MScFE 560 FINANCIAL MARKETS

Group Work Project # 3

See grading rubric here.

Scenario

In GWP 2, you examined the effect that regulation played. Similar to GWP2, we will focus on a financial crisis and the regulation intended to avoid future occurrences of those problems.

Tasks

Step 1:

As a group, submit a 1000 word review that includes a detailed description of mortgage-backed securities in the context of the Global Financial Crisis. All group members should contribute to these 4 questions by sharing the writing of the review. The review must include:

1. A detailed and specific outline of mortgage-backed securities themselves,
2. an explanation of why they can be useful financial instruments,
3. an analysis of the role they played in the Global Financial Crisis, and
4. a comparison between 2) and 3), explaining why the potential benefits and uses of mortgage-backed securities did not manifest in the Global Financial Crisis.

Step 2:

Each team member selects one of the following roles[1]:

- Student A discusses the senior tranche
- Student B discusses the junior tranche
- Student C discusses the equity tranche

Then, individually, based on their role, each member will answer questions 5, 6, 7, and 8 below.

[1] In a **group of 2 students**, one student is A, another student is B, and both students work on C.

5. Taking into account the following about mortgage-backed security, answer the questions below.

   A mortgage-backed security (MBS) can be carved into different tranches. The equity tranche absorbs the first set of losses. That is, if there are mortgages that do not pay on time, the cash flows will not be paid to the tranche holders. If enough mortgage holders do not pay their mortgage, then the equity tranche would be wiped out entirely. This equity tranches loss occurs before there is any loss to the junior tranche. Similarly, the junior tranche absorbs the next set of losses. If there are more mortgage holders defaulting, then the junior tranche would be wiped out entirely before there is any loss to the senior tranche. For the senior tranche to lose any promised return, both the equity tranche and the junior tranche would have to have lost all their stated earnings. Here are the specific questions to address:

   a. What are the advantages and disadvantages of a senior tranche?
   b. What are the advantages and disadvantages of a junior tranche?
   c. What are the advantages and disadvantages of an equity tranche?

For the following questions 6, 7, and 8, let's examine MBS and structured products along 5 factors:

a. Collateral-related risks: financing and credit
b. Statistical related risks: volatility and correlation
c. Magnifying risk factors: leverage and non-linearity
d. Frictional risk factors: liquidity and regulation
e. Fallout: model failure and crises

6. Collateral-Related Risks. Credit Risk. For your product:

   a. Write the formula for expected loss of a portfolio.
   b. Does the default correlation affect the value of the expected loss of a portfolio?
   c. Does the default correlation affect the shape of the loss distribution of a portfolio?

7. Statistical-Related Risks: Correlation. Keeping the default probability fixed,

   a. Suppose the mortgages in the MBS have very low default correlation (close to 0). Is your product a relatively safe investment? Why or why not?

b. Suppose the mortgages in the MBS have very high default correlation (close to 1). Is your product a relatively safe investment? Why or why not?

8. Magnifying Risk: Leverage & Nonlinearity
    a. Explain how the non-recourse loan creates a nonlinear risk.
    b. Explain how the combination of no-money down loans and non-recourse create leverage on top of nonlinear payoffs.
    c. How does this combination lead to asset bubbles?
    d. Using an option framework, show your investment is a type of option strategy, where
        i. The underlying is the portfolio loss
        ii. The option's value is the stated yield of the structured product
        iii. The option's strike is the attachment and/or detachment point

Step 3:

Based on the individual work from Step 2, all team members compare answers, and write a group report that synthesizes perspectives for each question based on their respective roles. For example, Question 8 asks to compare the tranche to an option. A, B, and C each describes the type of option(s) their tranche was. They would then say if these options are the same, or merely similar, or completely different. For example, if A were a call and B were a bull spread, then they can have the underlying, time to expiration, and 1 strike in common, but they differ in that the bull spread has limited upside and a 2nd strike.

Finally, as a group, answer questions 9 and 10.

9. Fallout Risk: Model Failure
    a. Incentives in the system for some stakeholders may be to maximize the sales price of the home. Explain the specific incentives of each of the following stakeholders:
        i. Homebuilders
        ii. Mortgage Lenders
        iii. Mortgage Back Securities (MBS) Structurers
        iv. Realtors (real estate brokers)
        v. Real Estate Appraisers
        vi. Townships that collect local real estate taxes

vii. Homeowners using a mortgage.

b. Rating Agencies rate the credit of the tranches.

i. What are the top 3 credit risk variables that determine the credit rating of a tranche?
ii. In the Global Financial Crisis, did the rating agencies do their job accurately for many of these MBS? Why or why not?

10. Regulation. Since the global recession, new lending laws have made the housing market more stable. Using an option framework, let's examine how we can make the market more stable.

a. Where should the call option be sold, OTM, ATM, or ITM?

b. Regarding non-recourse loans, how can we minimize rampant speculation?

c. How can the incentives of stakeholders be better aligned for long-term responsibility?

Submission requirements and format

One team member submits on behalf of the entire group the following:

1. **1 PDF document*** with:
    a. 1 Group 1000-word review of Questions 1 - 4
    b. Individual answers to questions 5-8
    c. 1 Group report for step 3
    d. Group answers to questions 9 and 10

Use the available Report Template and fill out the required information on the first page

** **Use Google Docs to collaborate**. Start by uploading the Report Template provided in the Course Overview. Once your report is completed, click File → Download → PDF Document (.pdf) to obtain the copy for your submission.*

Rubric

Your instructor will evaluate your group submission for GPW2 using the following rubric:

Quantitative Analysis (open-ended questions) 40 Points	Technical and Non-technical Reports 30 Points	Writing and Formatting 20 Points
The group is able to apply results, formulas, and their knowledge of theory to real-life finance scenarios by doing the following: ● Providing all the necessary information to support their arguments. ● Presenting arguments that reflect group discussion and research. ● Using authoritative references to support a position and provide updated information ● Concluding with practical takeaways for more insightful financial decision-making	Technical Reports contain 3 parts: 1) summary of key results; 2) interpretation of results; and 3) the recommended course of action that can reasonably follow from those results and interpretations. **Note**: Technical reports will include the technicalities of models, such as names, methods of estimation, parameter values, etc. and exclude generalities about the work done. It should NOT include the names of Python code that was used.	A submission that looks professional should include: ● The axes labels and scales in graphs. ● No significant grammar errors or typos. ● Organized, clear structure, and easy to read document. ● Proper citations and bibliography using MLA format.
	Non-technical Reports contain 3 parts: 1) clear explanation of results; 2) the recommended course of action that follows; and 3) the identification of factors that impact each portfolio. **Note**: AVOID all references to model names, algorithms, unnecessary details, and focus on the investment decision.	

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