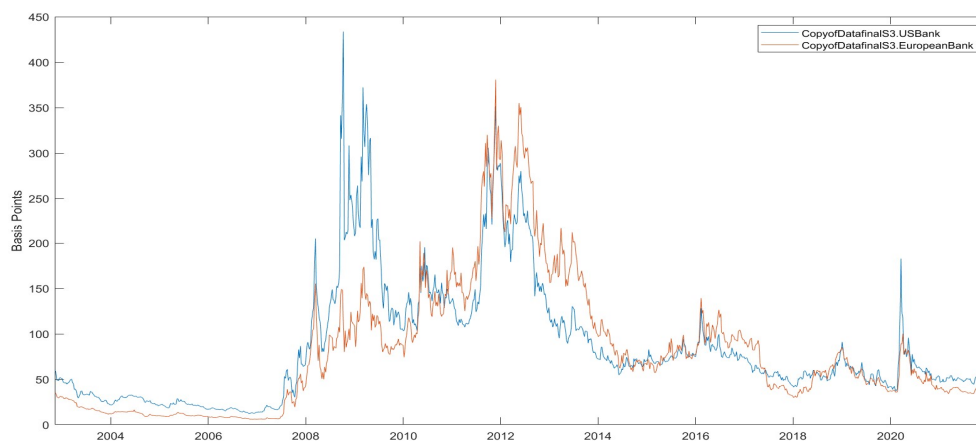
Hedging funding risk is challenging as the dealer will need to hedge the market-to market risk of the derivative position and, at the same time, hedging the bank's own funding cost (that is the credit spread component), which is instead more challenging. To hedge the credit spread component, the dealer would have to short its own debt or buy a CDS (credit default swap) on the bank.

From a practical viewpoint, to hedge the "spread" component of funding cost, the dealer will need to rely on proxies, which, particularly in times of shocks, may lead to large volatility in the profit and loss statement of the bank.

## 1.2 Where did all this come from?

To answer this question, we need to take a step back and discuss funding costs following the 2008 financial crisis.

Banks' credit spreads have increased after 2008 financial crisis although banks are better capitalised now than before 2008. Pic 1 shows the cross-sectional average of the five-year CDS spread of the largest six European and six US dealers' banks.



Pic 1: Large banks' CDS Spreads

The large increase in banks CDS spread is documented and discussed in Duffie (2018), Andersen and Duffie (2019) and Albanese, Andersen and Iabichino (2014). Berndt, Duffie and Zhu (2024) associate larger spreads to bank creditors' expectations of larger losses in the event of a bank's insolvency.

Large CDS spreads and funding costs and the difficulty for dealers' banks to hedge it, is affecting financial intermediation. This comes in addition to regulatory frictions (I am referring to leverage ratio requirements) that have been well documented in the literature.

## 1.3. Can We Really Hedge Funding Risk?

As I mentioned above, hedging funding risk is challenging and the dealer will need to find some sort of "good hedging proxy". This is even more relevant now as the Libor rate has been discontinued, Albanese, Iabichino and Mammola (Risk, 2020).

Practically the industry relies on “ad hoc” fixed spread adds-on which remain fixed over the duration of the trade, while the dealers’ funding costs, related to the client’s position on the balance sheet, change daily.

Recently, Berndt et al (2023) launched the idea of the AXI index. This index should provide a proxy for the wholesale cost of unsecured borrowing at different maturities. Therefore, the AXI would reflect “an average” of the cost of borrowing in the wholesale unsecured market for the dealer. Iabichino and Kappen (2023) discuss the wealth transfer related to the AXI.

