

# Enhancing Critical Thinking in Corporate Finance at a Christian University

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**ABSTRACT:** Critical thinking is one of the key components to higher education. Before covering specific decision-making areas involving capital budgeting, a lecture is presented in which various critical thinking ideas are outlined. The primary focus is on logical fallacies. We have developed a presentation which encourages students to examine the importance of critical thinking skills that are usable in both undergraduate and graduate corporate finance classes. The lecture could easily be modified for use in any business discipline where critical thinking and logical flaws is relevant.

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## INTRODUCTION

Critical thinking is one of the key components to higher education (Wood, 2012). The typical corporate finance textbook contains a chapter on capital budgeting investment decisions (Ross, 2014). Before going through the specific decision-making areas in finance, a lecture is presented in which various critical thinking ideas are outlined. Thus, we have developed a presentation that encourages students to examine the importance of critical thinking skills that are usable in both undergraduate and graduate corporate finance classes. The lecture could also be used in any business discipline where teaching critical thinking and logical flaws is relevant.

In pursuing this goal, students are asked to read chapter 5 of *The Mind of the Market* (Shermer, 2008). This provides students an introduction of critical thinking in general, as well as specifically addressing issues in behavioral finance. We have composed a PowerPoint presentation which presents some of the key points of the Shermer chapter. (The PowerPoint is available from the author.) It includes a variety of multimedia interactions that help illustrate the important points.

## LITERATURE REVIEW

Some background is necessary to understand why critical thinking should be taught as part of a finance course. Most finance instructors do significant implicit teaching of critical thinking skills. This assumes that students already know how to use the tools, which is often not the case. Therefore, one of the key goals of a finance class should be explicit instruction. This is defined as being able to clearly identify and define skills and processes (Abrami, 2008). Explicit instruction shows an understanding of when and how a skill or process is to be used (Beyer, 1998). Critical thinking is an important part of business and finance; without critical thinking one might not be able to clearly express and demonstrate skills and answers needed by the company or client. The use of critical thinking sheets are helpful for introducing new skills and provide excellent examples of how to act upon answering the what, why, when, and how questions.

Implicit instruction is quite different from explicit instruction. For implicit instruction, the professor does not have to introduce the critical thinking concept to the students. Mentioning the skill without any stipulation is

all the students will need because they are already familiar with how they need to utilize the skill. This is seen often in classroom settings. Once the professor has taught his/her students, they will be able to put their critical thinking skills to good use. However, it is necessary that the students know how to use the skill and that it is not assumed they know more than they do.

One approach to exercising critical thinking skills is through dispositional instruction. Being willing, motivated, and intent on engaging in solving problems and making decisions through the use of critical thinking is what defines dispositional instruction (Facione, 2004). Critical thinking skills can be implemented in three different ways. The first is inquisitiveness. Students who practice inquisitiveness are seeking a clearer understanding of a thesis or question. The next way is with open-mindedness. Students who practice and implement open-mindedness learn to withhold judgment when reasons or evidence is insufficient. Finally, critical thinking can be implemented systematically. By developing systematic critical thinking skills, they will be able to deal in a more orderly fashion with parts of an issue or problem. Dispositional instruction is not only seen in the world around us but can also be seen through the Bible in Acts 17:11 and 1 Thessalonians 5:21. These verses demand us to look for what is good and to look within Scripture for the answers. God has given us the Bible as a tool to test what is right and wrong and to guide us morally throughout life. These verses involve the use of inquisitiveness, open-mindedness, and systematic thinking.

Critical thinking involves transfer instruction, which contains both low and high types of transfers. A transfer instruction is defined as being able to apply one's learned skills to new problems and situations (Halpern, 1996). Low transfer is defined as the application of a previously learned skill to another relevant area, while a high transfer is defined as the application of that skill to other areas of life or experiences. Low transfer also includes developing retrieval clues that are independent of the content material. These skills can be observed and implemented through applying the skills to content material, critical thinking outside of the classroom, and in everyday life (Haskell, 2001).

Metacognitive instruction is seen as a technique of critical thinking which involves planning, monitoring, and assessing of one's own thinking. These three components help with the use of knowledge or skills that have already been acquired through the years which can be used when employed (Beyer, 1998). These components help students be successful in the workplace and allow the effective demonstration of the skills gained through critical thinking over a lifetime.

