Instructions and Guide for
Credit Rating

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1 Introduction

1.1 Overview

In the lab, you will use Bloomberg to explore the topic of credit rating. In previous labs, you should have learned the idea of default risk, the risk investors are bearing in lending money to the financial institutions and for which those investors are compensated in a form of higher interest rate. Credit rating measures a bond/issuer’s default risk by classifying these bonds/issuers into classes of groups based on the credit rating agencies’ view of them defaulting on their borrowings to creditors. Thus investors are able to evaluate the investing opportunities and to compare among bonds of different yields and prices in the market.

In the World Bonds and Yields lab, we discuss and compare the borrowing costs of German bund, US Treasury bond and Spanish government bond. We might expect the Spanish government bond to have the highest interest rate among these three categories of government bonds, because Spain has the greatest opportunities to fail to make its promised interest rate payments and default in its borrowings. You will take this point to this Credit Rating lab - a worse credit rated issuer would have higher coupon rates to compensate its investors for the default risk.

Default risk could be measured in various ways. You could look at the interest coverage ratio (EBIT/interest expense), market capitalization (market value of the company’s outstanding shares), and so on, to evaluate the company’s default probability. For instance, the higher the interest coverage ratio, the more earnings (before interest and taxes) the company holds which could be used to pay back the company’s borrowings. In this lab, we will discuss several defaulting measurements, and you can Google them or find relevant information in the page of Bloomberg Help.
in each function.

In this lab, we will mainly use three Bloomberg functions. In the Bloomberg function Rating Scales And Definitions (RATD), you will learn definitions and scales of several of the most common credit rating agencies, including Moody’s Investors Service (Moody’s), Standard & Poors (S&P) and Bloomberg Composite (COMP). This function will help you establish the basic understanding of what credit rating is.

You will also explore the role of bond issuer’s fundamentals in the credit rating - how the fundamentals impact on the bond credit ratings by using the Bloomberg function Description (DES).

The Bloomberg Default Risk (DRSK) function will enable you to determine the issuer’s default risk and default probability based on the model inputs, such as share price, price volatility and total debt. This function also compares the company’s fundamentals with the industry averages and graphs the company’s default risk distribution in the industry. By comparing the fundamentals among companies with different credit ratings and among peer companies in the same industry sector, you will understand the leading factors in determining default risk. This function also enables you to change the fundamentals to compare the company’s credit default risks assuming a different model inputs.

In this lab, you will learn:

- Definitions of credit rating scales
- Credit ratings of companies with different default risk and default probability
- Credit rating fundamentals
- Credit default measures’ sensitivities to changes in these fundamentals

1.2 Assignment details

As you work through these sections, be sure to prepare a detailed logbook for yourself to contain all the steps and results. Your logbook should be in a spiral bound or similar notebook, used only for purposes of our Labs. You will turn in your logbook after each Lab, and it will be returned to you after each Lab is graded.
You should make and save screenshots of some of the important Bloomberg screens you construct. (In the lab guide, there are tips for you to save the most important screens and you are expected save the minimum set of screenshots.) In your logbook, record the date/time and description (with the Bloomberg Mnemonic where feasible) of all Bloomberg screens used to obtain the specific numbers you rely on for each question below. This allows for your data to be checked later for the professor's auditing purposes and your review purposes.

When you are finished, use your logbook and the understanding you have developed to prepare a 6-8 page Lab Report for turn-in. Your lab report should carefully and professionally explain what you have done, what you have found, and what your work teaches you about finance. Your Lab Report should be numbered and keyed to the sections and specific items in this Lab Guide.

Your report should contain some Bloomberg graphics to help illustrate your points and show your completion of the lab items. These should be carefully labelled as numbered exhibits and should be placed in an Appendix at the end of your written report. Every Exhibit should be specifically discussed in the text of your report! Do not attach extra pages and pictures that you do not refer to in the body of your report, by specific exhibit number.

You may work through the lab with a partner, and you may turn in a single report for your partner team. Your Lab Report must be typed and carefully edited, and it should conform to professional standards for a business report.

A final note, about this Lab Guide. The Guide gives specific instructions on how to do the experiment, which have been tested on a Bloomberg terminal. Sometimes Bloomberg changes functionality, and the defaults and settings on your account may vary from the account used for testing. Thus, some flexibility and small adjustments on your part may be needed as you work through the Lab Guide.