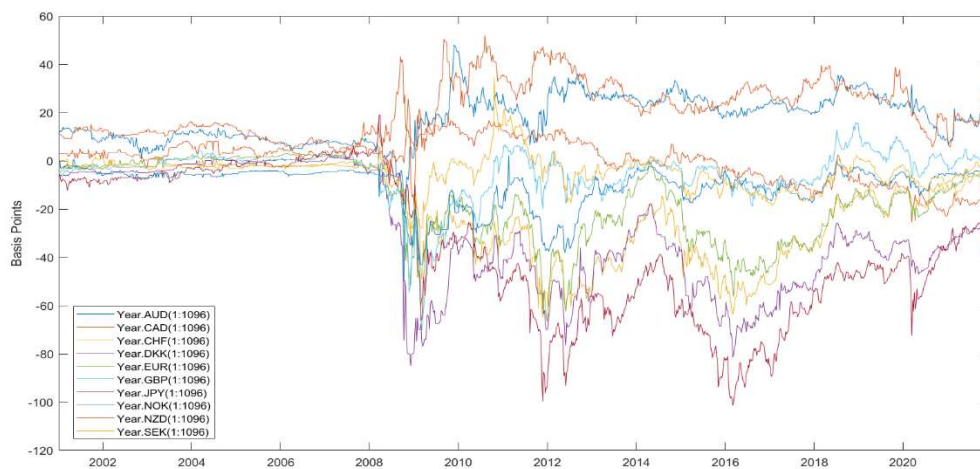
Recently Iabichino (2024) suggest instead hedging funding risk via the realised bank’s funding exposure and allocate the cost amongst clients in proportion to their contribution to the banks’ Net Interest Rate Income (NIRI), the spread between the bank’s funding and lending costs. This, waterfall cost amongst the dealers’ clients introduces a “perfect hedge” for the dealer as she will be able to hedge the funding costs exactly (based on the realised funding exposure of the dealer).

## 2. Financial Intermediation and The Dealer’s Funding Costs

The discussion, above, related to funding costs and funding risk, has significant impact on financial intermediation. For example, Burnside and Cerrato (2024) discuss funding value adjustments in relation to covered interest rate parity conditions (CIP). Following Andersen and Duffie (2019), we present robust evidence, from different markets, suggesting that dealers’ funding value adjustments, are associated with the observed large (negative) deviations (or basis) in libor CIP as well as repo CIP markets.

The CIP basis is the difference in the cost of borrowing US dollars in the US wholesale market and borrowing dollars via cross currency swaps. This basis should be zero in the absence of financial-markets frictions.

Pic 2 shows the five-year libor CIP basis before and after the 2008 financial crisis.



Pic 2: Five-Year Libor CIP Basis

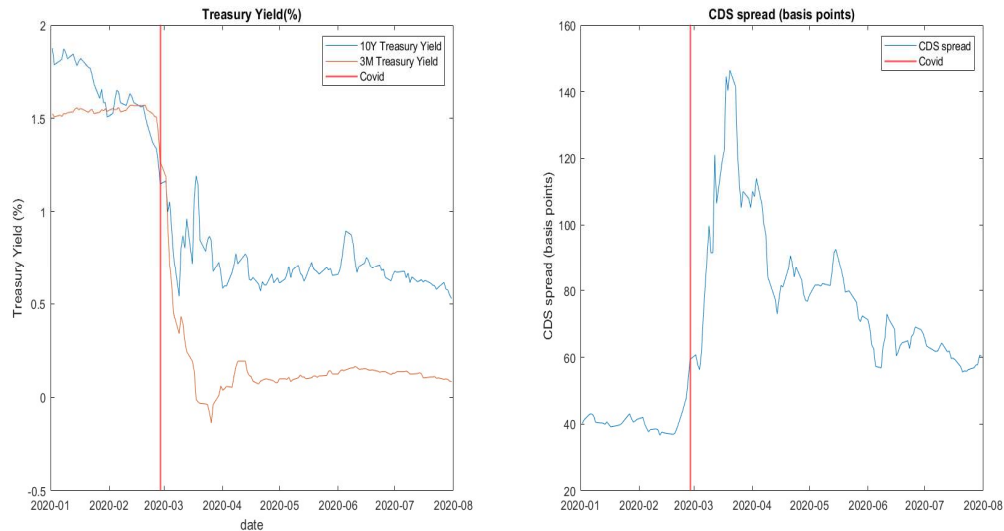
After 2008 CIP bases are much larger and negative than before. We discuss how funding value adjustments and debt overhang cost (first noted in Andersen and Duffie (2019)), are introducing a wedge when arbitraging CIP basis, which prevents dealers' banks from supplying dollar liquidity and profit from the trade. Our empirical results and related theory suggest that the debt overhang's wedge is not only functioning at quarter end, but it is more persistent.

