Critical Thinking Exercises for Use in Financial Markets and Institutions and Similar Courses

Abstract

Many universities now recognize the importance of instilling the ability to think critically and yet we continue to fall short. In an attempt to improve the ability of our finance majors to think critically and to improve their communication skills, we developed a number of exercises for use in the finance curriculum. These exercises were designed for use in and are particularly well-suited to a Financial Markets and Institutions class but some could also potentially be used in a Money and Banking class or in an Investments class. In this paper, we present five such exercises and discuss their benefits and drawbacks.

Keywords: Teaching methods, Critical thinking, Financial markets, Financial institutions, Finance pedagogy

Introduction

Critical thinking can be defined in many ways. According to Edward Glaser’s seminal study on critical thinking:

The ability to think critically...involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. It also generally requires ability to recognize problems, to find workable means for meeting those problems, to gather and marshal pertinent information, to recognize unstated assumptions and values, to comprehend and use language with accuracy, clarity, and discrimination, to interpret data, to appraise evidence and evaluate arguments, to recognize the existence (or non-existence) of logical relationships between propositions, to draw warranted conclusions and generalizations, to put to test the conclusions and generalizations at which one arrives, to reconstruct one's patterns of beliefs on the basis of wider experience, and to render accurate judgments about specific things and qualities in everyday life.
According to Paul (1985), “The critical thinking movement can be traced back to the practice and vision of Socrates, who 2,400 years ago discovered by a probing method of questioning many authorities of his day could not justify on rational grounds their confident claims of knowledge. Confused meanings, inadequate evidence, or self-contradictory beliefs were often lurking beneath smooth but largely empty rhetoric...Those who advocate critical thinking instruction hold that knowledge is not something that can be given by one person to another...Knowledge, rightly understood, is viewed as a distinctive construction by the learner, something that issues out of a rational use of mental processes.” Besides defining the essence of critical thinking, Paul also asserts that learning how to think critically is essential to the ability to learn to ask and answer questions that comprise the three highest levels of Bloom’s famous taxonomy of learning: analysis, synthesis, and evaluation.

**Background and Motivation**

Many universities now recognize the importance of instilling the ability to think critically and yet we continue to fall short. Arum and Roksa’s 2010 indictment of higher education asserted that colleges and universities are not improving students ability to think and that we fall particularly short when it comes to critical thinking. After analyzing over 2,300 undergraduate students at more than 24 higher education institutions, they conclude that almost half of them exhibit no significant improvement in critical thinking, complex reasoning, or writing. Furthermore, those of us in Colleges of Business often find that employers explicitly state that one of the biggest deficiencies they find upon hiring our graduates is an inability to think
critically and there is ample evidence that this is a widespread phenomenon. For example, a 2014 study conducted by the Association of American Colleges and Universities found that employers gave students very low grades on critical thinking while students judged themselves to be far better prepared for career success than employers did. In addition, a separate study by Hart Research Associates found that 91% of employers agreed with the statement that when it comes to career success, “a candidate’s demonstrated capacity to think critically, communicate clearly, and solve complex problems is more important than his or her undergraduate major.”

In an attempt to improve the ability of our finance majors to think critically and to improve their communication skills, we developed a number of exercises for use in the finance curriculum. These exercises were designed for use in and are particularly well-suited to a Financial Markets and Institutions class but some could also potentially be used in a Money and Banking class or in an Investments class. These exercises were first put in place in the Fall 2016 semester and were repeated in the Summer 2017 semester (the class was not offered in Spring 2017).

**Framework for Development of the Exercises**

Our short working definition of critical thinking assumes that it entails the objective analysis and evaluation of an issue in order to form a reasoned judgment. Based on this broad definition, a number of desirable traits were identified and incorporated into these exercises.
First and foremost, we wanted the problems to require some original thought and perhaps to even necessitate some outside research.

Second, we wanted the exercise to provide some experience in working with at least one key finance concept.

Third, we wanted each exercise to exhibit some level of complexity.

Fourth, since research has shown that ill-structured problems are a source of frustration to students and do not promote learning, we wanted to provide enough structure so that well-thought-out answers would have some commonality. This commonality is also helpful because it permits a more focused approach when discussing the exercise in class. However, we wanted to be careful to still leave plenty of room for critical thinking and originality.

And finally, we wanted each exercise to give the students a chance to practice communicating either in writing or verbally.

