Credit Derivatives

Credit forward

Credit forward contracts provide symmetrical payoffs. The payoff at maturity of the forward contract may is determined by the following formula:

[spread at maturity – contracted spread] x notional capital x risk factor

Binary credit options

There are two types of binary options

- with predetermined payouts,
- based on credit rating.

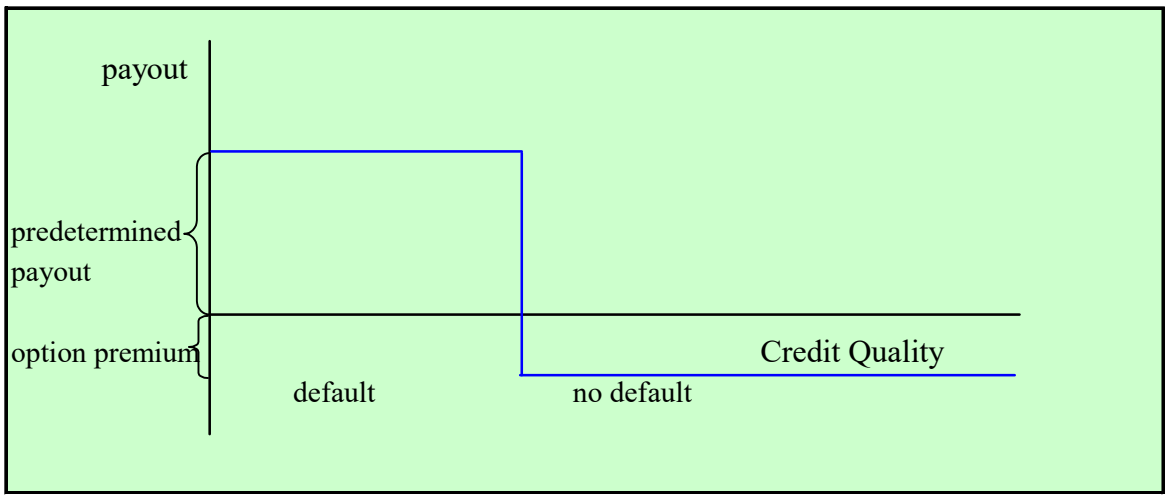


Figure 1. Binary option with predetermined payout

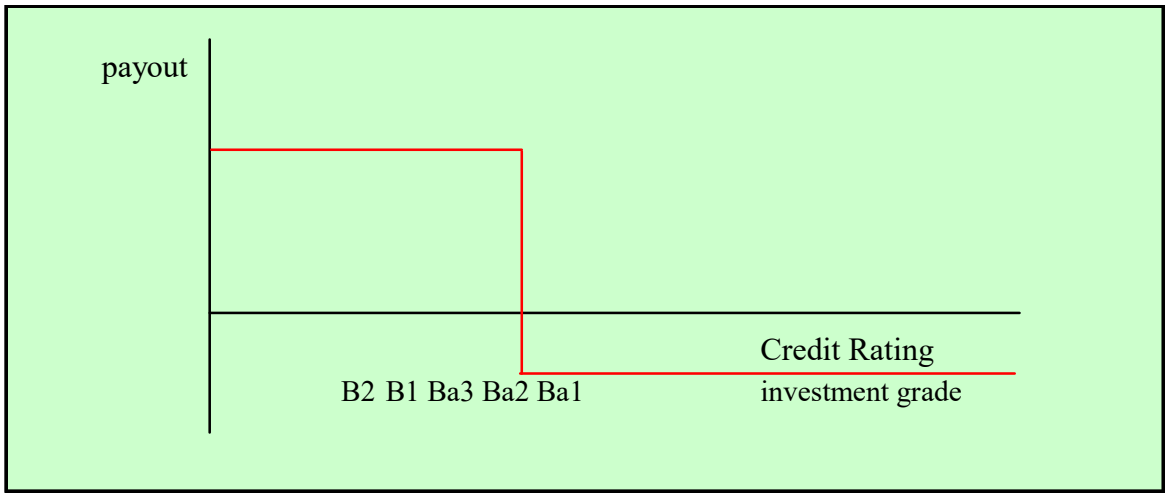


Figure 2. Binary option based on a credit rating

Credit Swaps

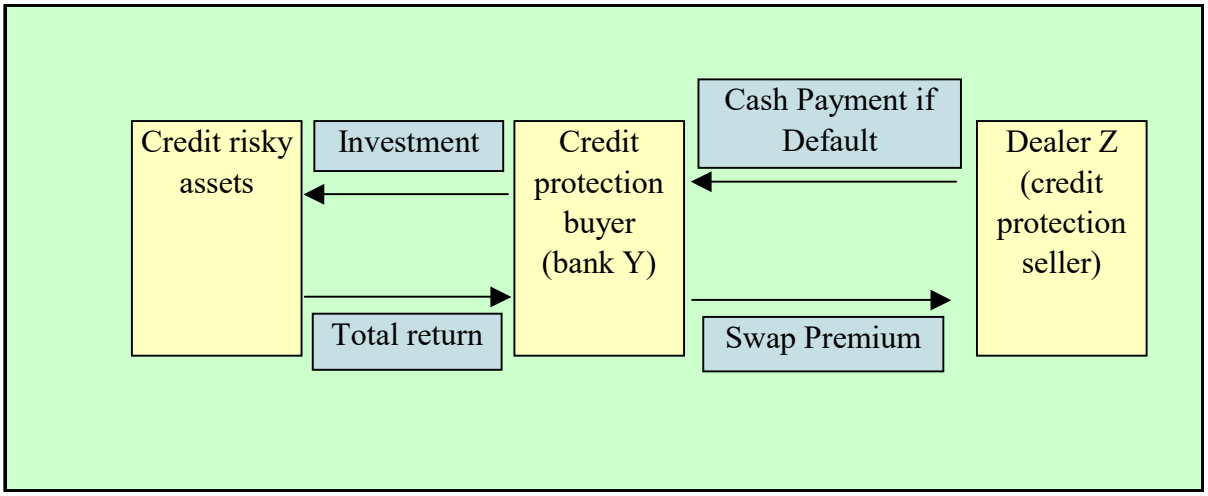


Figure 3. Credit Default Swap with a Cash Payment Upon Default

