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**Total Return Swaps: Credit Derivatives and Synthetic Funding
Instruments**

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A *total return swap* (TRS), sometimes known as a *total rate of return swap* or *TR swap*, is an agreement between two parties that exchanges the total return from a financial asset between them. This is designed to transfer the credit risk from one party to the other. It is one of the principal instruments used by banks and other financial institutions to manage their credit risk exposure, and as such is a credit derivative. They are used as credit risk management tools, and also as synthetic repo instruments for funding purposes. One definition of a TRS is given in Francis *et al.* (1999), which states that a TRS is a swap agreement in which the *total return* of a bank loan or credit-sensitive security is exchanged for some other cash flow, usually tied to Libor or some other loan or credit-sensitive security.

The TRS trade itself can be to any maturity term – that is, it need not match the maturity of the underlying (or *reference*) security. In a TRS, the total return from the underlying asset is paid over to the counterparty in return for a fixed or floating cash flow. This makes it slightly different to other credit derivatives such as credit default swaps, as the payments between counterparties to a TRS are connected to changes in the market value of the underlying asset, as well as changes resulting from the occurrence of a credit event. So, in other words, TRS cash flows are not solely linked to the occurrence of a credit event; in a TRS the interest-rate risk is also transferred. The transaction enables the complete cash flows of a bond to be received without the recipient actually buying the bond, which makes it a synthetic bond product and therefore a credit derivative. An investor may wish to receive such cash flows synthetically for tax, accounting, regulatory capital, external audit or legal reasons. On the other hand, it may be easier to source the reference asset synthetically – via the TRS – than in the cash market. This happens sometimes with illiquid bonds. In some versions of a TRS the actual underlying asset is actually sold to the counterparty, with a corresponding swap transaction agreed alongside; in other versions there is no physical change of ownership of the underlying asset. The first would make TRS akin to a synthetic repo transaction.

Figure 1 illustrates a generic TR swap. The two counterparties are labelled as banks, but the party termed 'Bank A' can be another financial institution, including cash-rich fixed-income portfolio managers such as insurance companies and hedge funds. In the figure, Bank A has contracted to pay the 'total return' on a specified reference asset, while simultaneously receiving a Libor-based return from Bank B. The reference or underlying asset can be a bank loan such as a corporate loan or a sovereign or corporate bond. The total return payments from Bank A include the interest payments on the underlying loan, as well as any appreciation in the market value of the asset. Bank B will pay the Libor-based return; it will also pay any difference if there is any fall in the price of the asset. The economic effect is as if Bank B owned the underlying asset, as such TR swaps are synthetic loans or securities. A significant feature is that Bank A will usually hold the underlying asset on its balance sheet, so that if this asset was originally on Bank B's balance sheet, this is a means by which the latter can have the asset removed from its balance sheet for the term of the TR swap. If we assume Bank A has access to Libor funding, it will receive a spread on this from Bank B. Under the terms of the swap, Bank B will pay the difference between the initial market value and any depreciation, so it is sometimes termed the 'guarantor' while Bank A is the 'beneficiary'.

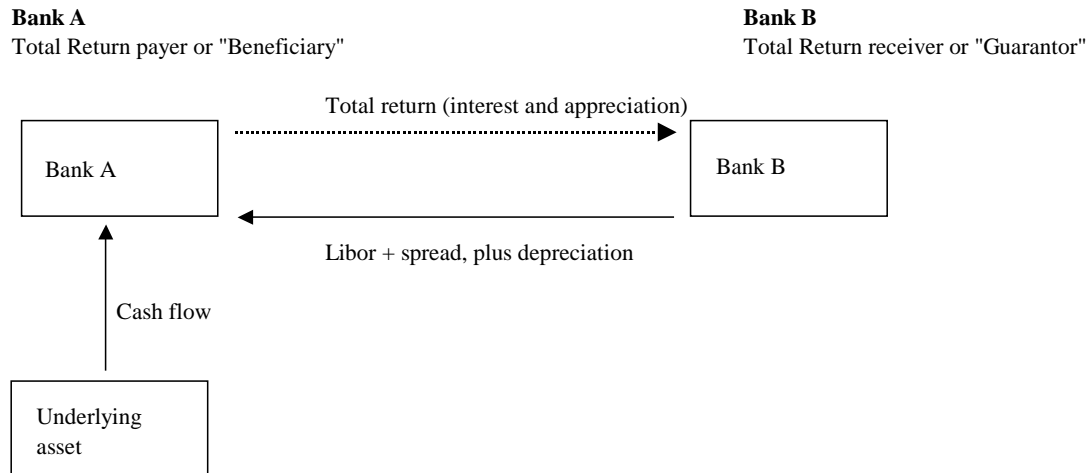


Figure 1: Total return swap

The total return on the underlying asset is the interest payments and any change in the market value if there is capital appreciation. The value of an appreciation may be cash-settled, or alternatively there may be physical delivery of the reference asset on maturity of the swap, in return for a payment of the initial asset value by the total return 'receiver'. The maturity of the TR swap need not be identical to that of the reference asset, and in fact it is rare for it to be so.

The swap element of the trade will usually pay on a quarterly or semi-annual basis, with the underlying asset being re-valued or *marked-to-market* on the re-fixing dates. The asset price is usually obtained from an independent third-party source, such as Bloomberg or Reuters, or as the average of a range of market quotes. If the *obligor* of the reference asset defaults, the swap may be terminated immediately with a net present value payment changing hands according to what this value is, or it may be continued with each party making appreciation or depreciation payments as appropriate. This second option is only available if there is a market for the asset, which is unlikely in the case of a bank loan. If the swap is terminated, each counterparty will be liable to the other for accrued interest plus any appreciation or depreciation of the asset. Commonly under the terms of the trade, the guarantor bank has the option to purchase the underlying asset from the beneficiary bank, and then deal directly with the loan defaulter. The TRS can also be traded as a funded credit derivative, and this is the case when it is entered into for funding purposes, rather like a repo transaction.