Critical Thinking Exercise 1: Financial Index Exercise

The first exercise we developed centered on learning about stock market indexes (all handouts for this exercise are provided in Appendix A). Various US stock market indexes are discussed in class so that students understood what an index is, the purpose and uses of indexes, and what the different weighting methods (value-, equal-, and price-weighted) entail. The exercise consists of reproducing the Dow Jones Industrial Average (DJIA) Index value on a particular date.

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1 While developed independently, this exercise is somewhat similar to one developed in Bernui and Stowe’s (2017) working paper “Developing Paper-based and Interactive Item Sets for an Introductory Investments Course”. However, it is less structured in terms of the questions posed which require discussion rather than selection from among a given number of choices. In addition, students are called upon to explain the pros and cons of different weighting methods and decide which is best.
(February 10, 2017). The students are provided with a list of the companies in the DJIA and their ticker symbols, the price of each company’s stock, the number of shares outstanding, and the DJIA divisor for that date. All of this data is provided in an Excel spreadsheet format to facilitate computations. The data can easily be updated each semester to prevent students from copying past work.

Part 1 of this exercise requires the students to compute both price weights and value weights. While the DJIA is price-weighted, the critical thinking element of this exercise revolves around deciding whether price-weighting or value-weighting makes more sense. And, of course, equal weighting could also be considered. Because this is the first exercise assigned, it is a little more structured and students are led to focus on the highest priced stock (Goldman Sachs) and the lowest priced stock (General Electric). They are further instructed to take a pros and cons approach to analyzing the key question of which weighting method is best. Finally, the exercise has the students compute the DJIA. This teaches them how the computation is done and also the role played by an index divisor. The instructor may want to provide the check figure or they may wish to withhold this information. Of course, students can always look up the answer online if they know how.

Part 2 of this exercise adds a global dimension to the exercise by having students evaluate a non-US index. A list of some major international indexes was created by the instructor and students were asked to choose an index to evaluate via a sign-up sheet that was passed around
in class. Another purpose of Part 2 is that it creates an individual component to the exercise. Therefore, while students may choose to collaborate on Part 1 (whether the instructor encourages it or prohibits it), they are individually responsible for doing the work required in Part 2. This part of the exercise also gives students practice in creating charts.

In the discussion phase of the exercise, students should be challenged to defend their opinion about price vs. value weighting. The instructor may wish to aggregate the pros and cons provided in the written submissions. Interestingly, the students seem to have problems identifying the shortcomings of a price-weighted scheme so this creates an opportunity to address their misunderstanding. If time permits, students can be individually charged with presenting the results of their research on the international index. Otherwise, the instructor may want to aggregate and present some of these results as well or may want to ask a handful of students to present their findings.

Importantly, this exercise addresses a number of goals found in most business school curricula by including critical thinking, a global approach, a research aspect, a chance to use spreadsheets for financial analysis and charting, and the opportunity to practice written and oral communication.

**Critical Thinking Exercise 2 and 3: Current Events**

The second exercise we developed centered on current political events under the belief that it is important to foster awareness and a sense of civic involvement in our students (all handouts
for this exercise are provided in Appendix B). It was also the hope that students would be highly interested in these topics given the current political environment. At this time, two separate exercises have been developed. One focused on the potential renegotiation of the North American Free Trade Agreement (NAFTA) and was assigned in the Fall 2016 semester and the other focused on the U.S. Treasury’s idea of issuing ultra-long bonds or bonds with maturities of 40, 50, or even 100 years and was assigned in the Summer 2017 semester.

As shown in Appendix B, the NAFTA Exercise begins with three questions with clear-cut answers based on the information given on US trade balances with Canada and Mexico. These three opening questions are followed by two questions that require outside research but have definitive answers and then by five questions that require outside research and varying degrees of critical thinking.

The third exercise centered on a proposal by US Treasury Secretary Steve Mnuchin for the US to offer Ultra-Long Treasury Bonds. In this exercise, students were given three articles about the proposal.


After reading these three articles, students are asked to answer the questions shown in Appendix C.

Unfortunately, our experience thus far indicates that this type of exercise is often the least favorite of the exercises assigned each semester. This does not mean that students are universally dissatisfied as some students do indeed find this exercise to be the most interesting. Often, however, it seems that these are the students who are already politically engaged.

