

Chapter 8

Securitization and the Credit Crisis of 2007

Practice Questions

Problem 8.1.

What was the role of GNMA (Ginnie Mae) in the mortgage-backed securities market of the 1970s?

GNMA guaranteed qualifying mortgages against default and created securities that were sold to investors.

Problem 8.2.

Explain what is meant by a) an ABS and b) an ABS CDO.

An ABS is a set of tranches created from a portfolio of mortgages or other assets. An ABS CDO is an ABS created from particular tranches (e.g. the BBB tranches) of a number of different ABSs.

Problem 8.3.

What is a mezzanine tranche?

The mezzanine tranche of an ABS or ABS CDO is a tranche that is in the middle as far as seniority goes. It ranks below the senior tranches and therefore absorbs losses before they do. It ranks above the equity tranche (so that the equity tranche absorbs losses before it does).

Problem 8.4.

What is the waterfall in a securitization?

The waterfall defines how the cash flows from the underlying assets are allocated to the tranches. In a typical arrangement, cash flows are first used to pay the senior tranches their promised return. The cash flows (if any) that are left over are used to provide the mezzanine tranches with their promised returns. The cash flows (if any) that are left over are then used to provide the equity tranches with their promised returns. Any residual cash flows are used to pay down the principal on the senior tranches.

Problem 8.5.

What are the numbers in Table 8.1 for a loss rate of a) 12% and b) 15%?

<i>Losses on underlying assets</i>	<i>Losses to mezzanine tranche of ABS</i>	<i>Losses to equity tranche of ABS CDO</i>	<i>Losses to mezzanine tranche of ABS CDO</i>	<i>Losses to senior tranche of ABS CDO</i>
12%	46.7%	100%	100%	17.9%
15%	66.7%	100%	100%	48.7%

Problem 8.6.

What is a subprime mortgage?

A subprime mortgage is a mortgage where the risk of default is higher than normal. This may

be because the borrower has a poor credit history or the ratio of the loan to value is high or both.

Problem 8.7.

Why do you think the increase in house prices during the 2000 to 2007 period is referred to as a bubble?

The increase in the price of houses was caused by an increase in the demand for houses by people who could not afford them. It was therefore unsustainable.

Problem 8.8.

Why did mortgage lenders frequently not check on information provided by potential borrowers on mortgage application forms during the 2000 to 2007 period?

Subprime mortgages were frequently securitized. The only information that was retained during the securitization process was the applicant's FICO score and the loan-to-value ratio of the mortgage.

Problem 8.9.

How were the risks in ABS CDOs misjudged by the market?

Investors underestimated how high the default correlations between mortgages would be in stressed market conditions. Investors also did not always realize that the tranches underlying ABS CDOs were usually quite thin so that they were either totally wiped out or untouched. There was an unfortunate tendency to assume that a tranche with a particular rating could be considered to be the same as a bond with that rating. This assumption is not valid for the reasons just mentioned.

Problem 8.10.

What is meant by the term "agency costs"? How did agency costs play a role in the credit crisis?

"Agency costs" is a term used to describe the costs in a situation where the interests of two parties are not perfectly aligned. There were potential agency costs between a) the originators of mortgages and investors and b) employees of banks who earned bonuses and the banks themselves.

Problem 8.11.

How is an ABS CDO created? What was the motivation to create ABS CDOs?

Typically an ABS CDO is created from the BBB-rated tranches of an ABS. This is because it is difficult to find investors in a direct way for the BBB-rated tranches of an ABS.

Problem 8.12.

Explain the impact of an increase in default correlation on the risks of the senior tranche of an ABS. What is its impact on the risks of the equity tranche?

As default correlation increases, the senior tranche of a CDO becomes more risky because it is more likely to suffer losses. As default correlation increases, the equity tranche becomes less risky. To understand why this is so, note that in the limit when there is perfect correlation

there is a high probability that there will be no defaults and the equity tranche will suffer no losses.

Problem 8.13.

Explain why the AAA-rated tranche of an ABS CDO is more risky than the AAA-rated tranche of an ABS.

A moderately high default rate will wipe out the tranches underlying the ABS CDO so that the AAA-rated tranche of the ABS CDO is also wiped out. A moderately high default rate will at worst wipe out only part of the AAA-rated tranche of an ABS.

Problem 8.14.

Explain why the end-of-year bonus is sometimes referred to as “short-term compensation.”

The end-of-year bonus usually reflects performance during the year. This type of compensation tends to lead traders and other employees of banks to focus on their next bonus and therefore have a short-term time horizon for their decision making.

Problem 8.15.

Add rows in Table 8.1 corresponding to losses on the underlying assets of (a) 2%, (b) 6%, (c) 14%, and (d) 18%.