Banks have employed a number of methods to price credit derivatives and TR swaps. Essentially, the pricing of credit derivatives is linked to that of other instruments; however, the main difference between credit derivatives and other off-balance sheet products such as equity, currency or bond derivatives is that the latter can be priced and hedged with reference to the underlying asset, which can be problematic when applied to credit derivatives. Credit products pricing uses statistical data on likelihood of default, probability of payout, level of risk tolerance and a pricing model. With a TR swap, the basic concept is that one party 'funds' an underlying asset and transfers the total return of the asset to another party in return for a (usually) floating return that is a spread to Libor. This spread is a function of:

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- the credit rating of the swap counterparty;
 - the amount and value of the reference asset;
 - the credit quality of the reference asset;
 - the funding costs of the beneficiary bank;
 - any required profit margin;
 - the capital charge associated with the TR swap.

The TR swap counterparties must consider a number of risk factors associated with the transaction, which include:

- the probability that the TR beneficiary may default while the reference asset has declined in value;
- the reference asset obligor defaults, followed by default of the TR swap receiver before payment of the depreciation¹ has been made to the payer or 'provider'.

The first risk measure is a function of the probability of default by the TR swap receiver and the market volatility of the reference asset, while the second risk is related to the joint probability of default of both factors, as well as the recovery probability of the asset.

Example: The TRS as a funding instrument

TRS contracts are used in a variety of applications by banks, other financial institutions and corporates. As we noted in the main body of the text, they can be written as pure exchanges of cash flow differences – rather like an interest-rate swap – or the reference asset can be actually transferred to the total return payer, which would then make the TRS akin to a synthetic repo contract.²

We describe here the use of TRS as a funding instrument, in other words as a substitute for a repo trade.³ Consider a financial institution such as a regulated broker-dealer that has a portfolio of assets on its balance sheet that it needs to obtain funding for. These assets are investment-grade rated structured finance bonds such as credit card ABS, residential MBS and CDO notes, and investment-grade rated convertible bonds. In the repo market, it is able to fund these at Libor plus 6 basis points. That is, it can repo the bonds out to a bank counterparty, and will pay Libor plus 6 bps on the funds it receives.

Assume that for operational reasons the bank can no longer fund these assets using repo. It can fund them using a basket TRS instead, providing a suitable counterparty can be found. Under this contract, the portfolio of assets is swapped out to the TRS counterparty, and cash received from the counterparty. The assets are therefore sold off the balance sheet to the counterparty, an investment bank. The investment bank will need to fund these itself, it may have a line of credit from a parent bank or it may swap the bonds out itself. The funding rate it charges the broker-dealer will depend on what rate it can fund the assets itself. Assume this is Libor plus 12bps – the higher rate reflects the lower liquidity in the basket TRS market for non-vanilla bonds compared to repo.

¹ Although it is common for the receiver of the Libor-based payments to have the reference asset on its balance sheet, this is not always the case.

² The economic effect may be the same, but they are considered different instruments. TRS actually takes the assets off the balance sheet, whereas the tax and accounting authorities treat repo as if the assets remain on the balance sheet. In addition, a TRS trade is conducted under the ISDA standard legal agreement, while repo is conducted under the GMRA standard repo legal agreement. It is these differences that, under certain circumstances, make the TRS funding route a more favourable one.

³ There may be legal, administrative, operational or other reasons why a repo trade is not entered into to begin with. In these cases, provided that a counterparty can be found and the funding rate is not prohibitive, a TRS may be just as suitable.

The broker-dealer enters into a three-month TRS with the investment bank counterparty, with a one-week interest rate reset. This means at each one-week interval, the basket is revalued. The difference in value from the last valuation is paid (if higher) or received (if lower) by the investment bank to the broker-dealer; in return the broker-dealer also pays one-week interest on the funds it received at the start of the trade. In practice these two cash flows are netted off and only one payment changes hands, just like in an interest-rate swap. The terms of the trade are shown below.

Trade date 22 December 2003
Value date 24 December 2003
Maturity date 24 March 2004
Rate reset 31 December 2003
Interest rate 1.19875% (this is one-week USD Libor fix of 1.07875 plus 12bps)

The swap is a three-month TRS with one-week reset, which means that the swap can be broken at one-week intervals and bonds in the reference basket can be returned, added to or substituted. Assume that the portfolio basket contains five bonds, all US dollar denominated. Assume these are all investment-grade rated credit card ABS bonds with prices available on Bloomberg. The combined market value of the entire portfolio is taken to be USD 151,080,951.00.

At the start of the trade, the five bonds are swapped out to the investment bank, who pays the portfolio value for them. On the first reset date, the portfolio is revalued and the following calculations confirmed:

Old portfolio value	USD 151,080,951.00
Interest rate	1.19875%
Interest payable by broker-dealer	USD 35,215.50
New portfolio value	USD 152,156,228.00
Portfolio performance	+1,075,277
Net payment: broker-dealer receives	USD 1,040,061.50

The rate is reset for value 31 December 2003 for the period to 7 January 2004. The rate is 12bps over the one-week USD Libor fix on 29 December 2003, which is 1.15750+0.12 or 1.2775%. This interest rate is payable on the new 'loan' amount of USD 152,156,228.00.

References

Francis, J., J. Frost, J. Whittaker, *The Handbook of Credit Derivatives* (New York, NY: McGraw Hill, 1999)