JOURNAL OF
FINANCIAL EDUCATION

Vol. 50 Spring 2024 No. 1

EDUCATIONAL RESEARCH

CREATIVE PEDAGOGY

SPECIAL TOPICS

CASE STUDIES

Financial Education Association

INSTRUCTOR'S CASE SOLUTION

You can obtain a detailed case solution and class discussion guide to any case published in the *Journal of Financial Education* by sending a written request, including your email address, on university stationery to:

Richard J. Fendler, Editor
Journal of Financial Education
Robinson College of Business
35 Broad Street, Suite 1206
Georgia State University Atlanta, GA 30303
jfed@gsu.edu

PERMISSION TO COPY

The *Journal of Financial Education*'s mission includes the dissemination of educational research and teaching aids that will promote/improve the educational process. In keeping with that mission, the *Journal of Financial Education* both encourages and permits copying of any article, in any quantity, for classroom use. The Journal only requests that the *Journal of Financial Education* be given appropriate citation. This blanket authorization to copy for classroom use does not include any articles reprinted from other journals, in which case, permission to reproduce must be obtained from the original journal of publication.

Copyright 2024 by the Journal of Financial Education
Richard Fendler and Milind Shrikhande, Editors
ISBN 00093-3961

The Journal Staff

The Journal of Financial Education is published by the Financial Education Association (FEA). The Executive Director of FEA is Timothy B. Michael (michael@uhcl.edu). For information concerning subscriptions to the journal, please see: http://jfedweb.org/subscrib.html. If you have any questions about the Journal of Financial Education or about the contents of this issue, please contact the journal co-editors (Richard Fendler and Milind Shrikhande) at jfed@gsu.edu.

Students' Perception of ChatGPT and Other GPT Applications in Finance Education: A Preliminary Study

Farhad F. Ghannadian
University of Tampa

Uyen T. Le
University of Tampa

This research explored student perceptions of using ChatGPT and other GPT applications in finance education. The findings revealed a generally positive yet cautious student perception of the applications. Most students maintained at least neutral or positive ratings toward the tools even with their challenges or limitations. Familiarity with the tools seemed to enhance satisfaction by students' adjusting expectations and adaptation; increased satisfaction (e.g. tool improvements) would likely bring more usage. Ethical concerns emerged as a separate issue, not fluctuating with usage patterns or satisfaction levels. Despite ethical concerns, students generally advocated for proactive approaches, such as clear guidelines, integrated assignments, and plagiarism detection software, to integrate these tools into education instead of avoiding them. There were distinctions between finance and non-finance majors in usage; the former with lower usage in general and quantitative tasks, which might reflect differences in background knowledge; some students without prior knowledge might be misled by incorrect content. The current relatively high satisfaction and usage level likely suggested continued future use, supported by positive correlations. This article offers the first in-depth analysis of students' perceptions in finance education, which can inform future research for the development of tailored educational strategies for AI applications in finance education.

Keywords: ChatGPT, GPT application, Students' Perception, Finance, Education

Introduction

GPT (Generative Pre-trained Transformer) is an artificial intelligence technology specializing in natural language understanding and generation (ChatGPT, 2023). GPT applications used large language models based on GPT technology for various text-based tasks, including chatbots, translation, and other conversational applications. A foundation feature of GPT technology, the transformer architecture, is a self-attention mechanism which allows the tools to focus on the inputs' most relevant part when processing data sequences (Lopez-Lira & Tang, 2023). The GPT models, with millions or even billions of parameters, can learn from a vast array of context and data, and can transfer learning (knowledge) from one task to another related task, making them highly versatile and adaptable to a multitude of tasks. These tools are initially trained on extensive text data from the internet, then are "fine-tuned" for specific tasks such as chatbot functions and translation services, etc. They are designed to generate relevant, human-like text or answers to given inputs.

As of now, there are several notable GPT chatbot applications, including OpenAI's ChatGPT, Google's Bard AI and Microsoft's Bing AI, among others. Early versions of ChatGPT lacked autonomous learning capabilities and could not access the internet to acquire new data beyond their training, which ceased in September 2021 and early 2022. Any changes or improvements to ChatGPT require the direct involvement of the development team. However, as of the time of writing this article, significant upgrades have been made. One of them is ChatGPT's capability to use a "browser" tool to access a limited set of websites for information. While this tool doesn't provide real-time internet browsing fully yet, it underscores that the technology is rapidly evolving and advancing over time.