2 Moody’s Investors Service (Moody’s)

1. In this section, you will explore the Moody’s Investors Service. Moody's credit rating is broadly used in many finance databases, including Bloomberg.

Type RATD and <Go> in the command line. Read the introductory paragraphs for this function on the right-hand side column. Below is a long list of
credit rating agencies. Notice that in this Bloomberg function, agencies mean
the institutions that rate and measure the credit ratings for bonds/issuers, and
it is not the entity that issues these bonds. In this lab, we will only concen-
trate on Moody’s, S&P and COMP, and in this section, we only cover Moody’s.

Click on Moody’s Investors Service (MOODY’S) on the right-hand side column
of the fifth row of the list, and enter the page for the credit rating agency. You
should have the Moody’s Investors Service (MOODY’S) on the right-bottom
of the screen. There is a long list of Moody’s credit rating scales, and firstly
you should click on Moody’s Long-Term Debt, the first one in the list.

In the page of Moody’s Long-Term Debt, you will have the credit ratings and
definitions. For instance, a bond rated as Aaa in the Moody’s Long-Term Debt
will have the highest quality with minimal risk; a bond rated as Aa will have
high quality but subject to very low default risk. You should have some ideas
about these credit rating definitions, i.e. a bond rated as Aa has higher quality
and lower default risk than a bond rated as Baa in the credit rating scale.

- What are the credit rating scales underlying Moody’s Investors Service
  (MOODY’S)? For instance, Moody’s Long-Term Debt and Moody’s Office
  Codes.
- What is the definition of Moody’s Long-Term Debt (according to the
  introductory paragraphs in the page of Moody’s Long-Term Debt)?
- What is the highest rating and what is the lowest rating? Can you find
  some bonds rated by Moody’s Long-Term Debt as the highest rating and
  as the lowest rating? What are their terms of maturity? You can Google
  or search them in Bloomberg.
- What does “investment grade ratings” mean? What is investment grade
  ratings? If you are an institutional investor, which kinds of bonds should

2. Click items on the left-hand side column, and go back to the page of the
Moody’s Investors Service (MOODY’S). Click on Moody’s Short-Term Debt
on the right-hand side column.
• What is the highest rating and what is the lowest rating? Can you find some bonds rated by Moody’s Short-Term Debt as the highest rating and as the lowest rating? You can Google or search them in Bloomberg. What are their terms of maturity? If bond has been rated as P-1 in the credit rating scale, what does that mean (what is the “indicates” of rating)?

• What is the difference between the Moody’s Short-Term Debt and the Moody’s Long-Term Debt?

• In this section, we only explore and concentrate on Moody’s Short-Term Debt and Moody’s Long-Term Debt credit ratings’ scales and definitions. While there is a long list of Moody’s other credit ratings, such as Moody’s Structured Finance, Moody’s Bank Financial Strength and Moody’s Insurance Financial Strength. The topic of Moody’s is not limited to those several credit ratings, and you should refer to this RATD function to search for helpful information when you are exploring other Moody’s credit ratings in the following sections. For instance, when you are exploring bond’s Issuer Description in the DES function, you may have Moody’s Outlook credit rating, and you could enter the RATD function again to look for the scales and definitions for Moody’s Outlook. In addition, it is your interests and benefits to explore other Moody’s credit ratings to help understand Moody’s credit default risk measures.

3 Standard & Poors

1. In this section, you will explore Standard & Poors credit rating scales. Click on “What Is RATD?” on the left-hand side column and go back to the page of Index of Agencies. Click on Standard & Poors (S&P) on the right-hand side column. You may need to scroll down the screen.

You are in the page of S&P credit rating. S&P credit rating is widely used to measure the bond’s credit default risk. Find out Standard & Poors (S&P) and click on the S&P Long-Term Issue Ratings, the first one in the Standard & Poors (S&P) credit rating scales list.

• What is the highest rating and what is the lowest rating? Find the S&P ratings for the same bonds you have in your answers for Moody’s Long-Term Debt. What are their S&P Long-Term Issue Ratings? Are these
classified as the highest quality bonds also rated by S&P as the highest? What about the lowest rating bonds?

- If bond has been rated as AAA in the credit rating scale, what does that mean (what is the “indicates” of rating)?