Another issue has been that some students believe that the instructors’ insistence on mainstream news sources is due to an inherent bias against certain political factions. Despite attempts to mitigate this, students who receive low grades on papers that are rife with opinion but short on facts tend to hold onto the view that their grade is due to differences in political beliefs rather than shortcomings in the assignment itself. On the positive side, most students are seemingly very challenged by this exercise, which leads one to believe that there are benefits to it as well as downsides. In fact, one reason that some students seem to dislike it is that they are not used to delving into issues or supporting their opinions with facts. Since this is a crucial element of critical thinking, students must develop this skill, whether they like it or not, if they are to become critical thinkers. Additionally, despite making some students uncomfortable, if it ultimately helps them to become more engaged in the social, economic, and political events that affect their lives then it may well be that the benefits outweigh the costs.
Critical Thinking Exercise 4: Mutual Funds Exercise

This exercise is probably our personal favorite. It involves a fictional company called Boxes, Baskets, and Bows, a retailer of gift baskets, whose owners are interested in implementing a retirement plan for their employees. The company is a simple one that is easy to understand. Information is given on the number of employees and the number of locations. Certain key employees are described and information on their responsibilities and their salaries is provided. The handout with this information is shown in Appendix D. The key focus in this exercise is the choice between a defined benefit plan and a defined contribution plan. The exercise begins simply; students are asked to identify the pros and cons of defined benefit plans and defined contribution plans from the viewpoint of the employer and from the viewpoint of the employee. The next step is to investigate ten mutual funds and design a plan based on three of those funds. In order to do this, students must look at certain key aspects of each fund (e.g., fund strategy, expense ratio, past performance) so they are also learning about these characteristics. The hoped for result is that students will choose funds that result in a diversified mix of asset classes while also taking into account other characteristics when choosing funds from within a particular asset class. The third step is to use the funds chosen to create model allocations for each of three employees. These employees primarily differ in age/stage of life so the idea is that students will recognize that different allocations are appropriate for each of these individuals with the younger, single individual taking on the most risk and the older, near retirement individual taking on the least risk.
Critical Thinking Exercise 5: The Big Short Film on the Financial Crisis Exercise

Having long believed that certain videos and movies are worthwhile and can make finance more interesting, we often run into the problem of whether or not students are really paying attention and understanding the lessons contained within the film. Using up precious contact hours to show a film is not always efficient but, if the film is not shown in class, we must be concerned that many students will not even watch it. One solution is to require students to write a summary but this solution is plagued by opportunities to collude or simply find something on the internet. Another often used solution is to include questions on an exam but it’s often hard to figure out what they should all remember for multiple-choice type questions and requiring them to write a summary under test conditions leaves less time for the other testable material and more time spent grading.

The solution offered here is to provide a list of questions that the students can answer while watching the movie. If these are submitted via a system such as Blackboard, they can be checked for plagiarism and spot graded. The film that was chosen for the summer of 2017 was The Big Short, a highly entertaining film that explains the causes and consequences of the 2008 Financial Crisis. Despite the filmmaker’s efforts to explain the events in layman’s terms, a deep understanding of the film will require some outside research and critical thinking on the part of the typical undergraduate student. The list of questions given to students to answer is shown in Appendix E.

Some instructors may be shocked to see that the students were asked to answer a total of 68 questions. However, no complaints were made about the number of questions and 79% of students chose this as their favorite exercise of the semester. Among the students who chose this as their favorite exercise, these are some of the comments made:

_Without a doubt the most interesting and useful exercise was The Big Short. I had seen it before but didn’t understand it. This report made me slow down and actually try to understand the concepts they were talking about which helped me understand it so much more._

_I loved The Big Short assignment because it really taught me a lot about mutual funds and mortgage backed securities._
My personal favorite was The Big Short assignment. I had seen the movie before, but with the material we learned from this class, it was almost like watching a new movie. Things I did not understand before were much clearer. I loved how a good amount of material from our class was seen throughout the movie.

The Big Short was my favorite. The Financial Crisis is such a huge factor when learning finance since it reshaped the whole financial system and the movie was excellent. The questions given really made you focus to small details that you may have missed otherwise, and made it a better experience to watch. I'm very glad you introduced me to this movie.

Concluding Thoughts

Critical thinking appears to be in low supply these days. It is particularly alarming to think that college graduates may not possess this important skill. In an effort to improve the critical thinking abilities of undergraduate finance majors, five exercises are proposed herein. One of the main purposes of this effort is to share ideas with colleagues and stimulate a discussion on how we can better prepare our students for the challenges they will face after graduation by developing ways of learning that require critical thinking. An encouraging aspect of our personal journey has been that students also seem to recognize the value of these types of learning methods as shown by the following comments made by students at the end of the course:

I've always thought written assignments were beneficial because you have to independently do enough research to be able to speak freely and in your own words about the subject material. The best way to do this is through proper research and learning! Once you get rolling on the typing you may not even realized how much knowledge you've gained. I really enjoyed the written activities.