Helping students apply critical thinking skills using step-by-step processes and problem-solving to explain different ideas is known as guided modeling and practice (van Gelder & Bissett, 2004). By receiving helpful and specific feedback along with encouragement to use metacognition, students will be able to make connections to solve new problems and be able to improve those skills learned through guided modeling. Guided modeling is useful for helping students quickly learn on their own how to think critically and put it to good use for life skills and within the workplace.

Supportive instruction is one way to facilitate difficult learning objects (Reeve, 2006). This is seen and observed in numerous areas such as the workplace, schools, and businesses. There are numerous methods in which one can facilitate learning difficult objectives. PowerPoints, handouts, group discussions, and video instructions are seen as helpful and useful learning methods and tools for provoking critical thinking.

Critical thinking relies on these questions: Why? When? How? What? Who? Professors are better able to help students understand the material conceptually at all four levels of knowledge (Humkins, 1989). When both student and professor ask these questions, both are able to help each other learn how to critically think about what is being taught or discussed in class.

Teaching critical thinking can be evaluated through formal quizzes and tests, assigned projects, and a review of critical thinking skills (Angelo & Cross, 1993). This is defined as evaluative instruction. Instruction that is evaluated in a specific and measurable manner provides an objective way to evaluate the continual process of critical thinking. The education system is one of the biggest structures that uses evaluative instruction to measure students' continual process of critical thinking.

In order for instructors to help teach critical thinking, they must use supportive motivation. A professor must develop and facilitate intrinsic motivation to help students think critically and thrive. By using motivation techniques such as love, cheerfulness, cooperation, and control, individuals can help promote critical thinking in a positive light.

## COURSE OVERVIEW

Critical thinking is one of the major emphases of corporate finance. There are five critical thinking skills explicitly introduced into the course (Appendix A). Each skill is introduced during a time which fits with the appropriate content. A skill sheet is given to each student so that the

topic is explicitly introduced. That particular skill sheet is given to the students when covering chapter 9 of the textbook (Appendix B). Critical thinking dispositions are also introduced during the course (Appendix C). Dealing with logical fallacies is the focus of this paper. It is important to note that several of the critical skill components work in tandem, for example, logical fallacies is used with analysis.

The goal of introducing logical fallacies is to help students spot ideas and assertions that are founded on erroneous perceptions. Developing the ability to spot logical fallacies allows students to identify elements of an argument that are based on bias. This, in turn, leads to better information being used to make decisions. Finance decisions are often affected because people make errors in the decision-making process (Shermer, 2008).

There are four major categories of fallacies that are introduced. The first is appealing to emotions. This might be any appeal to pride, pity, or tradition. Often, these can be subtle ways of making a person feel inferior if they don't agree with the argument. There is the use of inaccurate information, which includes any sort of false dichotomy, slippery slope, extrapolation, or part/whole argument. There is the use of incomplete information including the use of weak analogies or comparisons. Using a Straw Man is common. Finally, there is the use of illogical reasoning. This includes circular reasoning and false causality.

### LOGICAL FALLACIES LECTURE

The presentation begins with the Endowment Effect, which occurs when more value is placed on something we ourselves own versus its intrinsic value. A clip from an episode of *Pawn Stars* is shown to illustrate the logical fallacies concept. The person in the pawnshop wants to sell something but is not getting the desired price. The person says something such as, "It's worth more than that to me." The Endowment Effect can similarly be found within religious literature and Scripture. "Again, the kingdom of heaven is like a merchant in search of fine pearls, who, on finding one pearl of great value, went and sold all that he had and bought it" (Matthew 13: 45-46). This verse portrays God as the pearl of great value. We as "merchants" go out seeking to find a great "pearl" which will bring us great joy and value. Once we have found that "pearl" (God), we will place all of our value in it. There is of course no price tag on the value of God, but his value goes beyond all worldly riches and makes the point of the endowment effect.