2. Click the items on the left-hand side column, and go back to the page with all the credit rating agencies. Find S&P and click on S&P Short-Term Issue Ratings on the right-hand side column, the second credit rating scale underlying Standard & Poors (S&P) credit rating scales list.

- What is the highest rating and what is the lowest rating? Find the S&P ratings for the same bonds you have in your answers for Moody’s Short-Term Debt. What are their S&P Long-Term Issue Ratings? Compare your S&P and Moody’s results.
- If bond has been rated as A-1+ in the credit rating scale, what does that mean (what is the “indicates” of rating)?
- What is the difference between S&P Short-Term Debt and S&P Long-Term Debt?

4 Bloomberg Composite

1. In this section, you will explore the Bloomberg Composite (COMP) credit rating scale. Click on “What Is RATD?” on the left-hand side column and go back to the page with all the credit rating agencies. Click on Bloomberg Composite (COMP) on the right-hand side column. You may need to scroll down the screen.

You are in the page of Bloomberg Composite. In the page of the Bloomberg Composite (COMP), you will have the introductory paragraph for COMP. COMP is “a blend of a security’s Moody’s, S&P, Fitch, and DBRS ratings.”

- What is the definition of COMP? What does the introductory paragraph tell you? What is the difference between COMP and other credit rating scales?
- What are the credit ratings in COMP? What if the composite is between two ratings?
- What are the differences among Moody’s, S&P and COMP?
5 Verizon Communications Inc

1. Type VZ Corp in the command line and press <Go>. On the screen will show you multiple choices of Verizon Communication Inc corporate bonds. You should select the bond that issues recently, has the term of maturity of 10-year and denominated in US dollars. Just for instance, because this lab was written around December 2014, so here we choose the Verizon Communication Inc bond that issued in 10/22/2014, will mature in 11/01/2024 and denominated in US dollars. The name of the bond is VZ 3 1/2 11/01/24 Corp.

Right-click on the name of the bond and load in this bond. Type DES and press <Go> in the command line. On the right-hand side of the screen, you will have four credit ratings displayed in the Bond Ratings frame: Moody’s, S&P, Fitch and Composite.

- What is the bond’s credit ratings? (How is the bond rated by Moody’s, S&P, Fitch and Composite? While, in this lab, we do not concentrate on Fitch) Usually, on bond description section, the Moody’s credit rating is the Moody’s Long-Term Debt rating; S&P credit rating is S&P Long-Term Local Issuer rating, i.e. the Long-Term Issuer Ratings in RATD function.
- Do you think the bond is a good investment? Why? Should a financial institution invest in this bond? (Hint: what does investment grade bond mean?)
- What is the coupon rate? In which direction should the coupon rate change if the credit rating of the bond degrades to a lower rating? What if the credit rating upgrades?

2. Click on Issuer Description tab at the top of the screen.

- What is the Basic Information (VZ US Equity DES) on the screen?
- What are the Fundamental Highlights items for this bond?

What should be the relationships between the bond’s credit rating and each of those fundamentals? What are their characteristics? For instance, if Current Market Capitalization increases, how might the credit rating change? To a higher rating or to a lower rating? Why?
• What are the numbers on the right of each item?

• What are the credit ratings at the bottom of the screen (focus on the Moody’s Long-Term Debt, Moody’s Short-Term Debt, Standard & Poor’s Long-Term Local Issuer and Standard & Poor’s Short-Term Local Issuer)? How is the bond rated under each of the ratings?

3. In this item, we will compare between a mid-level credit risk bond with a very high quality bond to see the impact of credit default risk on the bond’s coupon rate and compare the fundamentals of their issuers. We will take the Verizon bond with a Microsoft bond, a very high quality corporate bond, in this item.

Type MSFT Corp and press <Go> in the command line. You should choose one bond that issues and matures at about the same times as the VZ Corp bond we have just concentrated on, and denominated in US dollars. In this lab, we will choose the Microsoft Corp bond that issued in 12/03/2013, will mature in 12/15/2023 and denominated in US dollars. The name of the bond is MSFT 3 5/8 12/15/23 Corp.

Right-click on the name of the bond and load in the bond. Type DES in the command line and <Go>.

• What are the bond’s ratings (for Moody’s, S&P, Fitch and Composite, respectively)?