This rapid evolution of AI technology can imply the potential to revolutionize the way we interact with the world, for better or worse. The exact impact of these technologies on society as a world remains a question to explore in the time to come. However, research has shown that the GPT applications have brought changes and support in various areas. For example, in business, ChatGPT has been found to improve user satisfaction and benefits (Chu, 2023); or in finance, ChatGPT is expected to aid predicting stock market returns using sentiment analysis from news headlines (Lopez-Lira & Tang, 2023), and to assist with stock selection (Romanko et al., 2023). Impacts of ChatGPT have also been observed in healthcare, education, and a lot of other areas.

In education, the release of ChatGPT and similar applications have "caught the attention of educators worldwide"; "ChatGPT triggered a massive response on Twitter, with education being the most tweeted content topic" (Fütterer et al., 2023). While there have been considerable number of articles in literature exploring the impact of ChatGPT and other GPT applications on education in general and in certain fields of studies, there appears to be a lack of research focusing on student perceptions of using these tools in Finance education. To the best of our knowledge, our research is the first to explore this aspect, concentrating specifically on the perceptions of students within the finance discipline.

Finance education has its own distinct characteristic compared to other fields of study. It combines conceptual, theoretical knowledge and quantitative, numerical problem-solving, while being closely tied to real world case studies and everyday financial issues. Researchers have noted that ChatGPT performed differently in each subject area including finance, coding and math (Gill et al., 2023). Therefore, given the benefits and limitations of emerging AI tools like ChatGPT, their use in finance education needs to be taken with careful consideration. For that reason, our article tries to explore students' perception of using ChatGPT and Other GPT applications in finance education. We believe that understanding these perceptions is crucial, as these perceptions of technology are likely to influence intention, which in turn influences actual behaviors (Davis, 1989).

It's important to emphasize that this study does not seek to evaluate the advantages and benefits of such AI tools in education in general or in Finance education, in particular. Rather, it aims to explore the students' viewpoint of these tools. As previously mentioned, perceptions play a critical role in shaping behaviors. The findings from this article will contribute insights to the existing literature about ChatGPT and other GPT applications and make a first step in examining the perception of students in finance education. Furthermore, these results are expected to assist in informing future research to make policies for users of ChatGPT and other GPT applications.

Literature Review

The rapid advancement of technology has made its integration into finance education essential for staying current and enhancing the learning experience. To better understand how students adopt

and interact with new technologies, it can be helpful to consider frameworks like the Technology Acceptance Model (TAM), introduced by Davis (1989), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). These models highlighted key factors like perceived usefulness, ease of use, and social influence, which are essential in understanding technology adoption in educational settings.

Over time, various technological tools have been implemented to assist students in learning finance, ranging from innovative uses of Microsoft Excel and computer programming languages to specialized web applications. For example, Virmani (2022) discussed combining spreadsheets with internet browsers using R programming to create web applications for teaching complex finance topics like portfolio analysis and option pricing. West et al. (2021) emphasized the importance of integrating Bloomberg terminals into university finance curricula, recommending more in-depth use, staff training, and a variety of assessments. Lin (2021) introduced the "flipped classroom" model, which integrates advanced information technology to improve student engagement, knowledge and learning autonomy through a hybrid approach. These examples demonstrate the ongoing effort to integrate technology into finance education, as information-based teaching methods are more effective in practical finance and economics education (Zhai, 2020).

While numerous tools and ongoing classroom innovations have been incorporated and significantly enhanced finance education, the emergence of AI-powered applications like ChatGPT could represent an unprecedented new frontier if applied correctly. These applications not only complement traditional teaching methods but also offer dynamic, interactive, and personalized learning experiences. However, despite their potential benefits, they also present limitations and ethical concerns, particularly in finance education, where accuracy and precision are crucial.

In broader educational contexts, ChatGPT and other GPT applications are being used to support various aspects, including teaching, studying and research. OpenAI, the company behind ChatGPT, has suggested ways to utilize ChatGPT in classrooms, such as role-playing, creating quizzes, and teaching critical thinking. These methods aim to make education more dynamic, personalized, and accessible while promoting responsible AI use (Teaching With AI, 2023). Additionally, specific teaching cases and techniques have been developed to incorporate ChatGPT into education. For example, Zhong and Kim (2024) created a teaching case that utilized ChatGPT to generate R codes for data analysis, helping students to overcome programming challenges and focus on building business solutions.

