The Background
Interest rate swaps have become an essential tool used to help manage interest rate risk. The interest rate swap market has grown dramatically over the last 20 years. According to the BIS, the gross notional amount traded of interest rate swaps has increased by more than 13 times since 1998, when the BIS started collecting the data. In this paper we explain what interest rate swaps are, how they are used and aim to simplify and demystify seemingly complex instruments.

What to Know

What is an interest rate swap?
An interest rate swap is an agreement between two parties to exchange one stream of cash flows for another, over a set period of time. Swaps, like futures contracts, are “derivative” contracts (i.e., they derive their value from underlying cash instruments).

What are “vanilla” interest rate swaps?
The most commonly traded and most liquid interest rate swaps are known as “vanilla” interest rate swaps, which exchange fixed-rate payments for floating-rate payments based on LIBOR. Vanilla interest rate swaps allow investors to manage the overall level of exposure to interest rates in their portfolios or to transform the nature of cash flows they are receiving from fixed to floating, or vice versa. The party that elects to receive a fixed rate and pay floating is the “receiver,” and the party that pays fixed in is the “payer”.

What is the counterparty risk?
Due to new regulation, vanilla interest rate swaps are now centrally cleared. Central clearing is designed to standardize certain swaps, promote transparency and allow investors to mitigate their counterparty risk by making the clearinghouse the ultimate counterparty.

How does an interest rate swap work?
At the inception of the swap, the expected values of the fixed and floating payment streams are set equal to each other, so each counterparty is economically indifferent. Paying fixed payment streams is equivalent to being short the market (i.e., just as shorting a Treasury would result in an investor paying the fixed coupon) while receiving fixed payment streams is equivalent to being long the market (i.e., just as being long a Treasury would result in an investor receiving the coupon). The floating leg in a swap may be thought of as either the cash opportunity cost of a money market position or a financing rate.

The only payments the counterparties exchange are periodic interest payments. These interest payments are based on a predetermined principal amount called the “notional amount” but the notional amount is never exchanged in a vanilla swap.

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1 Source: BIS Quarterly Review: June 2015
2 Counterparty risk is the risk that the other party in the agreement will default on its payments. After a swap is cleared, the fund will face the clearinghouse as a counterparty rather than a specific bank, therefore reducing counterparty risk.
How does an interest rate swap work? (Continued)

As an example, assume that an investor enters into a 5-year swap in which they agree to pay a 1.75% fixed rate in exchange for 3 month LIBOR. Currently 3 month LIBOR is 0.29%, so initially the investor would pay out a net of 1.75% - 0.29% = 1.46% annually. However, the market believes that ultimately 3 month LIBOR would exceed 1.75% such that the investor would be made whole over the life of the swap. Note that this is similar to shorting a US Treasury, in which current 5-year rates are 1.63% while Treasury overnight repo rates are 0.16%.

How do swaps and Treasury futures differ as a hedge?

While it is true that you are paying more on the fixed leg of the swap, you are generally receiving more on the floating leg relative to Treasuries. In the example above, the investor is paying 1.75% on the swap instead of 1.63% on the Treasury, but the investor is receiving 0.29% on LIBOR instead of 0.16% on the Treasury repo rate.

How does a swap work vs. a futures contract?

As illustrated in the example above, all of the swap cash flows are explicit. In a futures contract, the net cash flows are embedded in the current futures price.

Using the same data in the previous example, assume that there is a 3 month futures contract on the 5-year Treasury. Further assume that the current Treasury price is par and that the repo rate remains constant over the life of the futures contract. The theoretical futures price is a function of the current price of the Treasury and the projected cash flows of the underlying Treasury position. In this case, the 3 month futures price would be:

Futures price = 100 x (1+(repo – yield) / 4)
Futures price = 100 x (1+(0.16% – 1.63%) / 4) = $98.53

At the end of the 3 month period, the futures contract would mature at par. So an investor who shorts the contract at $98.53 and unwinds it at expiration at $100, would experience a loss of ($1.47).

In the case of the swap, the investor would pay 1.75% and receive 0.29% over 3 months (on a face of $100). The swap investor would experience a loss of ($1.46):

P/L = 100 x (3m LIBOR – Fixed Rate)/4
P/L = 100 x (0.29% - 1.75%)/4 = ($1.46)

As this example illustrates, the economic impact of the swap and futures contract are quite similar in this scenario even though the mechanism differs (i.e., the swap cash flows are explicit while the futures cash flows are implicit).

How do changes in interest rates impact the value of a swap?

If interest rates fall or stay lower than expected, the “receiver” will profit because they are receiving a fixed amount on interest but the amount they pay will decrease with interest rates. Conversely, if rates rise and remain higher than expected, the “payer” profits because the amount they are receiving will increase with interest rates while the amount they are paying will stay fixed. In addition, the market value of the swap will typically change in a very similar manner to that of a comparable Treasury as rates rise/fall (i.e., as rates fall, the value of the swap increases for the long since they are receiving a fixed coupon and vice versa).

The examples above are provided for illustrative purposes only and are not indicative of any actual investment.

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