• Which bond has higher quality and lower default risk? The VZ or the MSFT Corp bond? Why? You should have the answer based on the comparison between the two bonds’ credit ratings.

• What is the coupon rate? Which bond has higher coupon rate? The VZ or the MSFT Corp bond? Why?

• How does the credit default risk impact on coupon rate? How do you relate this to the World Bonds and Yields lab?

• Click on Issuer Description tab. What is the Basic Information?

• What are the Fundamental Highlights numbers? How are these numbers compared with the VZ Corp bond’s Fundamental Highlights numbers? Are these numbers consistent with the credit ratings? Why? (For instance, does the Microsoft bond have a higher EBITDA to Total Interest Expense?)
• What are the credit ratings at the bottom of the screen? How are these ratings compared with the VZ Corp bond’s ratings?
• How are the fundamental highlights impact the credit ratings? You should write down your logic in several sentences.

4. Based on the given information on DES,
• Which bond should have lower default probability and higher credit rating?
• What do you think would be the most important factor in determining the credit rating among the fundamentals? Why? You could Google to find any references that might help.
• What other factors might have an impact on credit rating, i.e. think of one factor of your own idea that might impact credit rating?

6  Bloomberg estimate of default risk

1. In this section, you will explore the Bloomberg Default Risk function that will compute 1-Yr Default Risk and 1-Yr Default Prob based on fundamental inputs. Type VZ US Equity DRSK and <Go> in the command line to enter the Bloomberg Default risk (DRSK) function. While we are exploring bond credit ratings in this lab, however, DRSK is an equity function. DRSK is not particularly for bonds, it is used to evaluate bond issuers and equities.

*Left Top.* The 1-Yr Default Risk is the Bloomberg Company Default Risk rating and the 1-Yr Default Prob is the probability of the company defaulting over the next one year. You can click on the red Info tab at the top menu and select the Bloomberg Default Risk Scale to have details of the one-to-one relationship between the 1-Yr Default Risk and 1-Yr Default Prob, i.e. the 1-Yr Default Risk is the rating for the 1-Yr Default Prob, each Default Risk indicates a interval of default probability. In addition, these various Default Risks are classified into three groups: (1) IG - Investment Grade; (2) HY - High Yield; (3) DS - Distressed. The Investment Grade group has the highest credit rating, The Distressed group has the lowest credit rating, and the High Yield group is in the middle. The 5-Yr Model CDS, 5-Yr Market CDS and Market/Model CDS Ratio are the three quantitative measures of the bond’s credit default risk. You can click on the Help tab at the right-top of the screen
to search for the definitions of these three items.

*Left Middle.* The Model Inputs (USD) in the middle of the screen are the fundamentals that determine the 1-Yr Default Risk, the 1-Yr Default Prob and the 5-Yr Model CDS.

On the right of each item, there is a small chart tab that you can click on to graph the item in the chart on the right-hand side.

- What is the bond’s 1-Yr Default Risk? What is the bond’s 1-Yr Default Prob? What is the bond’s 5-Yr Model CDS?
- What are the Model Inputs? What do they mean? (Hint: You can find the definitions in the Help page)
- What is the Market Cap?
- Increase the Market Cap by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?
- Increase Total Debt by 10% (Bloomberg will not allow you to change the total debt directly, you have to increase the long-term debt and short-term debt by 10% individually to increase the total debt by 10%), what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? Do they differ from the numbers when Market Cap and Total Debt are the initial values? What does that mean? Does Market Cap itself make impact on default probability and risk? If so, why?
- Setback the Market Cap and Total Debt to initial values. Increase Price Vol (1-Yr) by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?
- How does the volatility of stock price impact on the credit rating of the company? You can Google KMV Merton Model.
- Setback the Price Vol (1-Yr). Increase Short-Term Debt by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?
- Setback the Short-Term Debt. Increase Long-Term Debt by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?
Setback the Long-Term Debt. Increase Interest Expn (T12M) by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?

Setback the Expn (T12M). Increase Adj CFO (T12M) by 10 %, what are the 1-Yr Default Risk, 1-Yr Default Prob and 5-Yr Model CDS? How much do they change?

Compare the results. Which items have the largest impact on the bond’s default risk? Which items have the smallest impact on the bond’s default risk?

Are you surprised at any of these outcomes? Do they make sense? Why?