<i>Losses to subprime portfolio</i>	<i>Losses to Mezz tranche of ABS</i>	<i>Losses to equity tranche of ABS CDO</i>	<i>Losses to Mezz tranche of ABS CDO</i>	<i>Losses to senior tranche of ABS CDO</i>
2%	0%	0%	0%	0%
6%	6.7%	67%	0%	0%
14%	60%	100%	100%	38.5%
18%	86.7%	100%	100%	79.5%

Further Questions

Problem 8.16.

Suppose that the principal assigned to the senior, mezzanine, and equity tranches is 70%, 20%, and 10% for both the ABS and the ABS CDO in Figure 8.3. What difference does this make to Table 8.1?

<i>Losses to subprime portfolio</i>	<i>Losses to Mezz tranche of ABS</i>	<i>Losses to equity tranche of ABS CDO</i>	<i>Losses to Mezz tranche of ABS CDO</i>	<i>Losses to senior tranche of ABS CDO</i>
10%	0%	0%	0%	0%
13%	15%	100%	25%	0%
17%	35%	100%	100%	7.1%
20%	50%	100%	100%	28.6%

Problem 8.17.

“Resecuritization was a badly flawed idea. AAA tranches created from the mezzanine tranches of ABSs are bound to have a higher probability of default than the AAA-rated tranches of ABSs.” Discuss this point of view.

When the AAA-rated tranches of an ABS experiences defaults, the mezzanine tranches of the ABSs must have been wiped out. As a result the AAA tranche of the ABS CDO has also wiped out. If the portfolios underlying the different ABSs have the same default rates, it must therefore be the case the AAA-rated tranche of the ABS is safer than the AAA-rated tranche of the ABS CDO. If there is a wide variation if the default rates, it is possible for the AAA-rated tranche of the ABS CDO to fare better than some (but not all) AAA rated tranches of the underlying ABSs.

Resecuritization can only be successful if the default rates of the underlying ABS portfolios are not highly correlated. The best approach would seem to be to obtain as much diversification as possible in the portfolio of assets underlying the ABS. Resecuritization then has no value.

Problem 8.18.

Suppose that mezzanine tranches of the ABS CDOs, similar to those in Figure 8.3, are resecuritized to form what is referred to as a “CDO squared.” As in the case of tranches created from ABSs in Figure 8.3, 65% of the principal is allocated to a AAA tranche, 25% to a BBB tranche, and 10% to the equity tranche. How high does the loss percentage have to be on the underlying assets for losses to be experienced by a AAA-rated tranche that is created in this way. (Assume that every portfolio of assets that is used to create ABSs experiences the same loss rate.)

For losses to be experienced on the AAA rated tranche of the CDO squared the loss rate on the mezzanine tranches of the ABS CDOs must be greater than 35%. This happens when the loss rate on the mezzanine tranches of ABSs is $10 + 0.35 \times 25 = 18.75\%$. This loss rate occurs when the loss rate on the underlying assets is $5 + 0.1875 \times 15 = 7.81\%$

Problem 8.19.

Investigate what happens as the width of the mezzanine tranche of the ABS in Figure 8.3 is decreased with the reduction of mezzanine tranche principal being divided equally between the equity and senior tranches. In particular, what is the effect on Table 8.1?

The ABS CDO tranches become similar to each other. Consider the situation where the tranche widths are 12%, 1%, and 87% for the equity, mezzanine, and senior tranches. The table becomes:

<i>Losses to subprime portfolio</i>	<i>Losses to Mezz tranche of ABS</i>	<i>Losses to equity tranche of ABS CDO</i>	<i>Losses to Mezz tranche of ABS CDO</i>	<i>Losses to senior tranche of ABS CDO</i>
10%	0%	0%	0%	0%
13%	100%	100%	100%	100%
17%	100%	100%	100%	100%
20%	100%	100%	100%	100%

Problem 8.20.

Suppose that the structure in Figure 8.1 is created in 2000 and lasts 10 years. There are no defaults on the underlying assets until the end of the eighth year when 17% of the principal is lost because of defaults during the credit crisis. No principal is lost during the final two years. There are no repayments of principal until the end. Evaluate the relative performance of the tranches. Assume a constant LIBOR rate of 3%. Consider both interest and principal payments.

The cash flows per \$100 of principal invested in a tranche are roughly as follows

<i>Tranche</i>	<i>Yr 1</i>	<i>Yr 2</i>	<i>Yr 3</i>	<i>Yr 4</i>	<i>Yr 5</i>	<i>Yr 6</i>	<i>Yr 7</i>	<i>Yr 8</i>	<i>Yr 9</i>	<i>Yr 10</i>
<i>Senior</i>	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	103.6
<i>Mezz</i>	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	1.1	21.1
<i>Equity</i>	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	0	0

The internal rates of return for the senior, mezzanine and equity tranches are approximately 3.6%, -6%, and 16.0%. This shows that the equity tranche can fare quite well if defaults happen late in the life of the structure.