Funding costs are also affecting fx spot intermediation. In a recent paper with Tongtong Wang, we use daily (weekly) fx volume (and order flows) from two large dealers for the period 2002 to 2021 and suggest that funding costs, and again, related debt overhang costs, may be associated with large sales of foreign currencies and purchases of US dollars.

Fleckenstein and Longstaff (2019) provide similar evidence for the for the interest rate futures market.

Another example of how funding costs can impair financial intermediation, in relation to the intermediation of safe assets, for example Treasury securities, is the large sale of US Treasury securities during the COVID-19 shock.

Following the shock, large dealers' banks were not there to provide the necessary liquidity at the long end of the yield curve (blue line) but there was demand instead for the three-month Treasury securities (red line). This was also noted in He et al, (2022), although they mainly relate the scarce liquidity in the Treasury market to leverage ratio requirements. Why? Leverage ratio requirements should also apply to the short end of the yield curve.



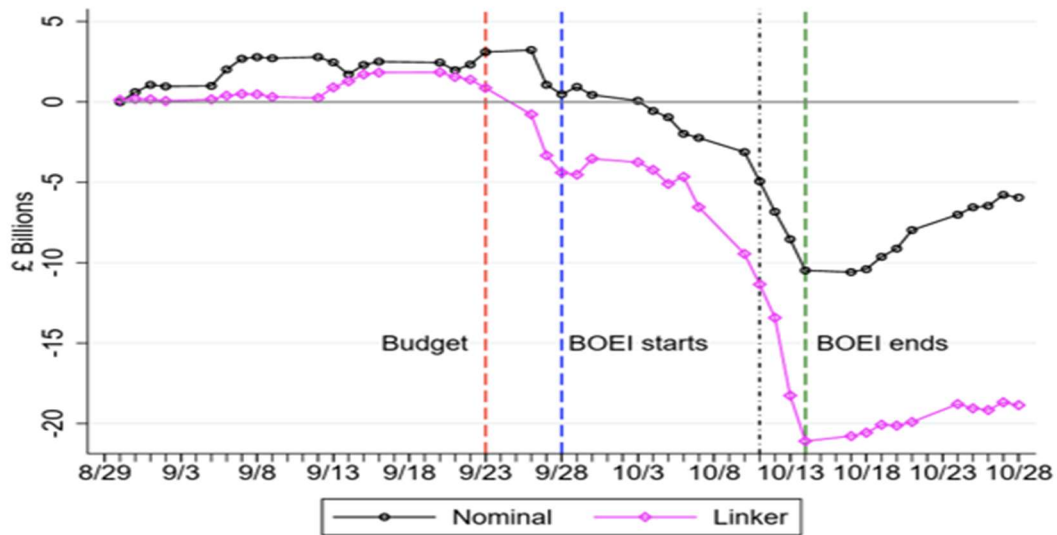
Pic 3: Treasury Yields and Large Banks' CDS Spreads

In Pic 3, I have plotted the 5-year CDS spread for the largest six European and six US dealers as proxies for funding costs for large dealers' banks. On top of regulatory frictions (leverage ratio requirements), additional frictions may be at work, probably preventing dealers' banks from supplying the necessary liquidity.

In the end the FED intervened providing the necessary liquidity as lender of last resort. In Middle of March 2020, the Fed purchased \$1trillion in three weeks to restore market liquidity in the Treasury market.

The final example I discuss is related to the UK mini-budget turmoil in September 2022. Following the announcement of large and unfunded tax-cuts by Liz Truss, there was a large

