Session 26: Swaps

Fall 2025

Outline

- Swaps
  - Contractual details
  - Uses of swaps
  - Pricing of swaps
- Credit default swaps (CDSs)

SWAPS
Contractual Features

- A **swap** is a contract where two counterparties agree to exchange one stream of cash flows (leg) against another stream (leg)

- Exchange rate swap: $1.5 million for £1million, for each of the next 5 years

- Interest rate swap: $1 million times short-term interest rate, e.g., LIBOR, (floating leg) for $1 million times fixed rate, e.g., 4%, (fixed leg), for each of next 7 years

HUGE market ($200+ trillion notional)

Use of Swaps

1. Firm issued fixed-rate debt and believes interest rates will fall

2. Fixed-income portfolio manager has long-term bonds with fixed rate and believes interest rates are about to rise

3. U.S. firm has euro denominated revenues but no offsetting costs

Financing

- Firm has $100 million par value of long-term bonds with 6% coupon rate, and believes interest rates are about to fall

- What should he do?

LIBOR scenarios	5.5%	6.0%	6.5%
Interest cost of bond			
Cash-flow from swap			
Total			

Swap Pricing

- Intuition: PV of two cash flow streams must be equal
- Interest rate swap: a sequence of interest rate forward contracts
- Currency swap: a sequence of exchange rate forward contracts

Interest Rate Swap

- Recall: The forward rate is the future borrowing or lending rate you can lock in today

$$f_n = \frac{P_{n-1}}{P_n} - 1 = \frac{(1+y_n)^n}{(1+y_{n-1})^{n-1}} - 1$$

- Lending (borrowing) at f_n is equivalent to receiving (paying) fixed, paying (receiving) floating

	n-1	n
Lend @ f_n		
Finance @ ST rate	___	___
Total		

The Swap Rate

- The swap rate is the "average" of forward rates over the life of the swap

- The geometric average of forward rates

$$[(1 + f_1)(1 + f_2)\cdots(1 + f_n)]^{1/n} - 1 = y_n$$

- The swap rate is the maturity matched fixed rate

Currency Swap

- Recall
$$F_0 = S_0 \left(\frac{1 + r_{Aus}}{1 + r_{US}} \right)^T$$

- Example ($AUS/$US):
$S_0 = 1$, $r_{US} = 0.5\%$, $r_{Aus} = 3.5\%$

	1	2	3
F_0	1.03	1.06	1.09

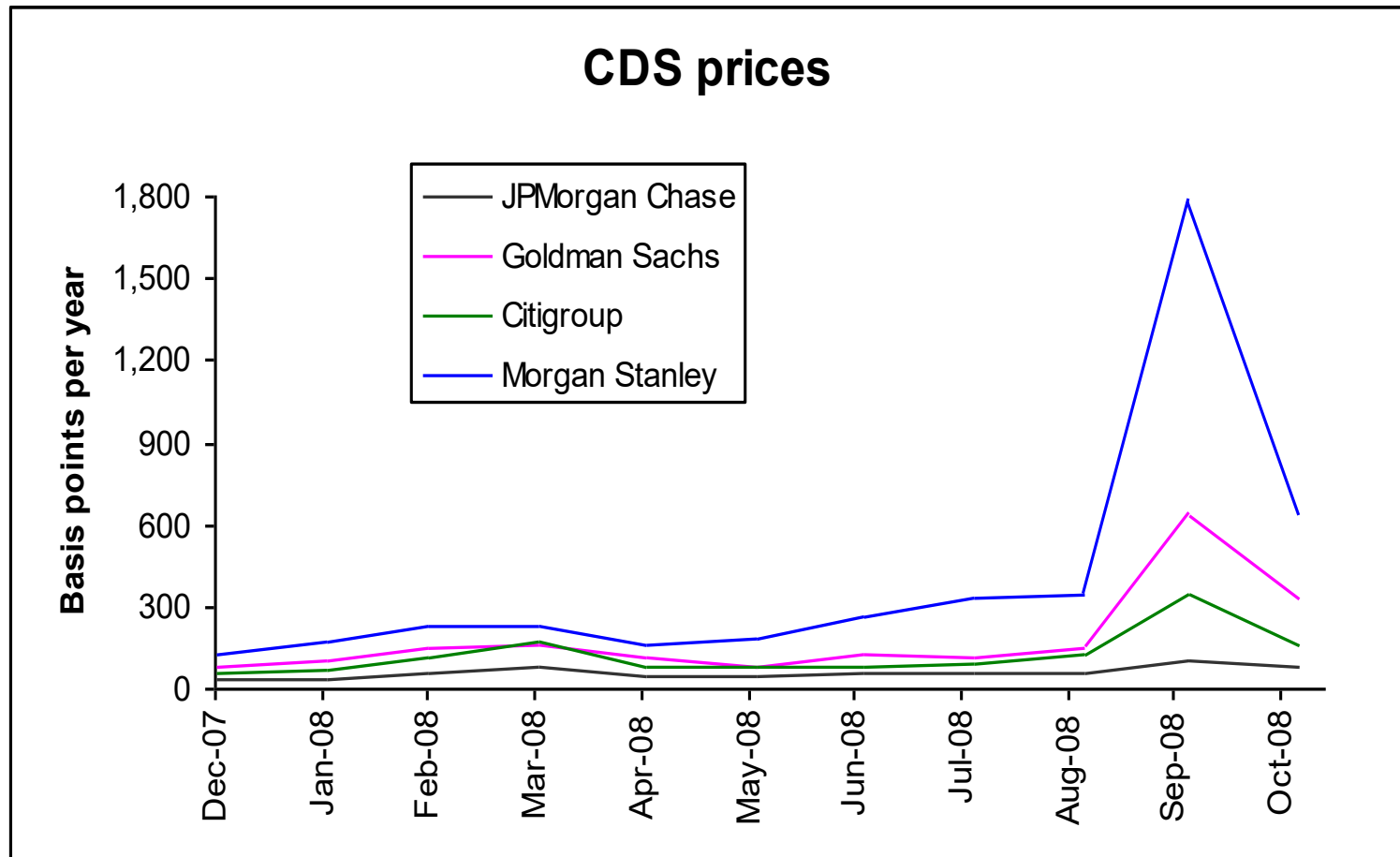- The swap rate is the "average" of forward rates over the life of the swap