I think the writing assignments are a good idea, because it gives us better insight into the financial world. This was stuff we don't get to learn in textbooks. I also loved that these assignments made us more aware of current events.

I think overall these exercises were a good learning experience. They made me put conceptual finance ideas into real-world examples and forced me to think about them.

I think they helped a lot to learn the information given real life scenarios and current events. I enjoyed doing the research and learning more in depth about the topics. It also allows you to research from both perspectives to get a full picture and to form your own opinion about the topic given. I think they were a great assignment idea.

The writing assignments gave me the opportunity to research certain topics without being restricted to the book. The assignments required outside research in order to do the assignment effectively. This sparked an interest outside of just getting the assignment completed, at least for me. It made me look up actual information and give my opinion on it.
I always gain more knowledge with writing assignments because I have to spend time reading and discussing. I believe writing assignments were a good learning experience.

I really did enjoy the writing assignments. I think they were a great way to really understand some of the content that we might have missed while reading the material.

While these exercises tend to be more demanding for the instructor due to the additional time required to develop them and grade them, they also provide the students with a chance to practice written communication along with critical thinking while also deepening their understanding of the course content. We have personally found that if class sizes can be held at a reasonable level (i.e., 20-25 students), the development and grading of three assignments over the course of a semester is manageable.
References


Appendix A: **Dow Jones and International Index Exercise**

### Part 1 – DJIA Index:

The DJIA (Dow Jones Industrial Average) is an index composed of 30 stocks. These are stocks of very large, well-known companies. The index is price-weighted as opposed to value-weighted or equal-weighted.

Shown on the back of this page are the current components of the DJIA index along with some related data on those components as of 2/10/2017. To make your life easier, this data is also available in an Excel file on Blackboard.

Next compute the price weights of each component of the index. These weights should, of course, sum to 100%.

Then compute the market capitalization of each component and the value weights which will also sum to 100%.

Compare the price weights and the value weights. Discuss the differences.

How would a 10% increase in the value of Goldman Sachs stock affect the price weighted index if all other components remain unchanged? How would the effect differ if the index were value weighted?

How would a 10% increase in the value of General Electric stock affect the price weighted index if all other components remain unchanged? How would the effect differ if the index were value weighted?

Do price weights or value weights make more sense? Why? Discuss the pros and cons of each weighting mechanism. Conclude by clearly stating which method you think is best.

The DJIA is calculated by adding together the current price of each of the components and then dividing that result by the DJIA divisor. The DJIA divisor is at this time 0.14602128057775. Use this information to compute the DJIA as of 2/10/2017.

### Part 2 – International Index:

Using the non-US index you chose on the sign-up sheet. Answer the following questions in an essay format:

1. What is the name of the index and what (if anything) does it stand for (i.e., most of these are acronyms so explain the acronym and, if it’s not in English, explain what it means in English)?
2. What country’s stock market does it represent?
3. How many stocks are included in the index? What are the criteria for choosing those stocks?
4. How is the index weighted?
5. How has the index performed over the last year? Include a chart showing this.
6. What are the pros and cons of investing in this index right now? Based on your analysis would you invest in this index?
Appendix A: **DJIA Components, Prices, and Shares Outstanding as of 2/10/2017**

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<thead>
<tr>
<th>Ticker and Company Name</th>
<th>Price</th>
<th>Shares Outstanding (millions)</th>
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<td>MMM 3M</td>
<td>$179.00</td>
<td>596.73</td>
</tr>
<tr>
<td>AXP American Express</td>
<td>78.48</td>
<td>915.25</td>
</tr>
<tr>
<td>AAPL Apple</td>
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<td>DIS Disney</td>
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## Appendix A: DJIA Calculation Solution