In teaching, these tools can assist professors in creating materials, tests, evaluations, syllabus, etc. (Gill et al., 2023; Javaid et al., 2023). Javaid et al. (2023) noted that teachers can use ChatGPT to design lessons and instructional materials tailored to individual student needs and can save time by automating tasks like testing and grading assignments. Gill et al. (2023) observed that ChatGPT can aid in creating instructional content and act as an “online educator”. For students, the tools can serve as a valuable assistant, supporting them in the learning process (Dai et al., 2023; Javaid et al., 2023; Malladi, 2023). The applications can provide explanations, generate ideas, offer theoretical insights, assist with translations, etc. (Javaid et al., 2023). Dai et al. (2023) described ChatGPT as a “student-driven innovation”, “with rich potential to empower students and enhance their educational experiences and resources”.

In research, ChatGPT has been proven to be a useful asset, assisting idea generation, data identification, framework suggestion and literature review aid, etc. Dowling and Lucey (2023) found that ChatGPT can significantly aid finance research by generating ideas and identifying data. Its limitations lie in the literature synthesis and testing framework. The overall quality of output

depends largely on the researcher's expertise and input. Dowling and Lucey also suggested that these findings can be generalized across various research domains. Additionally, Cao and Zhai (2023) believed that the emergence of GPT-4 could greatly reduce the technical barriers facing finance and accounting researchers, allowing them to focus on the research and analysis of domain-specific problems in finance and accounting.

Despite these advantages, it's important to recognize that ChatGPT and other GPT applications have their limitations and raise ethical concerns, highlighted in current literature. One of the limitations is the potential for incorrect or biased responses (Gill et al., 2023; Malladi, 2023). Gill et al. (2023) pointed out the risk of Generative AI's possibility to provide inaccurate or false data and "hallucinations". Malladi (2023) when testing on a quantitative undergraduate finance exam, concluded that at this stage, these applications were not sufficient to pass the finance exam; future improvements are expected to improve these problems. Another concern about ChatGPT is the ethical issues, such as plagiarism (Gill et al., 2023). Dowling and Lucey (2023) discussed that the usage of ChatGPT in research can lead to an ethical implication regarding the attribution of credits in research study where ChatGPT or the like platform is used as a "research assistant". Chaudhry et al. (2023) conducted empirical tests to evaluate ChatGPT's ability to solve undergraduate assignments and examined the tool's outputs using plagiarism detection services like Turnitin and GPTZero. The findings revealed ChatGPT's ability to pass plagiarism detection software and highlighted the need for higher education institutions to reconsider their current practices for monitoring student learning and improving educational programs in response to these new AI technologies.

Overall, perceptions of ChatGPT in academia are mixed, with both excitement about its potential to enhance various aspects of education and concerns or skepticism regarding its limitations and potential negative impacts (Chemaya & Martin, 2024; Livberber & Ayvaz, 2023; Shoufan, 2023; Tossell et al., 2024; Valova et al., 2024).

Many educators and students recognize the value that ChatGPT brings, particularly in assisting with tasks like creating teaching materials, automating grading, and generating ideas. A study by Shoufan (2023) found that senior students in a computer engineering program generally found ChatGPT "interesting, motivating, and helpful for study and work," though some noted that using the tool effectively requires background knowledge and pointed out that the platform's answers are not always accurate. Interviews with 10 Turkish academics revealed that academics generally believe that ChatGPT will be a valuable tool in scientific research and educational processes and serve as a source of inspiration for new topics and research areas (Livberber & Ayvaz, 2023). These perceptions reflect a broader sentiment across academia, where ChatGPT is considered beneficial, yet with room for improvement, particularly in areas like accuracy and the potential for misinformation.

Despite the positive reception, concerns about ChatGPT persist, particularly regarding inaccuracy and ethical issues such as plagiarism, among others. Livberber and Ayvaz (2023) also stated concerns about plagiarism and misinformation. Ogurlu and Mossholder (2023) pointed out that while there is potential for ChatGPT to reduce workloads and enhance teaching quality, it must be used carefully to avoid compromising academic integrity. Chemaya and Martin (2024) noted that the tool has sparked discussions, with no uniform agreement yet, about the need for disclosing AI use in manuscript preparation and what specific uses of AI should be reported. While students have found ChatGPT valuable for learning, especially as a tool for revising manuscripts, they have also expressed concerns about its accuracy and reliability, and students preferred instructors using ChatGPT as a grading aid rather than relying on it entirely (Tossell et al., 2024). Educators have

also voiced concerns about the potential loss of higher-order thinking skills, overreliance on technology, and the risks of plagiarism. Holland and Ciachir (2024) further explored the varied perspectives on incorporating ChatGPT in the learning process, finding concerns about its impact on group work and the potential devaluation of degrees in the eyes of employers.