The next topic explores the difficulty of the human mind comprehending extreme magnitudes. For example,

things that are extremely large or small are hard to conceive. This is also true when something is inordinately fast or slow. Discussing the U.S. government debt of around \$16 trillion demonstrates the issue. Most people have no comprehension of the magnitude of this debt. In fact, most undergraduates in corporate finance do not have a solid comprehension of the amount of cash a company such as Apple Computer holds. Another example is that most Christians, even those who do not believe in Christianity, are unable to comprehend the power of God. "In the beginning, God created the heavens and the earth. The earth was without form and void, and darkness was over the face of the deep. And the Spirit of God was hovering over the face of the waters" (Genesis 1:1-2). This first verse in the Bible highlights extreme magnitudes. We are unable to even comprehend how powerful and big the God of the universe is, let alone understand when or how God created the earth and heavens. The discussion involves learning ways to think through and help others comprehend things of unusual size or speed. One point that is expressed is that a financial manager needs to be able to help others understand large numbers.

Confirmation bias occurs when a position is taken and then evidence is found to support it. Often, an emotional decision is made and then a person works backwards to confirm the belief. For example, when Jesus rose from the dead, many didn't believe what Mary Magdalene and the other Mary were saying. All the disciples saw Jesus die on the cross and didn't believe Mary Magdalene and Mary when they told them that the tomb was empty and that Jesus had risen. Likewise, the guards believed that the disciples had stolen his body so that others would believe he had risen on the third day. Each person displayed confirmation bias by taking a position before they found evidence to support such claims. The hindsight bias is also discussed, especially as it pertains to seeing market crashes looking back. When the 2008 stock and real estate markets fell, there was significant talk about how that was predictable. Time and time again in finance, people look back and feel something should have been predicted.

A common bias that has been made by most everyone is self-justification. This bias is defined as interpreting in a way that makes us look good. By making a self-justification bias, we tend to filter out contradictory data leaving only the evidence that supports our decision. Once perceived incorrect data have been filtered out, people are able to justify claims by saying the evidence found is correct, even if the wrong data were used. The self-justification bias occurs on a daily basis which can cause issues within the workplace, schools, and homes. For example, in Matthew 12:2-14, the passage shows how the Pharisees acted out their self-justification.

The Pharisees were looking for fault within Jesus for his work on the Sabbath. They found it unlawful that Jesus and his disciples were not acting in a manner like themselves. However, the Pharisees filtered out most of the data which contradicted their statements about what was holy and unholy on the Sabbath day, leaving them with a distorted view and a self-justified bias of their work. By ignoring all other relevant data to prove our point and show the data that represents what we want to be shown, bias gets in the way of what is essentially true.

Attribution bias is another error in the way people think about themselves and others. Attribution bias is how a person interprets behavior. We all tend to favor ourselves and attribute our good fortune to hard work and intelligence. For instance, if we receive an award or a good grade we tend to attribute it to our hard work and dedication. However, if we see another person receive an award or a good grade, we tend to attribute their good fortune to luck and circumstances. Similarly, attribution bias occurs when bad things happen. For instance, if we lose a game we blame the referee for the unwise calls made during the game. However, if we win the game, we express to others that it was due to teamwork and being a superior team. For example in Job chapter 3, Job blames his birth for being the cause of all his pain. If he were not born then he would not have experienced the death of his family, sores, and homelessness. His bad luck came from his birth and lead to his being tested. However, at the end of Job we see that because of Job's faithfulness God rewarded him tenfold and blessed Job's latter days more than his beginning days. Job regained his riches and favor with God because he was continuously faithful, not because he got lucky.

We may not think of this bias as an issue, but it does cause us to look at others differently. By letting our attribution bias carry over into the workplace we can allow for an unhealthy work environment. By assuming that we are a better worker or smarter than our colleagues, we may create the possibility of poor teamwork in the future and conflicts among co-workers.

The lecture includes a discussion on contingency vs. necessity. *Clips from A Wonderful Life* and *Back to the Future* are shown to help students with this concept. This deals with the idea of rerunning the last 20 years, for example, and asking the question would everything have turned out the same. If the answer is yes, then it is a necessity. If not, then it is a contingency. This is more of a philosophical or theological topic, but it is something students need to be aware of as part of critical thinking.