2. Right Top. The chart will show the historic 1-Yr Default Prob and Share Price in the previous year as default. You can click on the small chart at the right of each item to check for the curve you want to be displayed in the chart.

Bottom. At the bottom of the screen, the Sector Comparison (DRAM) compares the industry numbers with the issuer’s number of each of the items in Credit Metric. You will have the Debt/Equity, Interest Coverage, EV/EBITDA, Realized Vol (1-Yr %) and Implied Vol (1-Yr %) in the Credit Metric; for each item, you will have the issuer’s numbers and industry numbers: (1) the 10% percentile, median, weighted average and the 90% percentile in the industry. You can compare the industry numbers with the bond’s issuer numbers.

On the right of the Metric is a small chart displaying the 1-Year Default Risk Distribution in the industry. You can have a broad idea of the issuer’s default risk level in the industry sector.

What are the issuer’s Credit Metric numbers?

How are the issuer’s numbers compared with the industry averages? You can compare with industry median, weighted average, or the percentiles.

How is the issuer’s 1-Yr Default Risk distributed in the industry? Is VZ 1-Yr Default Risk distributed in the lower percentile of the industry, or in the higher percentile of the industry? How do most companies in the industry distribute?

3. In this item, you will compare Verizon with a another company which has a higher quality and borrowing credit, Microsoft. Type MSFT US Equity DRSK
in the command line and press <Go> to load Microsoft Corp in the function. Hint: You have two monitors for each PC in the trading lab, so you can load MSFT in another Bloomberg window and move the window to the the other monitor to compare the two companies at the same time.

- What are the credit measures for this company? i.e. What are the 1-Yr Default Risk, 1-Yr Default Prob, 5-Yr Model CDS, 5-Yr Market CDS and Market/Model CDS Ratio?
- According to the credit measures, which company has higher credit rating? VZ or MSFT?
- What are the model inputs? How do these numbers compared with Verizon?
- Which Inputs do you think play the most important roles in determining the MSFT credit rating? i.e. which MSFT Inputs do you think differ from VZ Inputs most that give MSFT a higher credit rating?
- What are the Credit Metric numbers and how do they compare with Verizon numbers?
- How do MSFT Credit Metric numbers compare with the industry numbers? How do MSFT 1-Yr Default Risk distribute in the industry?
- How do MSFT Credit Metric numbers and 1-Yr Default Risk Distribution compare with VZ? Is your answer consistent with VZ’s and MSFT’s credit ratings?

4. In this item, you will compare the Verizon Communication Inc’s default risk with a issuer that has much lower quality and much higher default risk. In this lab, we will use WB. Enter WB US Equity in the yellow box at the left-top of the screen.

- What are the credit measures for this company? i.e. What are the 1-Yr Default Risk, 1-Yr Default Prob, 5-Yr Model CDS, 5-Yr Market CDS and Market/Model CDS Ratio?
- What are the model inputs? How do these numbers compared with Verizon Communication Inc’s numbers?
- What are the Credit Metric numbers compared with the industry numbers?
- How do Weibo Corp’s 1-Yr Default Risk distribute in the industry? i.e. How do you describe the 1-Year Default Risk Distribution?
7 Monitoring risk while pursuing high returns

1. Read the Bloomberg article Monitoring risk while pursuing high returns. This is a four-page Bloomberg Professional Service Offering article which might help you understand the meaning of the Bloomberg DRSK function and the methodologies underlying the DRSK model.

- Concentrate on the second page. What is the advantage of a quantitative measure over a qualitative measure? Is Bloomberg’s DRSK model a quantitative measure or a qualitative measure? What is the disadvantage of Z-Score? How do Bloomberg’s DRSK model solve the problem?
- Concentrate on the third page. Is DRSK an equity or a bond function? What are the characteristics of an equity function? How does an equity function evaluate a company’s credit risk (i.e. what are the inputs in the model)?
- Does Bloomberg’s DRSK model work in the past? What examples are given in the “LOOKING BACK” paragraphs?
- According to the “MAGIC BULLETS” part, what are the short-comings of a quantitative model?
- After you finish reading this article, what do you think of the Bloomberg DRSK model? Do you consider DRSK model as an efficient credit rating measure? What are its advantages over S&P, Moody’s and Fitch? What are the model’s disadvantages?