

# Russell Research

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## An introduction to swaps

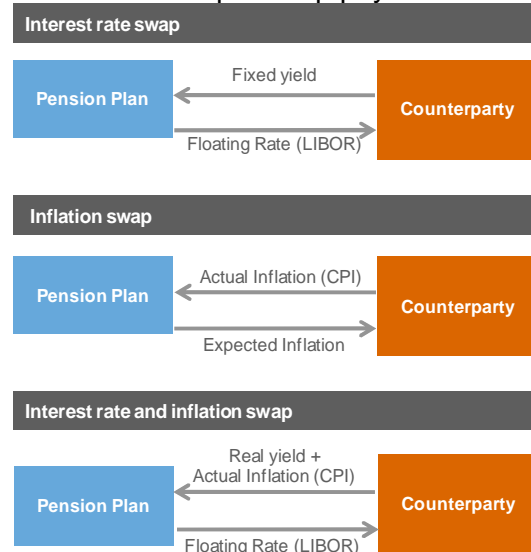
The use of liability hedging techniques by pension plans has become increasingly popular over recent years. While not the only instruments, interest rate and inflation swaps are often used in the management of hedging solutions. This paper takes a detailed look at these instruments, the benefits of their use and the pension plans' required risk-management techniques.

### What is a swap?

A swap is an agreement by two parties to swap two future streams of cash flows. It is a tailored contract governed by a specific legal agreement (an ISDA<sup>1</sup> contract). Typically, one of the parties to the swap is an investment bank, and the agreement will be to swap a variable stream of future cash flows for a fixed stream of future cash flows.<sup>2</sup> Importantly, no payments are made at the outset, and payments are based on a notional amount (at the introduction of central clearing, an initial margin will be transferred). The terms of the swap will be negotiated and agreed upon in advance, and the most important parameters will be the notional principal, the pay leg, the receive leg and the term of the swap. The most common types of swaps for pension plans hedging their liability-related risks are interest rate and inflation swaps, depicted at right.

Exhibit 2 shows an example of the parameters for interest rate and inflation swaps used by pension plans.

### Exhibit 1: Example swap payments



<sup>1</sup> "ISDA" stands for International Swaps and Derivatives Association, which was established in 1985. The global trade association for OTC derivatives, it develops and maintains standard documentation for swaps and other derivatives. ISDA fosters safe and efficient derivatives markets to facilitate effective risk management for all users of derivatives products.

<sup>2</sup> It is possible for both legs of the swaps to be based on variables. For example, the swap may be to exchange floating interest rate payments for the total return on an equity index. This is known as a total return swap.

## Exhibit 2: Typical swap parameters used by pension plans

	Interest rate swap	Inflation swap
Notional principal	USD1 million	USD1 million
Pay leg	Floating rate: 3-month LIBOR	Fixed rate: expected inflation
Receive leg	Fixed rate: e.g., 3%	Floating rate: actual inflation / CPI
Term	30 years	30 years

For illustrative purposes only. Source: Russell Investments

### How does the value of a swap change?

At the outset, a swap is normally structured so as to have no value to either party. The fixed leg of an interest rate swap will be set so that the rate matches the expected floating rate over the period. If the actual floating rate over time is lower than expected, the party receiving the fixed rate will be better off.

#### PAR SWAPS AND ZERO-COUPON SWAPS

*A par swap is the most common types of swap; it mimics a traditional bond. Regular (every three months) cash flows transferred between the parties represent the payments on the fixed and floating legs.*

*No regular payments are made under a zero-coupon swap, and payments under both the fixed and floating legs are rolled up and paid at the maturity of the swap contract.*

For example, assume that a pension plan enters into a 10-year zero-coupon swap to receive a fixed rate of 3% and pay a floating rate of 3-month LIBOR, with a notional principal amount of USD1 million. If expected interest rates (as reflected in the 10-year swap rate) immediately decrease, the swap becomes more valuable to the pension plan; if they immediately increase, the swap becomes more valuable to the counterparty.