In summary, while ChatGPT has significant potential for enhancing educational experiences and supporting academic tasks, the enthusiasm for its use comes with concerns about its limitations and the ethical implications of its integration into academic environments. As academia continues to explore the potential of AI tools like ChatGPT, a balanced approach that addresses these challenges while leveraging the benefits will be crucial.

While there has been substantial research on the use of AI tools in general education and various fields, there is a notable research gap in understanding how these tools are perceived and utilized specifically within finance education. Existing studies have largely focused on the broader impacts of AI in educational settings, but none have specifically examined student perceptions of AI applications like ChatGPT in finance education, which is a unique field that combines conceptual, theorical knowledge and quantitative, numerous problem-solving, while being closely tied to real world case studies and everyday application. Research, such as that by Gill et al. (2023), also indicated that ChatGPT's performance varies across different subjects, including finance, coding, and mathematics. Therefore, this study addresses this gap by analyzing how finance students perceive these tools and what implications this has for their future use and integration into finance curricula. Specifically, this research seeks to answer the following questions: (1) How do students currently perceive the use of ChatGPT and other GPT applications in their finance studies? (2) What are the perceived benefits and challenges associated with these tools? (3) How do these perceptions influence the likelihood of future use and the integration of these tools into finance education?

Our method is to construct a survey to grasp students' usage, satisfaction and their view on the benefits, advantages, ethical concern and intented future use. This article does not seek to evaluate the advantages and benefits of such AI tools in education in general or in Finance education in particular, rather it aims to explore the students' viewpoint of these tools, as these perceptions of technology are likely to influence intention, which in turn influences actual behaviors (Davis, 1989). The outcomes of this will contribute to the current literature about ChatGPT and other GPT applications and be the first to examine the perception of students in Finance education. These findings are expected to assist in informing future research to recommend different policies for users of ChatGPT and other GPT applications. The methodology and results of the survey will be detailed below.

Methodology

The survey instrument was developed based on a comprehensive review of existing literature on technology adoption and student perceptions of AI tools. The questions were designed to capture a broad range of student experiences and perceptions related to the use of ChatGPT and other GPT applications.

Participants were recruited from students enrolled in finance courses at the University of Tampa. The sample included both finance majors and non-finance majors to capture diverse perspectives on the use of ChatGPT and other GPT applications. The survey was distributed face-to-face in several finance classrooms and randomly across the campus within the College of Business over a three-week period from October 16, 2023, to November 3, 2023. This approach allowed for gathering data from both a concentrated group of finance majors and a diverse group

of students from other majors within the College of Business. A total of 59 students participated, comprising 41 finance majors and 18 non-finance majors. Finance majors included students pursuing a Bachelor of Science in Finance, an MBA with a concentration in Finance, or a Master of Science in Finance. Other majors included all students enrolled in other programs offered by the College of Business, excluding those majoring in Finance.

Participation in the survey was entirely voluntary, and participants were informed of the purpose of the study at the beginning of the survey. They were assured that their responses would remain anonymous and confidential, and that they could withdraw from the survey at any time without any consequences. No personally identifiable information was collected, and all data was stored securely to maintain confidentiality.

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Survey Structure

The survey in this study was structured to obtain information about student's majors, permission to use the tools in the courses, frequency and purpose of use, satisfaction level along with perceived advantages and limitations, viewpoint on ethical concerns, and likelihood of continued usage. The survey mainly consisted of multiple choices questions for easy and quick responses and analysis, as well as some open-ended questions for more detailed and insightful feedback.

The survey utilized an ordinal scale to measure responses. For example, for the frequency of use, scales such as "Never," "Rarely" (less than 1 hour/week), "Sometimes" (1-3 hours/week), "Often" (3-5 hours/week), and "Very Often" (more than 5 hours/week) were used. For the purposes of analyzing the results, these ordinal scales were subsequently converted into interval scales, with values ranging from 1 to 5, respectively.