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<tr>
<td>TRV Travelers Companies</td>
<td>119.73</td>
<td>279.60</td>
<td>33,476.51</td>
<td>4.05%</td>
<td><strong>0.57%</strong></td>
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<tr>
<td>UTX United Technologies</td>
<td>111.05</td>
<td>823.41</td>
<td>91,439.68</td>
<td>3.75%</td>
<td>1.57%</td>
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<tr>
<td>UNH UnitedHealth</td>
<td>160.75</td>
<td>951.82</td>
<td>153,005.07</td>
<td>5.43%</td>
<td>2.63%</td>
</tr>
<tr>
<td>VZ Verizon</td>
<td>48.98</td>
<td>4,076.56</td>
<td>199,669.91</td>
<td>1.65%</td>
<td>3.43%</td>
</tr>
<tr>
<td>V Visa</td>
<td>85.90</td>
<td>2,103.49</td>
<td>180,689.79</td>
<td>2.90%</td>
<td>3.10%</td>
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<tr>
<td>WMT Wal-Mart</td>
<td>68.02</td>
<td>3,073.21</td>
<td>209,039.74</td>
<td>2.30%</td>
<td>3.59%</td>
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</tbody>
</table>

|                                            | 2,959.76 | $5,824,701.44 | 100.00% | 100.00% |
| Current Dow Divisor                      | 0.14602128057775 |
| DJIA                                        | 20,269.37 |

**DJIA if Goldman Sachs' price increases by 10%:**

- **if index is price weighted**: DJIA = 20,435.60, **Change = 0.82%**
- **if index is value weighted**: Change = 0.17%
Appendix A: Sign-Up Sheet for International Index Component

<table>
<thead>
<tr>
<th>Country</th>
<th>Index</th>
<th>Student Name</th>
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<tr>
<td>Argentina</td>
<td>MERVAL</td>
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<tr>
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<td>ATX</td>
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<td>Brazil</td>
<td>BOVESPA</td>
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<tr>
<td>Canada</td>
<td>TSX Composite</td>
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<tr>
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<td>IPSA</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>SSE Composite</td>
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<tr>
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<td>PX Index</td>
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<td>OMX Copenhagen 20</td>
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<tr>
<td>UK</td>
<td>FTSE 100</td>
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Appendix B: Critical Thinking Exercise on NAFTA

Some information from the Executive Office of the US President, Office of the US Trade Representative concerning trade between NAFTA members is provided below.

North American Trade Facts
Canada and Mexico are currently the United States’ 2nd and 3rd largest trading partners, respectively.

According to the Department of Commerce, US exports of goods and services to Mexico and Canada support an estimated 2,206,000 jobs for US workers with 968,000 jobs attributable to Mexico and 1,238,000 jobs attributable to Canada.

The total amount of goods and services traded between the US and Mexico was $525.1 billion in 2015. Exports from the US to Mexico were $267.2 billion while imports from Mexico to the US were $316.4 billion.

Mexico is currently the United States’ 3rd largest goods trading partner with $531.1 billion in total (two way) goods traded during 2015. Goods exports totaled $236.4 billion; goods imports totaled $294.7 billion.

Trade in services with Mexico (exports and imports) totaled an estimated $52.4 billion in 2015. Services exports were $30.8 billion; services imports were $21.6 billion.

Exports
- Mexico was the United States’ 2nd largest goods export market in 2015.
- US goods exported to Mexico in 2015 were $236.4 billion which is an increase of 468% from pre-NAFTA levels. US exports to Mexico accounted for 15.7% of overall US exports in 2015.
- The top export categories in 2015 were: machinery ($42 billion), electrical machinery ($41 billion), vehicles ($22 billion), mineral fuels ($19 billion), and plastics ($17 billion).
- US exports of agricultural products to Mexico totaled $18 billion in 2015, making Mexico the US’ 3th largest agricultural export market. Leading categories include: corn ($2.3 billion), soybeans ($1.4 billion), dairy products ($1.3 billion), pork & pork products ($1.3 billion), and beef & beef products ($1.1 billion).
- US exports of services to Mexico were an estimated $30.8 billion in 2015, 2.7% ($807 million) more than 2014, 36.7% greater than 2005 levels, and up roughly 196% from pre-NAFTA levels. The leading services exports from the US to Mexico are in the travel, transportation, and intellectual property (computer software) sectors.

Imports
- Mexico was the United States’ 3rd largest supplier of goods imports in 2015.
- US goods imports from Mexico totaled $295 billion in 2015, up 0.2% ($667 million) from 2014, up 73% from 2005, and up 638% from pre-NAFTA levels.
- The top import categories in 2015 were: vehicles ($74 billion), electrical machinery ($63 billion), machinery ($49 billion), mineral fuels ($14 billion), and optical and medical instruments ($12 billion).
US imports of agricultural products from Mexico totaled $21 billion in 2015, our 2nd largest supplier of agricultural imports. Leading categories include: fresh vegetables ($4.8 billion), other fresh fruit ($4.3 billion), wine and beer ($2.7 billion), snack foods ($1.7 billion), and processed fruit & vegetables ($1.4 billion).