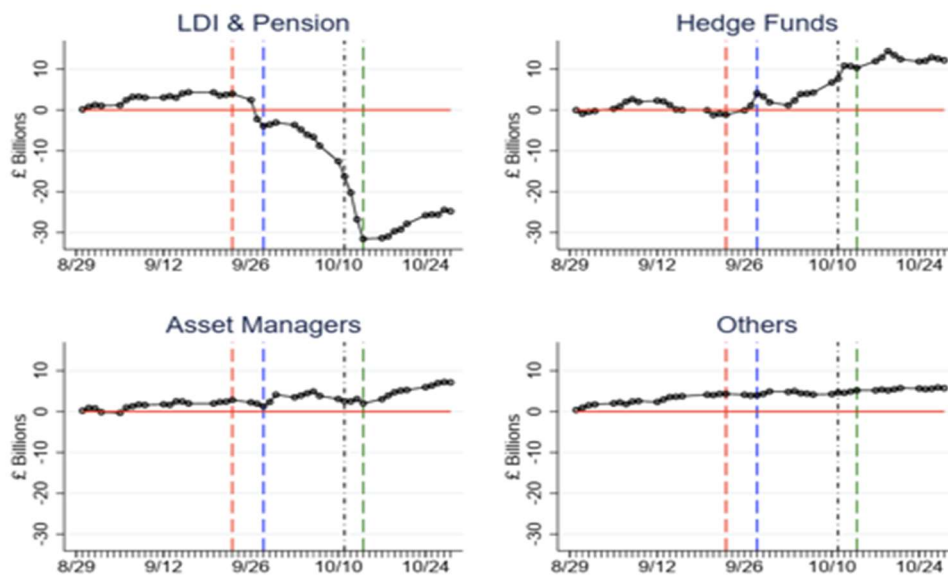
sale of UK gilts, but, once again, dealers' banks were not there to supply the necessary liquidity. Why? Probably leverage ratio requirements was not much of an issue in this case.



Pic 4: Cumulative Order Flow of the LDI Sector aggregated across nominal and inflation linked bond market

Pic 4 is from Pinter (2023), and it shows the cumulative flows for gilts and inflation linked gilts during that period. In the end the Bank of England was forced to intervene to restore liquidity in the UK gilt market.

But who was selling and who was buying gilts?



Pic 5: Cumulative Order Flow of different client sector

Pic 5, from Pinter (2023) is suggestive, as it shows that, Liability driven and pension funds were the main sellers, but, asset management firms, as well as hedge funds were instead buying UK gilts. They were providing liquidity even before the Bank of England started purchasing gilts.

Should we re-think of the important role of nonbank financial intermediaries in providing liquidity in key markets? After all large dealers' banks are facing significant new costs both related to the new regulatory framework (I am referring again to the leverage ratio requirements), and more important, related to funding costs and funding value adjustments.



## References

Albanese, C., L., B., G., Andersen and S., Iabichino (2014), “The FVA Puzzle: Accounting, Risk Management and Collateral Trading”, SSRN Papers.

Albanese, Iabichino and Mammola, “Risk Managing the LIBOR Transition (Risk, 2020)

Andersen, L., B., G., and., Duffie (2019), “Funding Value Adjustments”, *The Journal of Finance*, 74, 1.

Berndt, A., D., Duffie and Y., Zhu (2024), “The Decline of Too Big to Fail”, forthcoming, *American Economic Review*.

Berndt, A., D., Duffie and Y., Zhu (2023), “Across The Curve Credit Spread Indices”, *Financial Markets, Institutions & Instruments*, 32, 3.

Burnside, C., M., Cerrato (2024), “Covered Interest Parity Violations, Debt Overhang and Funding Value Adjustments”, The University of Glasgow.

Cerrato, M., and T. Wang, (2024), “The Dark Side of FX Volume: Evidence from large Dealer Banks”, The University of Glasgow.

Duffie, D., (2018), “Post-Crisis Bank Regulations and Financial Market Liquidity”, Banca D’Italia.

Fleckenstein, M., and F., A., Longstaff (2019), “Renting Balance Sheet Space: Intermediary Balance Sheet Rental Costs and the Valuation of Derivatives”, *The Review of Financial Studies*, 33, 11.

He, Z., S., Nagel and Z., Song (2022), “Treasury inconvenience yields during the COVID-19 crisis”, *The Journal of Financial Economics*, 143, 1.

Iabichino, S., and C., Kappen (2023), “Funding, Wealth Transfer and financial stability in the post-Libor era”, *Risk*, March.

Pinter (2023), “An Anatomy of the 2022 gilt market crisis”, Bank of England, Staff Working Paper No 1,019.