Results

Overview of Student Usage Patterns

Students' Frequency of Use

Of the 59 students who participated in the survey, approximately 32% reported never using ChatGPT or other GPT applications for their finance studies. Additionally, 41% reported using these tools for less than 1 hour per week; another 17% used them between 1 and 3 hours per week. Approximately 10% of students used the applications for more than 3 hours per week. It is important to note that when students reported not having used ChatGPT or other GPT applications for their finance studies, this did not necessarily imply that they had never utilized these tools for other purposes; instead, it only meant that they did not use them for their finance studies.

Figure 1 below showed the frequency of use in number of hours per week, and Figure 2 showed differences in usage among majors.

Figure 1
Frequency of Use (# Hours/week)

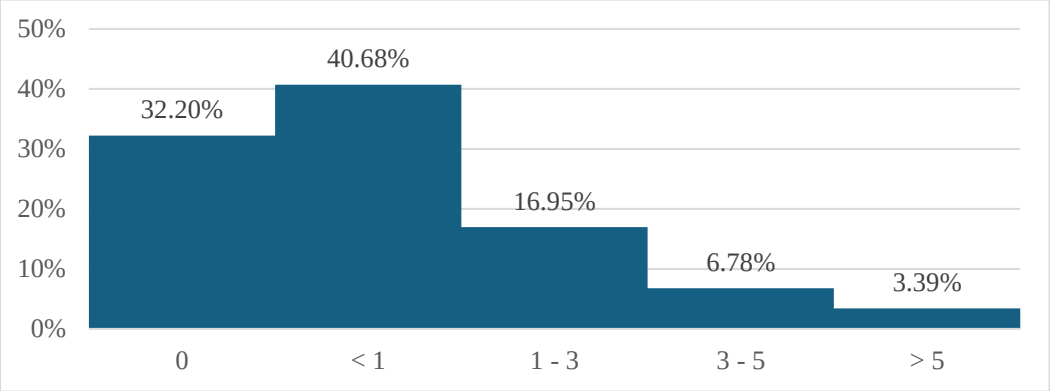
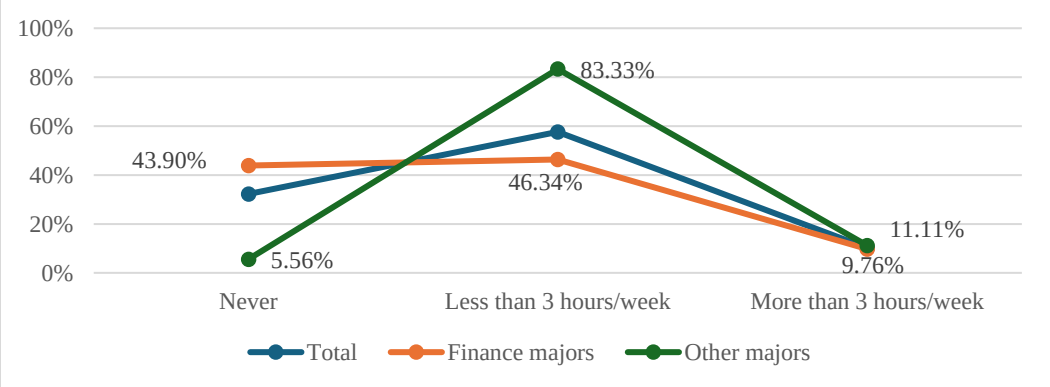


