Andreas Krause

Swaps



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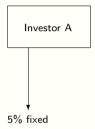
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Swaps

Investor A

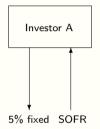




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Swaps







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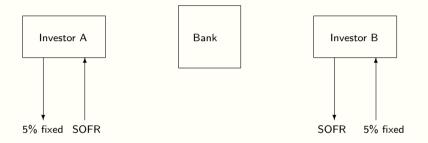
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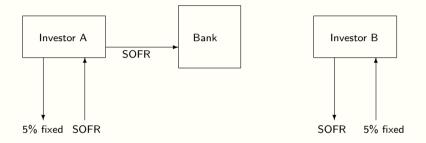


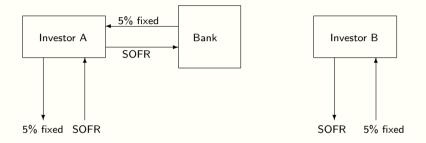
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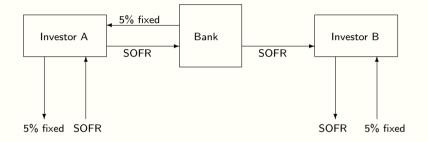


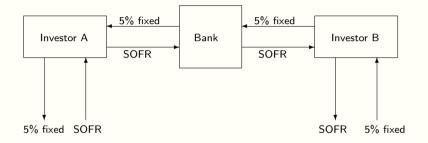
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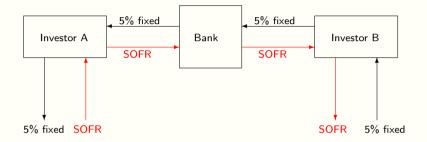


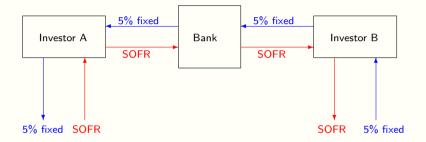


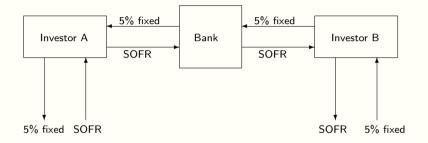












Valuing interest rate swaps

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Value of the long-term fixed-rate bond is the present value of all future payments

$$\blacktriangleright \quad B_{\mathsf{fix}} = \sum_{\tau=1}^{T} \frac{C_{\mathsf{fix}}}{1 - C_{\mathsf{fix}}} + \frac{B_0}{1 - C_{\mathsf{fix}}}$$

Value of the long-term fixed-rate bond is the present value of all future payments, discounted at the current long-term interest rate

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The variable bond will revert to its face value if the interest rate is adjusted to the market rate

$$\blacktriangleright B_{\text{var}} = \frac{B_0 + C_{\text{var}\Delta\tau}}{(1 + r_{\text{var}})^{\Delta\tau}}$$

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- For the period to the next coupon payment the investor obtains interest, and this is discounted by the current short-term interest rate

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▶ The swap value is the difference between these values: $V = B_{fix} - B_{var}$

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- ▶ The value of a swap can be positive or negative
- Whether a premium is to be paid, depends on the agreed conditions

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- The fixed rate at which the swap has no value, V = 0, is referred to as the swap rate

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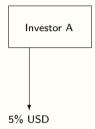
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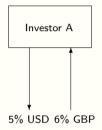
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Investor A

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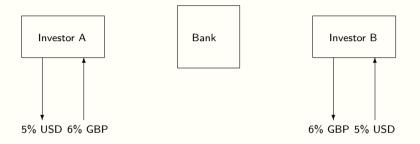


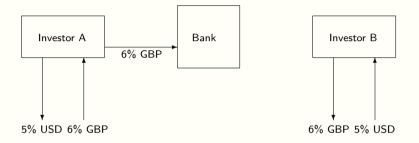


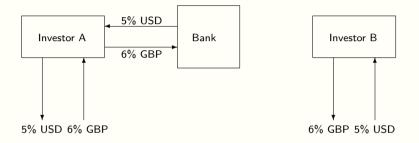


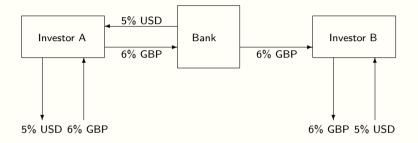


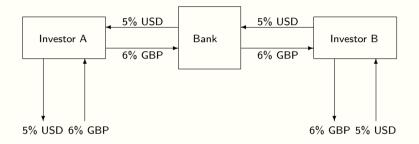


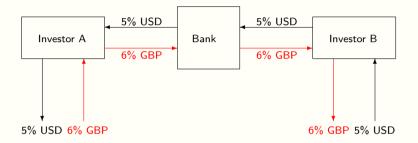


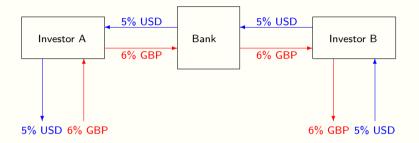


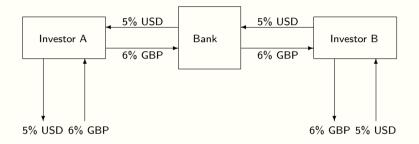












Valuing currency swaps

Value of a bond in the domestic currency is the present value of all future payments

 $\blacktriangleright B_{\text{domestic}} = \sum_{\tau=1}^{T} \frac{C_{\text{domestic}}}{1 - C_{\text{domestic}}} + \frac{B_0}{1 - C_{\text{domestic}}}$

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 $\blacktriangleright B_{\text{domestic}} = \sum_{\tau=1}^{T} \frac{C_{\text{domestic}}}{(1+r_{\text{domestic}})^{\tau}} + \frac{B_0}{(1+r_{\text{domestic}})^{T}}$

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Value of a bond in the foreign currency is the present value of all future payments

$$\blacktriangleright B_{\text{foreign}} = \sum_{\tau=1}^{T} \frac{C_{\text{foreign}}}{1 - 1} + \frac{B_0}{1 - 1}$$

$$B_{\text{domestic}} = \sum_{\tau=1}^{T} \frac{C_{\text{domestic}}}{(1+r_{\text{domestic}})^{\tau}} + \frac{B_0}{(1+r_{\text{domestic}})^T}$$

Value of a bond in the foreign currency is the present value of all future payments, discounted at the current long-term interest rate

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► The swap value is the difference between these values, adjusted for the exchange rate: $V = B_{\text{domestic}} - eB_{\text{foreign}}$

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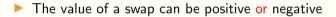
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