### Exhibit 3: Change in value of an interest rate swap, assuming an immediate change in interest rates

10-year swap rate	3.0%	3.5%	2.5%
Value to pension fund	\$0	-\$47,272	\$49,865

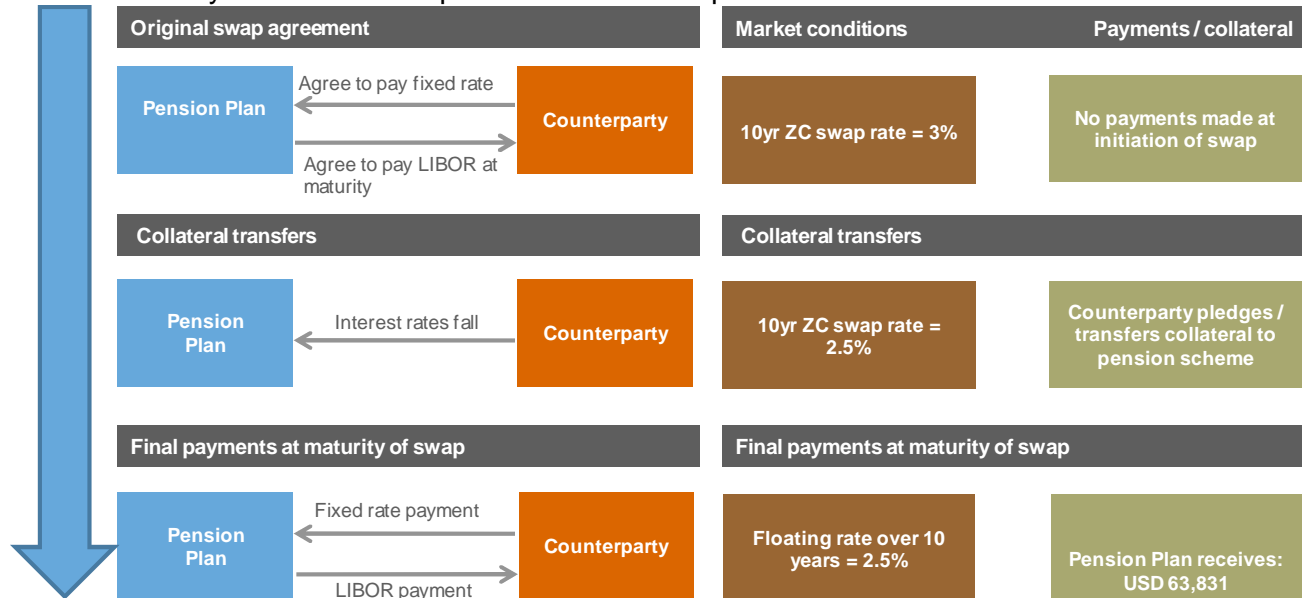
For illustrative purposes only. Source: Russell Investments.

Exhibit 4 shows the cash and collateral<sup>3</sup> transfers through the life of this zero-coupon swap. We assume a USD1 million notional principal amount for a 10-year term, with the pension plan receiving a fixed rate and paying the floating rate. If the swap rate falls, the counterparty will transfer to the pension plan collateral that represents the change in value of the swap.

At maturity, the fixed and floating payments are made to satisfy the pre-agreed swap terms.

<sup>3</sup> Details of the collateral process are covered on page 3.

## Exhibit 4: Life cycle of a zero-coupon interest rate swap



For illustrative purposes only. Source: Russell Investments

### Managing the risks associated with swaps

The introduction of swaps to a hedging strategy may bring into play some risks that were not previously present. Swaps are often referred to as “over the counter (OTC)” transactions, which means there is a direct contractual relationship between the two parties. Both parties are subject to the risk that the other may default on its obligations under the swap agreement.

This risk is mitigated in two key ways:

1. The ISDA Master Agreement acts as the primary legal documentation, making the obligations binding on both parties
2. Collateral representing the mark-to-market value of the swap is moved between the parties on a daily basis. As the value of the swap increases for one party, the other party is required to transfer collateral to the other party. (The collateral has to meet some pre-specified criteria to be eligible.)

Beyond the legal and collateral protections, exposure will typically be diversified across multiple counterparties to reduce the risk of bankruptcy by an individual party. Finally, an active approach is taken to selecting counterparties, and independent assessment of the counterparties’ creditworthiness is maintained on an ongoing basis. Exposure limits can be set for each counterparty, based on this assessment.

In order to meet the potential collateral and financing requirements of a swap, it is important for a pension plan to ensure that sufficient liquidity is maintained to meet these requirements. In most cases, a portfolio of cash or high-quality bonds is maintained for this purpose.

