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Case Article

You Can't Take It with You

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Abstract. The primary goal of the accompanying case study, “You Can’t Take It with You,” is to help business students develop better problem-solving skills. Teaching quantitative courses to students not in a STEM (science, technology, engineering, mathematics) discipline can be a challenging task. Using concrete examples with spreadsheets is an effective teaching strategy that appeals to many business students. This case study offers a concrete and relevant exercise using the base package of Excel. It is multidisciplinary and flexible in its delivery, allowing instructors to effectively integrate it into their course(s). Topics that may be covered include simulation, data analysis, and the time value of money. Advanced Excel functions that may be used include PMT, NORMINV, VLOOKUP, Scenario Manager, Data Table, and Goal Seek. Overall, students believed the case was challenging and that it was a valuable learning experience.



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Supplemental Material: The Teaching Note and final solutions file are available at <https://www.informs.org/Publications/Subscribe/Access-Restricted-Materials>.

Keywords: retirement planning • time value of money • simulation • advanced Excel

Motivation

Business students today must have a higher degree of technical skills than was required of them in the not too distant past. This change in skill level is brought to the forefront in an often-cited study by McKinsey Global Institute and is well publicized in the popular press. It was predicted that by 2018 there would be a talent shortage of nearly 1.5 million for business analysts with the necessary skills to analyze and exploit “big data” (Manyika et al. 2011). McKinsey has since updated these projections to be between two and four million over the next decade (Henke et al. 2016). People currently in the workforce are also affected. A Chicago-based recruiter of analytics professionals stated that MBAs without a quantitative foundation will not be considered promotable (Horner 2014).

A consideration specific to nontechnical audiences is that it is usually best to lead with concrete examples before presenting generalities. Fewer people grasp concepts when presented in the reverse order (Moore 2001, Burch et al. 2015, Grossman et al. 2016). Some leading educators suggest that the best way to present concrete examples is to use spreadsheets (Albright and Winston 2015, Grossman et al. 2016, Ragsdale 2018). Spreadsheets typically decompose complex

equations into bite-sized pieces, allowing students to digest them one cell at a time.

One final comment, concerning motivation, is the need to continuously revise and create new case studies. Changes in business practices cause some case studies to be irrelevant, making way for new studies with new practices. A more compelling reason, however, is to combat the unfortunate practice by individuals who sell answers to popular case studies on the Internet. One way to fight this battle is to continuously produce new case studies.

The need for business students to improve their quantitative skills is now established. A brief review of the literature is followed by a description of the case and its design, student learning objectives, and reviews of the classroom experience.

Literature Review

A review of case studies published in *INFORMS Transactions on Education* was conducted. This publication was selected because it is a repository for problem-solving cases as opposed to strategy-type cases. At the time of this writing, a search on the words “Case Article” produced 39 results, each of which were reviewed for topics covered and skills required to solve them. Of the five cases that directly mentioned simulation as a

skill (Shumsky 2009, Keller and Bayraksan 2012, Dillenburg 2016, Chambers and Williams 2017, Rajan and Ravichandran 2017), two did not use Excel; of the remaining three, one uses an Excel add-in and two require advanced statistical knowledge. This case study is different because it is designed to use base package Excel functions and a basic knowledge of statistics.

Leong and Cheong (2008) suggest that the critical feature of a course is the set of exercises used. Retirement planning and the time value of money are both listed as essential class exercises in their appendix. There are many retirement planning cases available for classroom use; only a few are examined to differentiate the work found herein. Powell and Baker (2016) offer a one-page textbook case about a 46-year-old professional. Most information needed to devise a retirement plan is provided in the case, and links are provided to investigate questions such as social security. Ragsdale (2018) offers a case based on a 59-year-old widow contemplating retirement. A different angle he uses is to make her death a random variable. Grace et al. (2016) offer a case about a Canadian graduate student who is helping her parents review their retirement possibilities before they turn 65.

Common dilemmas faced in most, if not all published cases, concern when funds will be depleted, how much can be withdrawn, and how much needs to be accumulated in savings before retirement. A distinguishing factor across many cases is typically the lifestyle of the protagonist, their goals, and their age. Our case includes a millennial and a baby-boomer, allowing for discussions to compare and contrast the differences. For example, each protagonist has a different view on forming a budget, one of which adopts the philosophy to make do with what they have. Another distinguishing factor among published cases is the recommended solutions; some are simulation-based, others deterministic. Depending on the objectives of the instructor, this case may be presented using either approach—it should be noted that other cases provide this option as well.