There is an exercise designed to help students understand macro-level thinking versus micro-level thinking. Just

about any college campus will have a set of sidewalks and areas of grass that are matted down due to heavy foot traffic. Students are asked to identify these areas and the opportunity is taken to explain that the macro thinkers place the sidewalks where they believe people will walk. The micro thinkers took the most direct path to where they were going regardless of where the sidewalks lead. The wise thing to do is let students walk on the grass for a couple of years, and then place the sidewalks appropriately.

This lecture becomes a great time to do some quick review of statistics. Specifically, things such as R-squared and type I and type II errors are reviewed. The issue of randomness is also discussed and a reference is made back to issues of efficient markets that were covered earlier in class to reinforce those ideas.

Once through the lecture, it will naturally connect to the content in the corporate finance chapter referenced earlier on capital expenditures (Ross, 2014). The chapter in the text is a discussion of such things as sunk costs, opportunity costs, forecasting risk, etc.

The idea of the lecture is not to convince students of any particular ideology, but to get them to examine bias and thinking errors so they become better decisions makers in general as well as begin to master the processes taught in finance that lead to a strong foundation in decision-making. The instructor's role is to make sure students are explicitly learning critical thinking and demonstrating appropriate dispositions.

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#### APPENDIX A: SELECTING AND SEQUENCING CRITICAL THINKING SKILLS

Select Five Thinking Skills to Teach	Locate in Syllabus where to <b>Introduce</b> the Thinking Skills <b>Explicitly</b>	Indicate the <b>Content Areas</b> to Have students <b>Practice</b> Thinking Skill in	<b>Sequence your Five Skills</b> in the order you will present them for the first time.
<b>1. Comparing &amp; Contrasting</b>	<b>Chapter 3: 9/6/13</b> Comparing and contrasting the performance of a corporation based on financial ratios	<b>Financial Ratio Analysis</b>	<b>First</b>
<b>2. Logical Fallacies</b>	<b>Chapter 9: 10/21/13</b> Introduction to appropriate data & information for capital budgeting (investments)	<b>Making Capital Budgeting Decisions</b>	<b>Third</b>
<b>3. Hypothesis Testing</b>	<b>Chapter 10: 10/28/13</b> Using the Efficient Market Hypothesis	<b>Efficient Market Hypothesis</b>	<b>Fourth</b>
<b>4. Analysis</b>	<b>Chapter 17: 9/16/13*</b> Credit analysis: Determining which customers should be allowed to borrow	<b>Use of Credit</b>	<b>Second</b>
<b>5. Decision Making</b>	<b>Chapter 13: 11/6/13</b> Determining if a corporation should borrow money to make an investment	<b>Leverage (borrowing)</b>	<b>Fifth</b>

\* I do not cover the chapters in order



**APPENDIX B: IDENTIFYING LOGICAL FALLACIES****What is meant by the skill of identifying logical fallacies?**

It means to spot ideas or assertions founded on erroneous logic or perception.

**Why use this skill?**

It helps you to sort out elements that are presented in an argument that are not logical support for the argument. This allows you to gain the best knowledge to make good decisions.

**When should this skill be used?**

1. When you analyze any (supposed) argument or effort designed to persuade someone.
2. When you are developing your own argument to convince others.
3. When you are determining if there is a problem that needs to be solved.

**What other skills are needed?**

1. Analyzing an argument
2. Developing a sound argument.

**How do you use this skill?**

1. Identify the claim or conclusion being asserted.
2. Identify the premises being used to support a conclusion.
3. Determine the logic of the connections between the premises by asking the following questions (a-e). Choose the area that the problem exists under.
4. Choose the type of fallacy being used that is listed below each question.

***Is there an appeal to your emotion without supportive reasoning?***

1. Appeals to pride
2. Appeals to pity
3. Appeals to tradition
4. Put-downs

***Is there an inaccurate use of information?***

1. False dichotomy
2. Slippery slope
3. Part/Whole argument

***Is there an incomplete portrayal of information?***

1. Weak analogies
2. Incomplete comparisons
3. Card-Stacking
4. Straw Man

***Has illogical rationale been given?***

1. Irrelevant reasons
2. Circular reasoning
3. Appeals to ignorance
4. False Cause
5. Knowing the knowable

\*\*\* See sheet on the definitions of logical fallacies listed above.