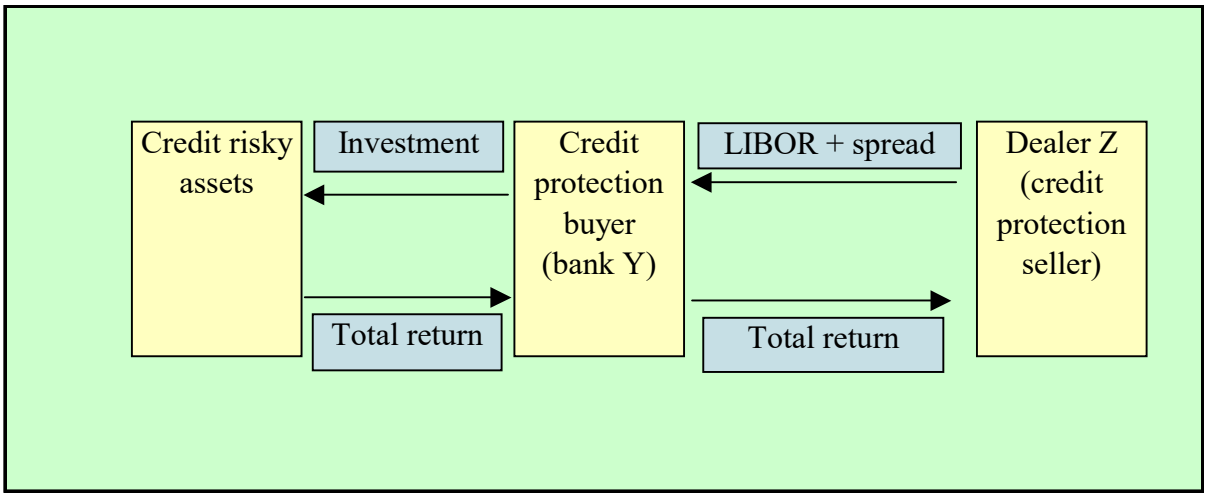


Figure 4. Credit Default Swap with a Periodic Payment

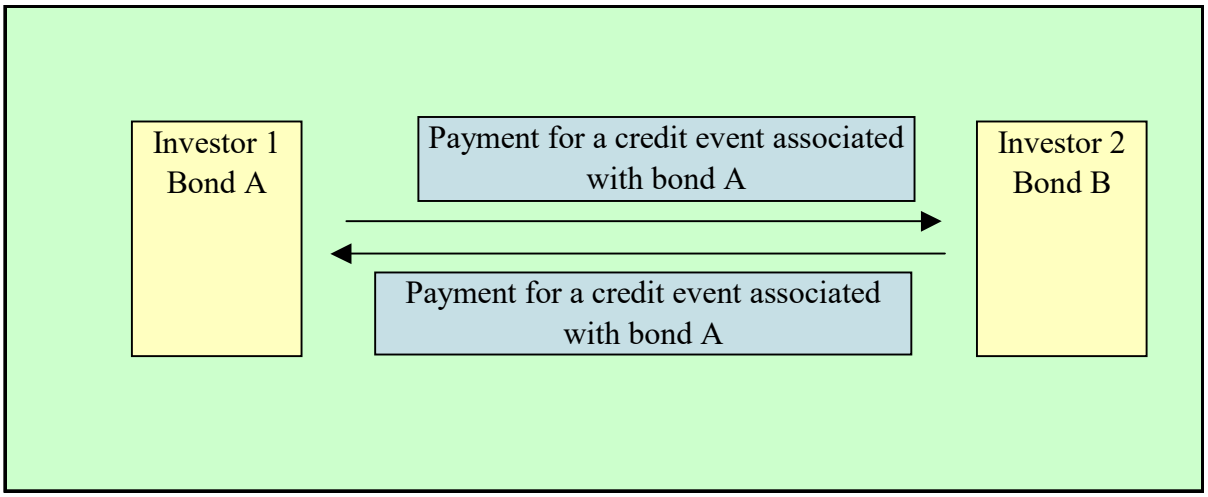


Figure 5. Reciprocal Credit Default Swap

Total Return Swap

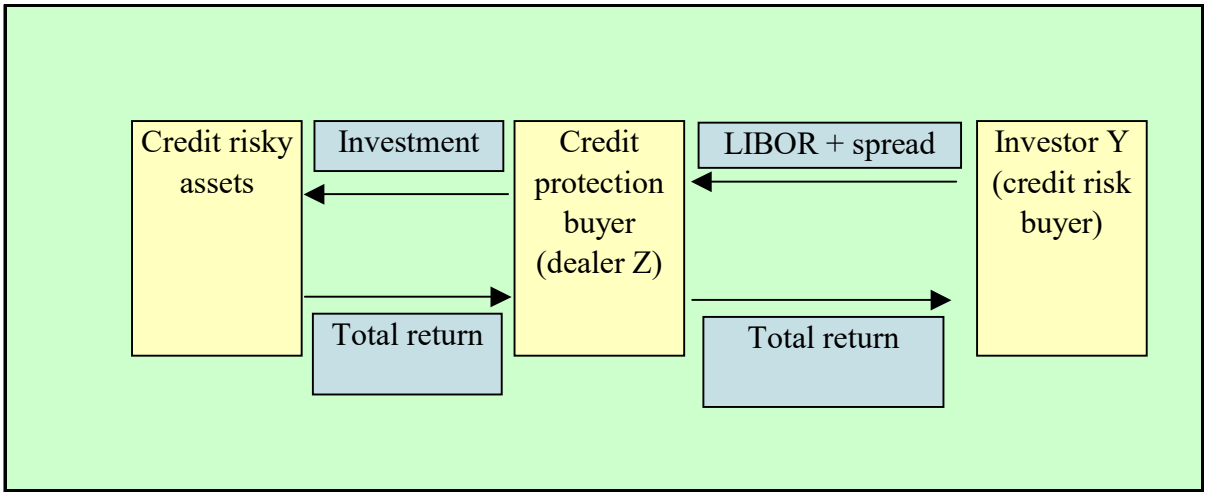


Figure 6. Total Return Credit Swap

Problem 1. Credit Forward

Bank Y buys a credit spread forward.