US imports of services from Mexico were an estimated $21.6 billion in 2015, 11.0% ($2.1 billion) more than 2014, and 50.0% greater than 2005 levels. They are up roughly 191% from pre-NAFTA levels. Leading services imports from Mexico to the US are in the travel, transportation, and technical and other services sectors.

Questions:
Questions 1-3 can be answered using this information. Question 4-10 will require research drawn from outside sources. Please be sure to list these sources in your submitted paper.

As always, be careful in your choice of information sources.

Many websites have a particular political agenda in mind and may present biased information and selective facts.

1. How much was the US goods and services trade surplus (deficit) with Mexico in 2015?
2. How much is the US goods surplus (deficit) with Mexico in 2015?
3. How much is the US services surplus (deficit) with Mexico in 2015?
4. What country trades more goods and services with the US than Mexico and Canada? And what is the trade surplus or deficit with that country? (Note: You may use figures from any of the years 2014-2016)
5. What is the North American Free Trade Agreement and when was it implemented?
6. What changes is President Trump proposing with regards to NAFTA?
7. How will these changes affect the US economy?
8. How will these changes affect the average American?
9. How will these changes affect the state of Texas?
10. Explain the pros and cons of keeping NAFTA as is and of changing it in the ways discussed in your answer to question 6.
11. With regards to NAFTA, what do you think the US should do? Support your answer using the evidence, facts, and analysis provided in the earlier parts of this exercise.
Appendix C: Critical Thinking Exercise 3 – Ultra Long Bonds

1. Who is Steven Mnuchin?

2. Explain what US Treasury Secretary Mnuchin is proposing and why?

3. What is the Treasury Borrowing Advisory Council? Who’s on this body and what is their background?

4. What is their opinion of Mnuchin’s proposal?

5. From the viewpoint of the current administration, what are the pros and cons of issuing extra-long term treasury bonds?

6. From the viewpoint of bond investors, what are the pros and cons of buying these bonds?

7. How will issuing these bonds help taxpayer?

8. Who will allegedly buy these bonds? Will anyone be hurt by this?

9. Will issuing these bonds increase the national debt? Will it shift the debt burden to future generations? Is this a good idea?
Appendix D: Critical Thinking Exercise 4 – Retirement Plans Design Decisions

Baskets, Boxes, and Bows (BBB for short) is a small business with 20 locations in the Southeastern US (primarily in Louisiana, Mississippi, Arkansas, and East Texas). The owners of BBB, Janet and Michael Schmidt want to introduce an employee retirement plan for themselves and their approximately 110 employees. The Schmidts are considering either offering a traditional defined benefit plan or a 401(k) defined contribution plan to their employees. A defined benefit plan provides a fixed, formula-based benefit for employees at retirement. A traditional 401(k) plan allows eligible employees to make pre-tax contributions to the account through payroll deductions. Employers have the option of making contributions on behalf of all participants, making matching contributions that are specified percentage of the employees’ contributions, or both. These employer contributions are often subject to a vesting schedule which provides that an employee’s right to employer contributions becomes portable only after a period of time. You have been hired to advise the Schmidts on a number of relevant issues.

1. The Schmidts want you to explain the pros and cons of a defined benefit plan and of a defined contribution plan from the owner/employer’s viewpoint and also from the employee’s viewpoint.

2. Information for 10 different mutual funds is provided in the links below. Design the BBB defined contribution plan using only 3 of these funds. Explain the reasoning behind your selections. Give as much detail as you can.

   Vanguard Prime Money Market Fund
   Vanguard Municipal Money Market Fund
   Vanguard Inflation-Protected Securities Fund
   Fidelity Short-Term Bond Fund
   Vanguard Total Bond Market Index Fund
   Vanguard Long-Term Investment-Grade Fund
   Vanguard High-Yield Corporate Fund
   Fidelity Stock Selector Large Cap Value Fund
   Vanguard Growth Index Fund
   Vanguard International Growth Fund

   At a minimum, you should consider each fund’s:
   - asset class and securities holdings
   - fund strategy (product summary, portfolio style box)
   - past performance (after-tax returns)
   - risk
   - expense ratio
   - average maturity/duration (money markets/bonds)
   - turnover (stocks only)