Figure 2
Differences in Frequency of Use among Majors



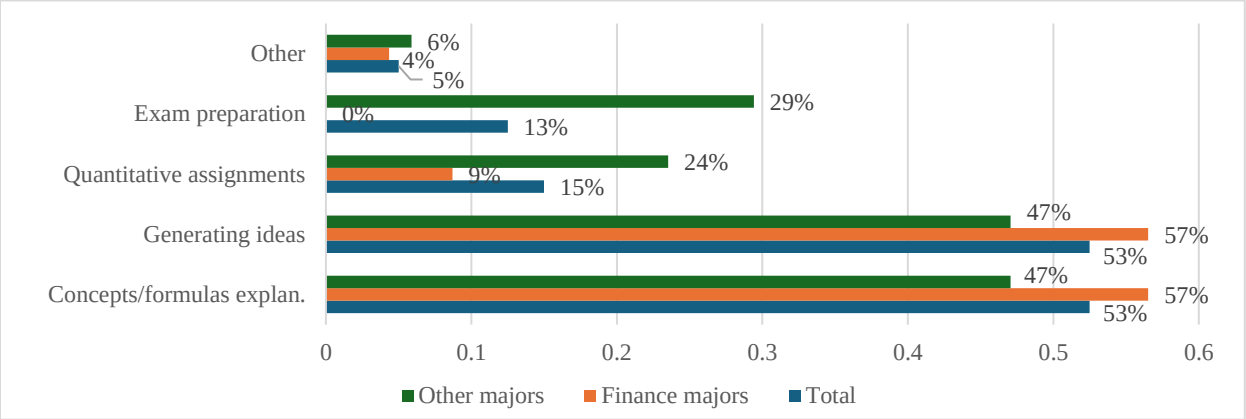
An interesting observation here was that a higher percentage of Finance major students had not used ChatGPT at all for their finance studies, with 43.9% reporting no use. On the other hand, only 5.6% of students from other majors had not used ChatGPT for finance studies. Besides, 83.3% of non-finance majors used ChatGPT for up to 3 hours per week for their finance studies, compared to only 46.3% of finance majors. One possible explanation for this difference was that students from non-finance majors, on average, might require more assistance from external sources, such as ChatGPT, due to a possible lack of prior knowledge in the area. On the other hand, finance majors might already possess a foundational knowledge of the field and, therefore, do not need to seek help from ChatGPT as frequently.

Students' Purpose of Usage

As with the purposes for which students used ChatGPT and other GPT applications, 53% of students reported using them to clarify concepts and formulas. 53% of students used them to generate ideas for research or essay assignments. Only 15% utilized these apps for quantitative assignments, and 13% used them for exam preparation.

Figure 3 below illustrates the percentage of the use of GPT applications for different purposes by students.

Figure 3
Percentage of Use for Different Purposes



** Note: For Figure 3, the percentages represent the proportion of students (excluding those who never used GPT applications for finance studies) who utilized the applications for various purposes. The total percentage exceeded 100% since each student had the option to select multiple purposes for using GPT applications.*

An observation from the survey results shown in Figure 3 was that non-finance majors had larger percentages of students using ChatGPT and other GPT applications to solve quantitative problems (about 2.7 times the rate) and prepare for exams (29% vs 0%) compared to finance majors. Conversely, finance majors had a larger percentage of students using ChatGPT to clarify concepts and formulas and generate ideas.

A current limitation of GPT applications is their ability to handle quantitative problems effectively (Malladi, 2023). However, it requires background knowledge to recognize incorrect answers, especially when no solutions are yet available for comparison. For this reason, finance majors may have an advantage due to their foundational knowledge, which helps them assess the accuracy of a solution. This was supported by an examination of the open-ended feedback (discussed in a later section), which showed that most comments about the inaccuracies and unreliability of ChatGPT for complex or quantitative tasks come from finance major students.

Students' Satisfaction Level

Overall Satisfaction Level

For satisfaction level, an interval scale ranging from 1 to 5 was used, corresponding to an ordinal scale from "Very Unsatisfied" to "Very Satisfied." For students who selected "Never" for frequency of use and "Neutral" for satisfaction level, a score of either "N/A" or "3 – Neutral was assigned," depending on their additional explanation of their satisfaction level (if any). If students did not provide additional comments or specifically stated they had no comment due to not using ChatGPT and other GPT applications, a score of "N/A" was given. If they left additional explanations about their satisfaction level with GPT applications, the original score of "3 – Neutral" was retained.

Overall, the mean satisfaction rating for the applications was 3.67, falling midway between "Neutral" and 'Satisfied', leaning more towards the latter.

Spearman's correlation, a non-parametric measure of statistical dependence between two variables, was employed to examine the relationship between the frequency of usage and the

satisfaction level. It is important to note that the N/A values were excluded from the analysis to ensure the accuracy and validity of the results.

Spearman's correlation:

$$\rho = \frac{\frac{1}{n}\sum_{i=1}^{n}\left(R(x_i) - \overline{R(x)}\right)\cdot\left(R(y_i) - \overline{R(y)}\right)}{\sqrt{\left(\frac{1}{n}\sum_{i=1}^{n}\left(R(x_i) - \overline{R(x)}\right)^2\right)\cdot\left(\frac{1}{n}\sum_{i=1}^{n}\left(R(y_i) - \overline{R(y)}\right)^2\right)}}$$

Where:

R(x) is the rank of the frequency of use; R(x) bar is the mean rank of the frequency of use.