Credit Default Swaps (CDS)

- A CDS is an insurance policy on the default risk of a corporate (sovereign) bond or loan

- The buyer (seller) of the CDS buys (sells) credit protection to cover the loss of the face value of an asset in the event of bankruptcy

- To pay for this protection, the buyer makes a regular stream of payments (R x principal) to the seller

- If bankruptcy occurs before maturity, the protection seller makes a payment of [(100%-recovery) x principal]

- CDS converts risky debt into risk-free debt (ignoring counterparty risk) → premium R = y(risky) – y(risk-free)
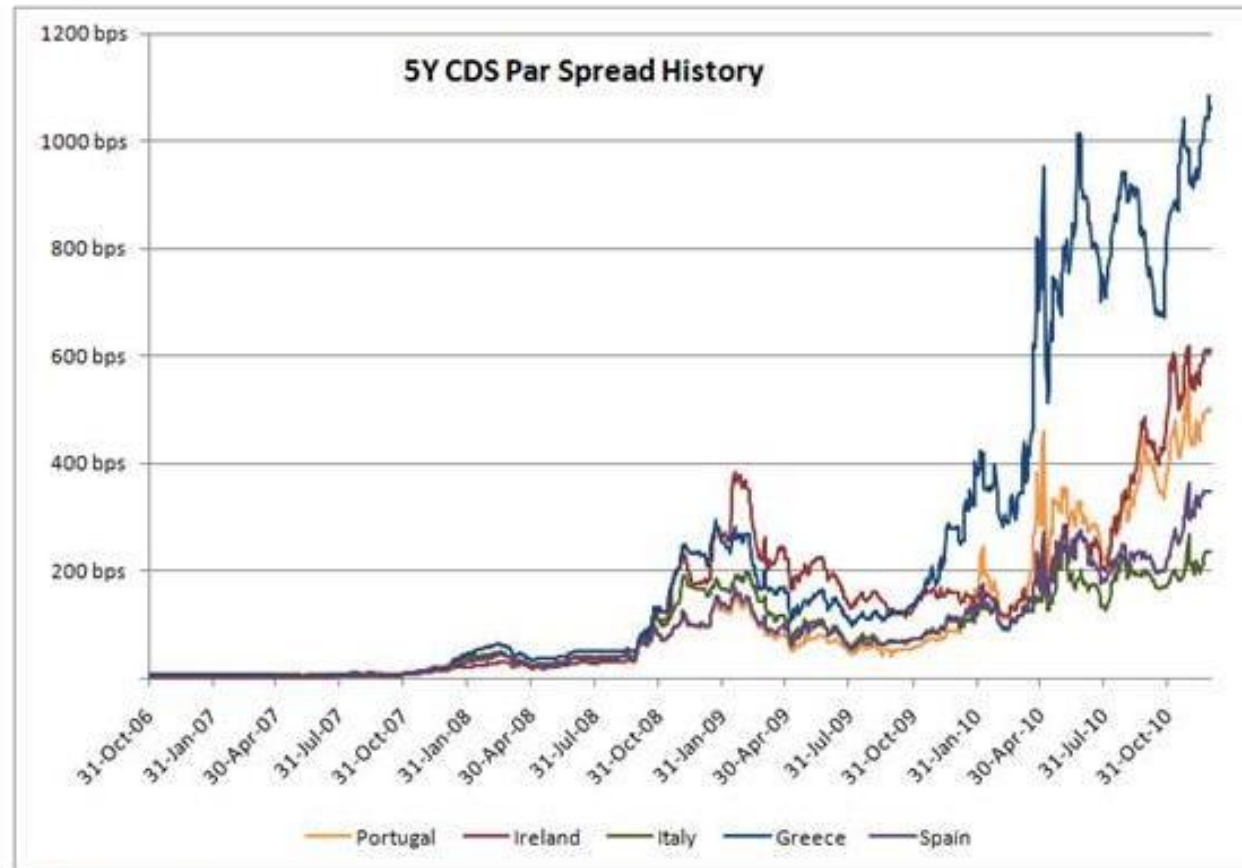
Citigroup CDS

- November 2008: Protection buyer purchases 5-year protection on a company's bonds at an annual CDS spread of 2%. The face value of the protection is $10million.

- The protection buyer makes annual payments of $10m(0.02) = $200,000

- Yield on Citi bonds should be 2% above AAA (credit rating of insurer)

Financial Crisis of 2008

CDS prices

Eurozone Crisis

5Y CDS Par Spread History

Source: Markit

Conclusion

- Swaps are portfolios of forward contracts
- Forwards are priced by no-arbitrage
- Swap rates are "averages" of these forward rates