3. Suppose that the Schmidts choose to use the defined contribution plan that you have designed. All employees must choose to allocate their 401(k) contributions across the funds offered. As with most business owners, the Schmidts are particularly concerned with retaining key employees. Three of these employees are described below. Create three model allocations based on these descriptions using the funds you have selected for the plan and illustrate each of them using a pie chart. For each of these BBB employees, explain which of your sample allocations would be most appropriate and why. Would these three designs be sufficient to serve most of BBB’s employees? Why or why not?
Appendix D: Critical Thinking Exercise 4 (continued)

a. Emily is 24 years old. She graduated from Lamar University in 2015. She has worked for BBB for almost 2 years now and is currently a district manager. She is responsible for 3 existing stores in East Texas and two additional stores that will be opening in the next year. She is also working on a redesign of the company website. Her current salary is $42,000 per year and she works approximately 45 hours a week. Emily is planning to be married next year. She and her fiancé, Matt, have no children but between them they have one dog (Emily’s) and one python (Matt’s).

b. Jason is 42 years old. He is a high school graduate with about 30 credit hours, mostly in general studies and management classes, from a local community college. He has worked for BBB for a little over 16 years now and is currently a district manager. Jason is responsible for 9 existing stores in Louisiana. His current salary is $56,000 per year and he works approximately 50 hours a week. Jason is married. He and his wife own a modest home and have two children, ages 8 and 12.

c. Susan is 59 years old. She is a high school graduate and has worked for the Schmidts since they opened their first store in 1993. She manages one of the larger stores located in New Orleans. Susan is divorced and has one child, a son who is now a sophomore at LSU. Fortunately for her, he made very good grades in high school and is on a full scholarship. Susan works approximately 42 hours per week and makes $16.50 per hour.

4. Suppose that the Schmidts choose to use a defined contribution plan where each employee may contribute up to 4% of their salary and the Schmidts will match each $1.00 contributed with $0.50. The Schmidts have told you that their out-of-pocket costs can be no more than $100,000 per year. Can they provide the proposed defined contribution plan and stay within this budget? List any assumptions you need to make and show your work.

5. Use the following assumptions to project Emily, Jason, and Susan’s future 401(k) account balance at retirement:
   a. Each of these individuals contributes the maximum amount allowed under the plan and based on their current salary/wages and each receives the matching employer amount as described by the formula above.
   b. All employees are paid weekly.
   c. The future rate of return for each of the funds selected in your chosen allocation plans will be equal to the past 10 year return for that fund.
   d. Each individual chooses the allocation you said was most appropriate for them in part 4.
   e. Each of these individuals works until age 65.
   f. To simplify the calculation, you may ignore the idea that their salary/wages will probably increase over time and simply assume that they make the same salary/wages every year from now until retirement. You may also ignore the fact that allocations will likely change over time.

Be sure to clearly show your work in terms of the inputs you are using to get these answers.
Appendix E: Critical Thinking Exercise 5 - The Big Short

Watch the film and answer the following questions. Most, if not all, can be answered by watching the film. However, if you need to look up a more detailed explanation of certain things that is fine too. The questions generally follow the chronological order of the film. Questions refer to the character’s name in the film.

The main characters are based on real people and the actors that portray them are:

- Michael Burry, MD – Christian Bale
  - Jared Vennett (Greg Lippman in real life) – Ryan Gosling
  - Mark Baum (Steve Eisman in real life) – Steve Carell
  - Ben Rickert (Hockett in real life) – Brad Pitt
  - Charlie Geller (Ledley in real life) – John Magaro
  - Jamie Shipley (Mai in real life) – Finn Wittrock

1. What is the significance of the Mark Twain quote “It ain’t what you don’t know that gets you into trouble. It’s what you know for sure that just ain’t so.”? You will presumably need to watch the most if not all of the film to answer this question.

2. What did Lewis Ranieri of Salomon Brothers do that “changed your life”?

3. In the film, what does Dr. Mike Burry do for a living?

4. What does Mike Burry ask his new employee, David, to do? Why?

5. What are some specific things that Mike discovers as he goes through the spreadsheet on mortgage-backed securities (MBS)?

6. What is his specific strategy to exploit his discovery? Explain how it works if he’s right.

7. What is the major impediment to his strategy? How does he get around it?

8. What is Goldman Sachs initial opinion of Mike Burry’s strategy?

9. What does the “pay-as-you-go” structure do as far as counterparty risk is concerned?

10. Why are the Goldman bankers so happy as Mike is leaving?

11. How much did Mike short in total?

12. What are the subject lines of the emails that Mike receives about? What point is made by showing them?

13. Who is Jared Vennett and what does he do?

14. What is the ABX?

15. Explain the Jenga prop analysis.

16. What makes the B tranches dog poop?

17. What is meant by Jared’s analogy about “standing in front of a burning house and offering fire insurance on it”? Who are the sellers of fire insurance in this scenario?