#### COLLATERAL MECHANISM

*At the initiation of the swap, no cash or assets are transferred between the parties.*

*As the value of the swap agreement changes through time, collateral is transferred between parties to manage the risk of default.*

#### A CREDIT SUPPORT ANNEX (CSA)

*CSA is part of the ISDA agreement and establishes the rules governing the posting of collateral between parties. It establishes, amongst other things the nature of the eligible collateral and the minimum transfer amounts.*

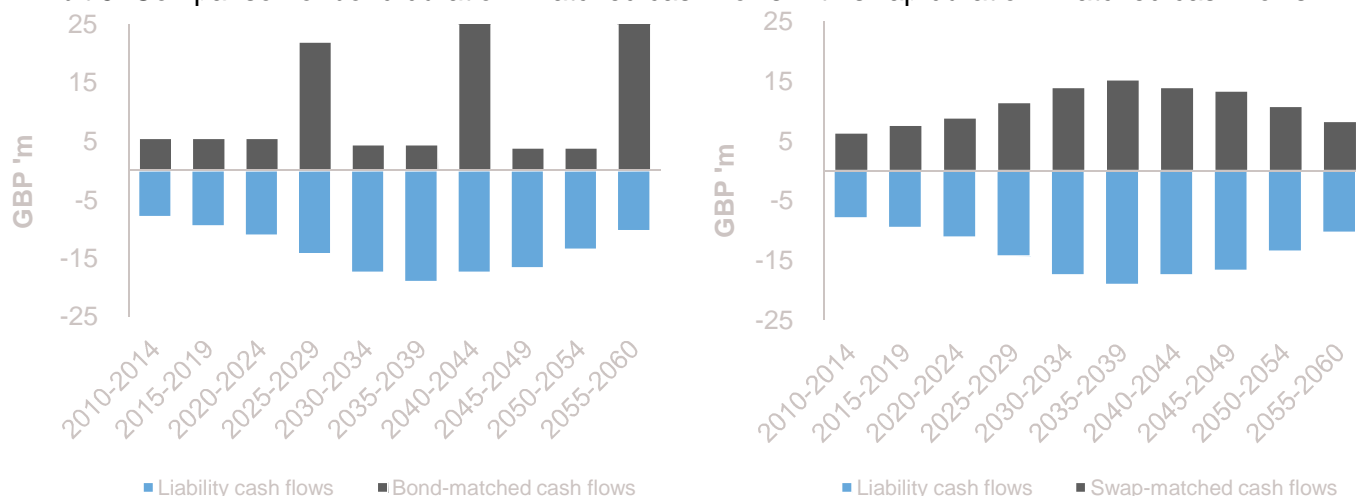
The introduction of central clearing to an interest rate swap makes the exposure similar to that of a futures contract, where an initial margin is also posted to a central clearing house. In the US, by the end of 2013, certain types of interest rate swaps will be required by the Dodd Frank Act to be centrally cleared. This provides additional protection in the event of the bankruptcy of one of the parties.

### What are the benefits of using swaps to hedge liability risks?

Swaps offer two very important potential benefits to a pension plan designing a portfolio to hedge its liability risks:

- Swaps are “contract for difference” agreements and do not require transfer of the full principal amount at initiation. As a result, the pension plan can employ leverage to create a more efficient hedge. Using swaps means that a greater proportion of the interest rate and inflation risk can be removed than when bonds alone are used.
- Swaps allow for a greater degree of customization than bonds alone enable. A more efficient hedge can be built that better matches the interest rate and inflation sensitivity across the maturity spectrum of the liabilities. The available bonds have fixed maturities, resulting in lumpy cash flows through time. Swaps allow for individual calendar-year cash flows to be matched, if necessary. This effect is demonstrated in Exhibit 5 below.

Exhibit 5: Comparison of bond duration–matched cash flows with swap duration–matched cash flows



For illustrative purposes only. Source: Russell Investments

### What other instruments can be employed for liability hedging?

We have constrained this note to considering swaps, which are very important instruments for designing and managing liability hedges for pension plan clients. However, a number of other derivatives instruments may have roles to play in a liability-hedge portfolio, including nominal and inflation-linked bonds, high-quality bonds, repo transactions, total-return swaps, swaptions and other derivative instruments.

### Summary

Swaps and other derivatives instruments are very useful tools for pension plans seeking to better manage the risks associated with their liabilities. They provide much greater flexibility in risk management by allowing for construction of a more precise covering longer maturities. A plan is able to better protect against the impact of movements in interest rates, while at the same time maintaining allocations to a multi-asset portfolio designed to generate growth from the plan’s assets.

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