contracted credit spread	200
notional amount	1 000 000
risk factor	6,62

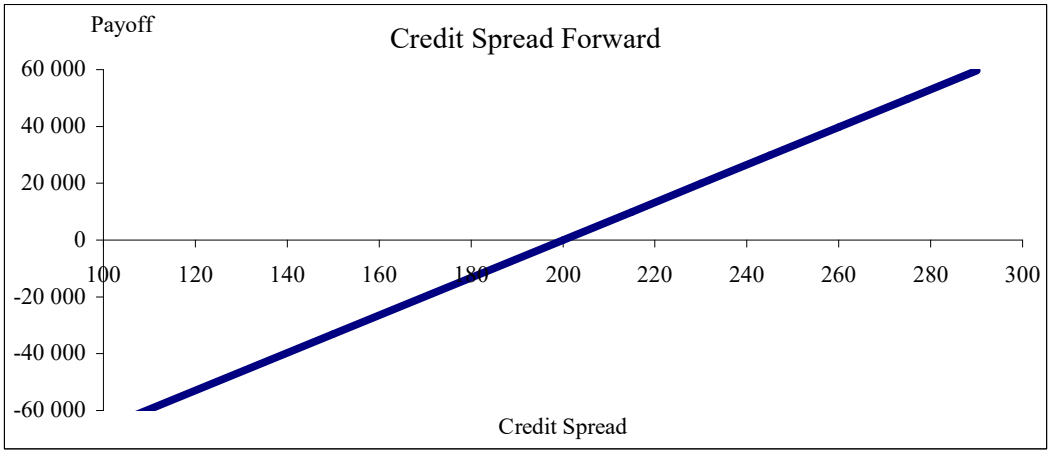
Required:

Draw the payoff diagram for a long position in credit spread forward.

Solution

[spreadit spread - contracted credit spread] x notional amount x risk factor

100	-66 247
150	-33 123
200	0
215	9 937
230	19 874
245	29 811
260	39 748
275	49 685
290	59 622



Problem 2. Credit Spread Call Option

A dealer writes a credit spread call option.

Origination date:	16-12-2005		
Maturity date:	16-3-2006		
Premium:	1,25%	125 basis points	
Notional principal:	1000000 zł		
Strike credit spread	2,00%	Risk factor	6,62

Underlying asset: bonds issued by a company XYZ.

Maturity:	16 grudzień 2015
Coupon:	8,00% (semiannual payments)

The interest rates on the origination date and expiration date are following:

	16-12	16-03
Risk-free rate	5,00%	4,90%
Credit spread	2,00%	2,15%

Required

(a) Calculate the payoff of a short call option on bonds on the origination and the expiration dates.
(b) What is the net payoff for a long position in credit spread call at maturity ?
(c) Show the payoff's sensitivity on spread for a long position in credit spread call option.

Solution

(a)

Price	Date	Yield T	Credit spread	YTM	Price of a bond	Total value	Payoff	Duration
spot	16-12-2005	5,00%	2,00%	7,00%	107,11	1071062,02		6,93
strike	16-12-2005	5,00%	2,00%	7,00%	107,11	1071062,02	0,00	6,93
spot	16-3-2006	4,90%	2,15%	7,05%	106,60	1066005,69		6,69
strike	16-3-2006	4,90%	2,00%	6,90%	107,70	1076969,82	-10964,13	6,71

Premium 12500 Net payoff 1535,87

(b)

[spread - contracted] x notional amount x risk factor - premium

0,0015	x	1000000	x	6,62	=	9937,04
						-12500,00
						-2562,96

(c)

Spread	Price	Payoff
100	115,39	-12500,00
150	111,46	-12500,00
200	107,70	-12500,00
250	104,10	20623,48
300	100,65	53746,95
350	97,35	86870,43
400	94,19	119993,91
450	91,17	153117,38
500	88,26	186240,86