

Counterparty Credit Risk in IR and FX Swaps

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Abstract:

The estimation of fair market value of a derivative contract between counterparties should account for the counterparty credit risk. Typically, the fair market value of a derivative contract, such as a swap, is estimated by discounting the cash flows at market rates like London Interbank Offered Rate ("LIBOR"), which doesn't inherently consider counterparty credit risk.

Introduction

Any transaction that involves two counterparties is always exposed to a counterparty credit risk. While valuing an interest rate swap ("IRS") or a cross-currency swap ("CCS"), cash flows are discounted using market rates such as LIBOR, etc. However, the default risk of the counterparty is not incorporated while evaluating the fair value of a swap.

Importance of Credit Spreads

Credit risk is one of the most important components in the evaluation of the cash flow exposure to an over-the-counter ("OTC") counterparty. It is important to adjust the fair value for counterparty credit risk by adding a spread to the discount rate.

This paper proposes two methodologies to determine the fair market value of a swap by considering counterparty credit risk.

Method 1

Following are the proposed steps for determining the credit spread for valuing a swap:

1. Find the counterparty credit rating from public sources such as Bloomberg or Capital IQ, if available.
2. If the counterparty credit rating is not available, other methodologies such as synthetic credit rating should be used to determine the credit rating.
3. Find the yields on public bonds with similar credit rating profile.
4. Repeat steps 1 to 3 for the second counterparty as well.
5. Estimate the difference between the yields of both the counterparties and call it credit spread.
6. Forecast the cash flows for both the legs of an IRS or CCS.
7. Find the net cash flows for a swap.
8. If the net cash flow position is skewed towards a counterparty with a higher determined yield, apply the credit spread estimated in step 5, otherwise use zero credit spread.
9. Discount the cash flow to determine the fair value of a swap.

An example of above methodology is shown below:

Let us assume a US based counterparty - Counterparty A enters into a 10 year swap agreement (Maturity = 10 years) with India based Counterparty B where Counterparty A receives fixed payment from Counterparty B in exchange for 3 month LIBOR. Counterparty A has a credit rating of AA and counterparty B has a credit rating of BBB. Assuming 10 year AA rated bonds in the US are being traded at 4.0% yield and BBB rated bond in India are being traded at 7.0% yield. The difference between the yields i.e. (7.0% - 4.0%) is 3%.

From counterparty A's perspective, all the cash flows received are positive and the ones that are paid by Counterparty A are negative. Given that the counterparty A equivalent bonds have a lower yield compared to counterparty B equivalent bonds yield, the net cash flows received by counterparty A should be discounted at 3M LIBOR + 3.0% whereas the cash flows paid by counterparty A should be discounted at 3M LIBOR.

Method 2

Following are the proposed steps for determining the credit spread for valuing a swap:

1. Find the counterparty credit rating from public sources such as Bloomberg or Capital IQ, if available.
2. If the counterparty credit rating is not available, other methodologies such as synthetic credit rating should be used to determine the credit rating.
3. Find the yields on public bonds with similar credit rating profile.
4. Repeat steps 1 to 3 for the second counterparty as well.
5. Forecast the cash flows for both the legs of an IRS or CCS.
6. Estimate the net cash flows for a swap.
7. If the net cash flow position is skewed towards a counterparty with higher determined yield, select the higher of the two yields and if the net cash flow position is skewed towards a counterparty with lower determined yield, select the lower yields.
8. Discount the cash flow to determine the fair value of a swap using a yield selected in step 7.

An example of above methodology is shown below:

Let us assume that a counterparty A pays fixed rate in exchange for 3M LIBOR. Given that the bond equivalent of counterparty A have a yield of 4.0% and the bond equivalents of counterparty B have a yield of 7.0%.

In this method, the net cash flows received by counterparty A should be discounted using 7.0% and the net cash flows received by counterparty B should be discounted using a rate of 4.0%.

Note: In both the aforementioned methodologies, the net cash flows should be discounted using their respective rates instead of each leg cash flow.

Conclusion

It is important to adjust the net cash flows for counterparty credit risk by adding an appropriate credit spread to the discount curve/rate. The use of proposed methodologies will account for the appropriate credit risk while estimating the fair market value of a swap and providing a premium to the counterparty with higher credit rating.