

CHAPTER 21

Solutions

Exercise 1

In an ABS any cash flows or the corresponding shortfalls from the original debt instruments are passed on to the investor who buys that particular class of ABS security. If there are defaults, the investors receive an accordingly lower coupon or may even lose their principal. Classes of ABS securities have different ratings because they are backed by different debt instruments. In a CDO, CDO classes called tranches are formed, not by classifying the underlying securities, but the risk in them. In fact, all CDO tranches will be backed by the same pool of securities. What distinguishes the tranches is the subordination of the default risk. The ABS categorizes the securities themselves. A CDO categorizes the priority of payments during defaults.

Exercise 2

CDO tranche spreads increase with default probabilities. The effect of an increase in default correlations on CDO tranche spreads depends on the seniority of the tranche. Under certain assumptions an increase in default correlations can reduce the spread on equity tranches but increase the spread on senior tranches.

Exercise 3

(a) A barbell is a strategy of maintaining a portfolio of securities concentrated at two extremes in terms of maturity date: very short-term and very long term. A positive roll down is a

positive return from a security trading at a discount which reaches its par value near the maturity date. Time decay is the ratio of the price with respect to a decrease in time to expiration of any asset whose value decreases over time.

- (b) A jump to default occurs when an investment grade entity with high rating which has been continuing in subsequent rolls of a credit index without degradation (in credit rating) suddenly defaults.
- (c) SG's strategy: Since the 7-year equity correlation has tightened, the spread has increased against the 5-year and 10-year spreads. Hence it is profitable to sell the 7-year equity tranche protection and buy the 5-year and 10-year equity tranche protection barbell. Naturally there is a steepening of the 7-year spread. A jump to default is well protected by the 10-year protection. SG thinks that Alstom's 3-5 year curve is steep. This means Alstom March 2010 bonds at 6.25% would lead to mark-to-market gains. The 3-year CDS provides the protection against default.

Exercise 4

- a) Suppose we have a portfolio of n names with some default correlation ρ . The risk of the entire portfolio moves according to the change in default correlation. On the other hand if the portfolio is tranced according to the order of their defaults then the various tranches behave differently as ρ changes. For example, a high ρ indicates subsequent defaults occurring together whereas a low ρ makes occurrence of subsequent defaults more or less independent.
- b) As default correlation increases the area under the middle part of the default density function decreases and the mass on the two extreme tranches increase. Hence area under

the subordinate tranche increases, which means that the probability that the subordinate tranche loses all its money decreases. Hence the risk for this tranche decreases along with the spread. On the other hand the cushion for the senior tranches decrease as default correlation increases. Hence it is more likely that the protection seller for the senior tranches will concede some losses. Hence the risk and hence the spread for this tranche increases.

- c) With a decrease in default correlation one should long on protection on the subordinate tranches and short on protection on the senior tranches.

Exercise 5

(a) iTraxx is a group of credit derivative indices managed by the International Index Company (IIC) and covering Europe, Asia and Australia. The entities in the portfolio forming the indices are selected on the basis of trading volume and liquidity of the underlying CDS. For example the iTraxx Europe index comprises of 125 investment grade names.

(b) A standard tranche for a credit index is a tranche with pre-specified lower and upper attachment point making it much more liquid than tranches created individually by negotiating with market makers. The following are the standard attachment points signifying the percentage of defaults protected by the the seller of the tranche:

Equity tranche: first 0 – 3%

Mezzanine tranche: 3 – 6%

Senior tranche: 6 – 9%

Super senior tranche: 9 – 12%

(c) We can mention the following few differences:

- Standardized tranches of credit indices are unfunded and hence no cash payment is involved whereas tranches of CDO's issued in the market by banks or hedge funds may be funded and require cash payment.
- For the standardized tranches the percentage of default that it protects is already determined, on the other hand tranches of CDO's issued in the marketplace depends on the issuer (bank or hedge fund).

Exercise 6

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Exercise 7

- (a) A typical cash flow diagram will incorporate the following. If you are short the CDO, then you receive a fixed amount at the initial point to. Then you make payments made of a floating risk-free rate plus a fixed spread. However, if one or more of the underlying credits default your share of the defaulted amount will be deducted from the coupon.
- (b) Since you are receiving a spread over a floating rate, the interest rate risk is minimal. There is some risk only between the coupon payments dates. This can be hedged using strips of FRA's. Or, by using swaps as the reading suggests. Otherwise the CDO is an investment vehicle and the investor is exposed to changes in the credit curve. If needed, such risks can be hedged by taking positions on a proper set of CDSs.
- (c) A decline of the overall level of interest rates means the floating rates are going down. If the investor is hedged through the FRA's this will have no effect on the overall returns. On the other hand if default rates increase the value of the CDO will decline.

(d) As underlying credits default this will decrease the principal amount involved in the CDO during its life cycle. On the other hand if such a CDO is hedged using a swap, the swap notional will remain fixed.

Exercise 8

(Case Study: Credit-Linked Notes)

(a) Credit linked notes are assets issued by financial institutions which have exposure to the credit risk of a reference Issuer. These notes pay an enhanced rate to the investor for taking on this additional credit risk. If the Reference Issuer defaults then the investor receive the recovery price of the reference security. Most credit linked notes are issued as traditional medium term notes that contain embedded credit default swaps.

Example:

Drug company Credit Linked Note

Termination Date: 5 Years

Reference Security: ABC bond 7.125% maturing 12/1/09

Interest: Libor + 50bp per annum. Interest paid quarterly.

In this CLN the investor receives Libor + 50bp coupon against the exposure to the default risk of the drug company in an asset backed trust.

Thus a CLN will be preferable to a straight Treasury if the investor desires a higher coupon associated with the risk of default of a certain security.

(b) Investment banks may need to hedge their position during the issuance process as the readings suggest. The process of packaging, pricing and selling a CLN may take time and during this period markets may move. As dealers issue CLNs they will have short derivatives positions mentioned in the text, in particular they will have short CDs positions.

(c) In the text the climate has been influenced by a shortage of corporate bonds in the secondary market. Note that when this happens the value of these bonds would go up and the associated “risk premium” would decline. As discussed in Chapter 18, this would lead to a lowering of the associated CDS rate.

(d) The arbitrage mentioned in this reading is in fact a true arbitrage in the academic sense. The logic of the arbitrage argument goes as follows. A basket of corporate bonds is something similar to a synthetic CLN packaged using the same names by a dealer. They both have exposure to an identical set of credits, they contain very similar default risks and they pay an enhanced coupon. Hence in theory the difference between the coupon paid by the basket and the synthetic CLN should be the same. Yet, as discussed in the chapter technical factors may make the two coupon diverge from each other. This is called the bond basis. The text mentions that this basis was negative originally and became even more negative as a result of the activity mentioned in the reading.

Those dealers who had access to the underlying bonds could then put together packages, by selling and buying the underlying and the associated CLN.

To represent the cash flows in a graphic one would use the cash flow diagrams from the text and put it together with the cash flows of a risky bond, which will be similar.

(e) If some bonds become special in the repo market, this means that there is a great deal of demand for them. Under such conditions those players who want to borrow these bonds will be willing to “surrender” their cash to the repo dealer at zero interest.

(f) Because if they have the bonds in their portfolio they give to bond to repo dealer and receive cash at zero cost, instead of paying interest to banks.

Exercise 9

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