A final distinguishing factor is the level of difficulty, which instructors can control. This case is designed for data-savvy managers, not data scientists. “Data-savvy managers” is a term used by the McKinsey Global Institute to describe professionals trained as consumers of big data (Manyika et al. 2011). Their mathematical aptitude is much lower than that required of a data scientist. Prerequisites for this case are kept to a minimum (i.e., introductory level Excel, basic probability and statistics). At the same time, the flexibility of the course allows instructors to increase the level of difficulty by using more sophisticated tools and/or changing the presentation of the case.

Case Description

The theme of this case is erroneous retirement planning. The case is composed of two parts, each based on a person who is at a different stage of life. Although there are differences across generations, a common goal is to maintain one’s lifestyle during retirement, which according to several active financial advisors is very typical. Another goal, which both Marsha and Matt express, is to spend all the money they have earned over their lifetime before they die, thus the title “You Can’t Take It with You.” The feasibility of these goals is examined during the analysis of the case.

The first part of the case is about Marsha, a 65-year-old baby-boomer planning to retire in the next few weeks. She is a millionaire and expects to have a small pension and social security to supplement her savings. She is shocked when she finds that she will not be able to maintain her current lifestyle and needs to find a workable solution.

The second part of the case focuses on Marsha’s nephew, Matt, a millennial. He is a recent college graduate and will be starting his new career in a few weeks. Matt has learned that he needs to start retirement planning early. He drafts a quick budget, inserts a few major life events, and copies his formulas down on the spreadsheet until he has accumulated more than two million dollars—a reasonable nest egg by his estimates. Matt’s final step is to calculate withdrawals for an average life span. Matt, like his Aunt Marsha, is shocked when he realizes he will run out of money. Matt faces a similar dilemma but has more time to remedy the situation.

Case Design

Case studies are a common pedagogy in business classes. Many management science textbooks contain short, end-of-chapter cases (Albright and Winston 2015, Taylor 2016, Heizer et al. 2017, Ragsdale 2018). In addition, business schools such as Harvard, Darden, and Stanford also publish case studies for MBA programs, which tend to be more complex and longer than those found in textbooks. The combined length of the two-part case, “You Can’t Take It with You,” is five pages, placing it somewhere between the shorter, end-of-chapter cases and the longer business school publications. Depending on an instructor’s presentation, it may be presented in a manner that requires students to do research. For example, an instructor may ask students to accept all information as given or ask them to question certain assumptions and suggest alternatives.

Our case study is inspired by real events on the one hand but fictional on the other. Marsha is a personification of one of the authors, and Matt is based on

characteristics typical of a millennial. Orchard (2019) debates the merits of case studies based on actual versus fictional events. He argues in favor of fictional case studies, citing the highly successful book *The Goal* (Goldratt and Cox 2004), which takes place in a fictional setting. He also shares comments from students who say they just want cases to “seem realistic.”

This case includes the top three factors (critical thinking, story, and relevance to students) faculty ranked as important in selecting a case study (Herreid et al. 2016). First, the level of critical thinking required depends on the delivery and objectives of the instructor. For example, an instructor may ask students to simulate investment returns using a specific distribution or instruct them to identify variables with the most uncertainty and model them appropriately, thereby forcing students to be more creative with their solutions. Second, our case is presented as a story and not just a problem with numbers to calculate. Marsha has a lifestyle that she wants to continue into retirement, and we know her lifestyle: vacations, parties, and her pet Charlie. Finally, our case is viewed as relevant to students. One student replied in an evaluation of the case:

While it was still a controlled and limited case study in a classroom, it was about something realistic we all need to think about at some point. It was not only a valuable part of learning how to simulate situations and evaluate variables, but good real life food for thought. It made me want to create a budget now and start investing as soon as I pay off my loans. This aspect lends more weight and importance to learning the technical parts of it.

This case study is designed to be multidisciplinary and flexible in its delivery. Student learning objectives, therefore, depend on the course for which it is used. Instructors may also choose to assign it at the end of a course as a project or in parts throughout the course as homework. This flexibility was tested in two different courses by two different professors with successful results.