**Example of identifying logical fallacies**

*Case studies for identifying logical fallacies using the steps mentioned above.*

***Guided Practice:***

EX: California State University is the best school for you. It has a better computer major than Colorado State and is cheaper than Harvard.

1. Identify the claim or conclusion being asserted.  
*You should attend California State University*
2. Identify the premises being used to support a conclusion.  
*It has a better computer major than Colorado*  
*It is cheaper than Harvard*
3. Determine the logic of the connections between the premises by asking the following questions (a-e). Choose the area that the fallacy would be within.  
*Is there an incomplete portrayal of information?*
4. Choose the type of fallacy being used that is listed below each question.  
*Incomplete comparison*

Only the computer department is being compared between two schools and finances are only compared between one school.

**Practice Problems:**

1. Walter Cronkite buys his clothes at Snooty Brothers. He is a man who knows. Shouldn't you be shopping here, too?
2. Gold has gone up from \$200 an ounce to \$1300. Therefore, it is going to \$5000.
3. You will get better tasting cake with Happy Homemaker Cake Mix

***Is there an appeal to your emotion without supportive reasoning?*****Appeals to pride**

Praises or flatters a person to get them to do or believe something.

Example: "This is only for a few people and you have been picked because of your outstanding qualities."

**Appeals to pity**

A propaganda technique that appeals to your compassion rather than to your reason.

Example: "I am just a poor college student working my way through college so you should buy my product."

**Appeals to tradition**

A propaganda technique that utilizes the reasoning that what has been done before is best.

Example: "We should have Sunday School at 9:30 because we have done it that way for 100 years."

**Put-downs**

Belittling an opposing point of view with no evidence to make it hard to accept.

Example: “Only a fool would choose that major.”

***Is there an inaccurate use of information?*****False dichotomy**

Making an issue black or white when there are many options to consider

**Slippery slope**

Once you take one step in a given direction, you will continue to go in that direction until tragedy takes place.

**Part/Whole argument**

Reasoning that says that because part of what the person is saying is wrong, all of what the person is saying is wrong.

***Is there an incomplete portrayal of information?*****Weak analogies**

An analogy in which all the important attributes of an issue are not illustrated by the comparison.

**Incomplete comparisons**

A comparison where only half the aspects of the comparison are mentioned

Example: “This soup is much better.”

**Card-Stacking**

A propaganda technique that omits important information that might support an unflavored view

**Straw Man**

A propaganda technique that gives only a weak form of the opponent’s argument so you can set it up and knock it down easily

***Has illogical rationale been given?*****Irrelevant reasons**

Providing premises that do not support the conclusion even though they are true

**Circular reasoning**

Providing premises that just restate the conclusions

**Appeals to ignorance**

An argument in which the premise involves something that is unknown.

**False Cause**

When one argues that just because two events occur together or follow one another that one event caused the second event.

**Knowing the knowable**

Making claims that one cannot know.

Example: “Unreported rapes have increased dramatically.”

**APPENDIX C: SELECTING APPROPRIATE CRITICAL THINKING DISPOSITIONS**

Select Dispositions you desire to Teach	Locate in Syllabus where to Introduce the Dispositions Explicitly	Indicate the Content Areas to Have students Practice Critical Thinking Disposition in	Sequence your Disposition in the order you will present them in for the first time.
1. Truth seeking	Chapter 16: 9/16/13	Cash flow accuracy	Third
2. Inquisitiveness	Chapter 1: 8/30/13	Introduction to topics in corporate finance	First
3. Analytical	Chapter 3: 9/11/13	The DuPont Analysis	Second
4. Systematicity	Chapter 5: 9/27/13	Comparing corporate bonds returns to tax-free bonds for analysis	Fourth
5. Open-Mindedness	Chapter 13: 11/6/13	Leverage (the use of debt). Sometimes debt makes sense for a corporation	Fifth
6. Critical Thinking Self-confidence	Chapter 12: 11/15/13	Deciding how much risk to take on	Sixth
7. Cognitive Maturity	Chapter 15: 12/2/13	Taking a company public	Seventh