18. What do they say Deutsche Bank does when the market thinks a bond is too risky to find buyers for?

19. How can a bunch of BB and BBB bonds get an AAA rating when bundled? How can this be?
Appendix E: Critical Thinking Exercise 5 (continued)

20. What is a collateralized debt obligation (CDO)? Use your own words rather than quoting Anthony Bourdain.

21. Who is accused of being “asleep at the wheel”?


23. What is Jamie and Charlie’s strategy? How much had their fund already made at this point? What kind of annual return is that (assume they have been in operation for 4 years)?

24. Who is Mark Baum and what does he do?

25. What is Mark’s “team” doing in Miami? What do they find?

26. Who is Ben Rickert?

27. When the investors confront Mike Burry they ask how Burry can know more than Alan Greenspan and Hank Paulson. Who are they?

28. Mike’s investors complain about the insurance premiums he is paying on the credit default swaps (CDS) he bought. What percent is $80-90 million on a $1.3 billion position?

29. What do Mark and his team observe in Las Vegas?

30. What did the mortgage brokers they meet in Las Vegas do before they became mortgage brokers? What does this imply?

31. What kind of mortgages are the brokers involved in? According to them, do mortgage applicants ever get rejected?

32. What are NINJA loans?

33. What does Mark think the mortgage brokers are “confessing” to doing?

34. What does Mark’s conversation with the Las Vegas stripper suggest about the mortgage market? What is Mark’s conclusion? Based on his conclusion, what action does Mark take?

35. What contradiction is happening on January 11, 2007?

36. What does the woman at Standard & Poor’s say when asked why they haven’t downgraded the mortgage backed securities even though the subprime mortgages are losing value? Are there indications of conflicts of interest in her statements? Explain.

37. Why do Jared Vennett and Mark and his gang go to the American Securities Forum meeting in Las Vegas?

38. Who else is there? Why?

39. What does Mark Baum say the probability of subprime losses being confined to 5% is?

40. What does Charlie think might be true about the AA tranches?

41. What does it mean to bet against the American economy?

42. Does Mr. Chau represent Merrill Lynch or investors? What is the alleged conflict of interest here?
Appendix E: Critical Thinking Exercise 5 (continued)

43. According to Mr. Chau, as a result of CDOs on CDOs, how much money could be dependent on the value of $50 million in CDOs? How much leverage does the mortgage insurance market have relative to actual mortgages?

44. What company files for bankruptcy on April 2, 2007? What did this company do?

45. Why does Kathy of Morgan Stanley presumably want Mark to sell his shorts to Morgan Stanley?

46. What company announces it is liquidating two hedge funds on July 31, 2007?

47. Why are all the big banks suddenly having systems failures, power outages, and crashed servers?

48. How can an insurance contract’s value not be affected by the demise of the very thing it insures?

49. What is the TABX?

50. What do Charlie and Jamie think the big banks are doing at this point? What do they do about it? Does it work?

51. What’s the bad news that Jared delivers to Mark from the executive bathroom?

52. What does Mike accuse Goldman Sachs of doing?

53. What did Bennie Cleager do? What happened to him?

54. When Mark finds out he has “bet against himself”, what do he and his team do?

55. Who has swaps they bought from the now near bankrupt Bear Stearns?

56. How much is Ben able to get for Charlie and Jamie’s $205 million in credit default swaps (CDS)? Is this a good deal for Charlie and Jamie?

57. How much does Mike get for his $1.3 billion in CDS?

58. How much of a bonus does Jared Vennett get from Deutsche Bank NY?

59. When Mark takes the stage with Bruce Miller, what does Mark accuse Wall Street of doing?

60. What are his friends following on their cell phones?

61. How much had Mike’s Scion fund made for investors when he closed it down? Show dollar amount and return.

62. What does Mark conclude about the big banks? What does Vinnie say?

63. Was Vinnie right in predicting that some bankers would go to jail and the big banks would be broken up?

64. What does Mark predict people will do in a few years?

65. How much did Mark and his team make shorting the bank stocks?

66. What happened to the American people?

67. Who was your favorite character in the film and why?

68. What do you think is the most important thing you learned from the film?