Student Learning Objectives

The objectives that follow are for a spreadsheet modeling course for which a basic Excel course is a prerequisite. These objectives are stated in general terms and may apply to other courses as well.

Students will:

- Visualize the effects of the time value of money.
- Demonstrate proficiency using advanced spreadsheet functions.
- Simulate the effects of variability and compare results using average values with those based on random numbers.
- Demonstrate good design principles in spreadsheet modeling.

One objective deserves extra attention: visualizing the effects of the time value of money. This case study provides a concrete example for the concepts of present and future values. Students often nod their heads to the idea that a dollar today is not worth the same tomorrow. They also will nod to the fact that a loaf of bread costs more today than it did yesterday. It does not actually register, however, until they see it evolve year by year over an extended period of time.

Classroom Experience/Student Feedback

This case was originally written for a spreadsheet modeling course, but it soon became evident that the artificial boundaries are not necessary. The first obvious extension was to finance, such as introductory finance or financial literacy. As word spread, other instructors commented about its usefulness for topics they already covered in their courses, such as the solvency of Social Security. Prerequisites and student feedback are summarized in the paragraphs that follow for courses in which the case was tested by the authors.

Spreadsheet Modeling Course

Both cases were used in a spreadsheet modeling course that is required for Business Analytics majors and available to other students as an upper level elective. A topic covered in the course is simulation. Students used base Excel functions to simulate expected market returns and observe the effects. A course in finance was not a prerequisite, although students with a finance background had an easier time understanding some of the concepts. It is advised that students have basic Excel skills before using this case, so that advanced functions are the focal point.

Students worked in groups of four to complete the assigned questions and shared their findings with the class. A one-page written summary to each client was also submitted for a grade.

Students were surveyed about their learning experience and the level of difficulty. Overall, they believed they learned a lot (4.6 on a scale of 5). Comments about what they learned varied, but most students liked the real-world application. One student expressed surprise to learn that “people pay more than their house is worth” when they finance it! Another student commented during the discussion that “There is no way someone would spend twice as much in retirement than they did when they were younger!”—he was referring to Marsha’s expenses when she was 90 years old. Thankfully, another student brought up the idea of inflation. Overall, students thought the project was not “too difficult” but challenging (4 on a scale of 5). One student remarked, “If this project were easy, I wouldn’t have learned anything.”

Introductory Finance Course

Both cases were assigned to a class composed of students majoring in business. Students worked in groups at home, and one section of in-class discussion was led by the instructor as a follow-up. The work was not graded, but completion with best effort was rewarded with extra credit. It turned out that everyone in the class completed it with satisfying results.

Overall, students believed this extra work gave them an insight on how the concept of time value of money is applicable to many different aspects of their life now and in the future. With intense quantitative case study questions, students felt it was quite challenging compared with other time value of money problems they had in class. In the meantime, they also admitted it makes them learn from a more practical perspective. When surveyed in class about what they learned and what advice they would give to their parents as well as themselves, one student commented, “I would tell my parents to start saving early, making wise investments, and most importantly, don’t count on Social Security for their retirement years.”

Personal Financial Literacy Course

Both cases were used in a personal financial literacy course that is offered to students campus-wide at all academic standings. Marsha’s case was assigned around the middle of the term, whereas Matt’s case was assigned in the end of the term. Students worked in groups with a maximum of five. Students were required to submit their written report online and also bring in a hard copy for in-class discussion.

Students were surveyed on the difficulty level of the case, as well as what they have learned from the two cases. Overall, they expressed that the case helped them consolidate class material because it helped them visualize flaws in other peoples’ financial plans. One student commented, “I’ve never done a case study and I actually had no idea what it was. But after this, I thought it was a good learning experience to apply what we learned in class.” Another student pointed out that Marsha should downgrade her lifestyle in her retirement years, whereas Matt should make more modest assumptions to give himself a larger safety cushion when planning for retirement. Some students recommended “adding more realistic and complex details” to the cases. These comments indicate that the cases shed light on the way students reflect on different financial plans (including their own, even if they might not have one right now!) and encourages them to bridge classroom learning to life practice.

Conclusion

This case was developed to help business students develop better problem-solving skills and improve

their proficiency in Excel. It also helps them visualize the impact of the time value of money. In general, students appreciated the realism and relevancy of the case and believed it was a valuable learning experience.

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