R(y) is the rank of the satisfaction level; R(y) bar is the mean rank of the satisfaction level.

The coefficient from Spearman's correlation analysis was 0.3068, indicating a weak to moderate positive monotonic relationship between the frequency of usage and the satisfaction level. In other words, as the frequency of using ChatGPT and other GPT applications for finance studies increased, there was a tendency for satisfaction levels to also increase. Conversely, when the satisfaction of students increased, they would tend to use more ChatGPT and other GPT application for their finance studies. However, it is important to note that this relationship was not strong but only to a weak to moderate extent.

Figure 4 below showed the correlation between the satisfaction level and the frequency level.

Figure 4
Correlation between Satisfaction Level and Frequency Level

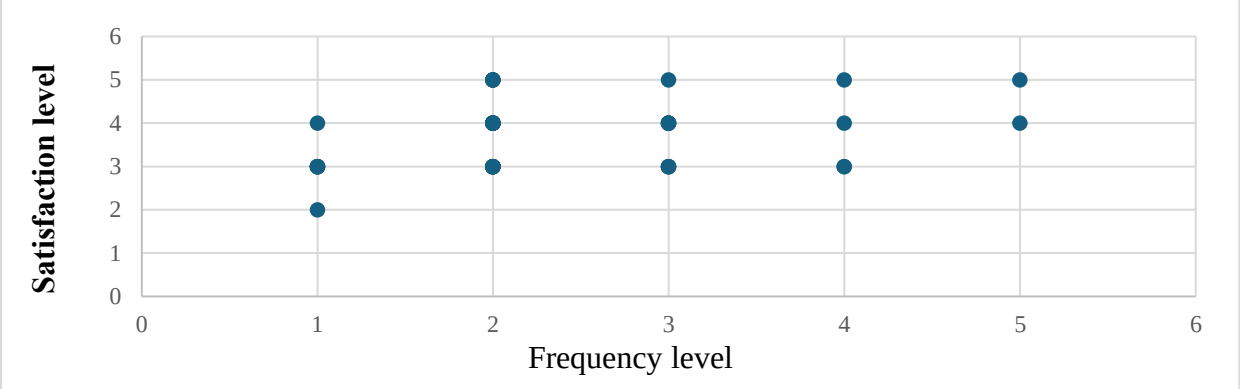


Figure 4 illustrated that, as the usage of ChatGPT increased, one could expect some increase in the level of satisfaction, though only to a small extent. However, the current limitations of GPT applications might still result in unsatisfactory experiences for some users, regardless of the frequency of usage. That said, students were likely to find ways to optimize the functions they found most beneficial, therefore partially mitigating dissatisfaction and enhancing their overall experience.

Conversely, if students became more satisfied with the tools (such as due to tool improvements), they would likely use them more frequently in their studies.

Level of Satisfaction for Different Usage Purposes

Student satisfaction levels related to their intended uses for GPT applications were examined as detailed below in Figure 5 and Figure 6. Figure 5 showed the rating generated for each purpose of use, while Figure 6 showed the rating generated exclusively for each purpose of use.

Figure 5
Rating Generated for Each Purpose of Use

Concept/formula explanation	Generating ideas for research/essay	Quantitative assignments	Exam preparation
3.64	4.00	4.17	3.80

**Note: a student might have multiple purposes for usage. This table did not exclusively contain the satisfaction levels of students who used ChatGPT for only one single specific purpose; instead, it included all students who had used ChatGPT for that particular purpose.*

Figure 6
Rating Generated Exclusively for Each Purpose of Use

Concept/formula explanation	Generating ideas for research/essay	Quantitative assignments	Exam preparation
3.25	3.93	4.00	3.00

Students who employed GPT applications for quantitative assignments reported a high average satisfaction rating of 4.17. However, this number could be nonrepresentatively skewed by the relatively small number of students who used the applications for this purpose. Exam preparation was also used by a small number of students.

For idea generation, all students using this function gave it a rating of 4.00, higher than the overall rating of 3.667. When considering only those students who specifically utilized GPT applications only for idea generation, the average satisfaction rating was just slightly lower (3.93).

Interestingly, students utilizing GPT applications for conceptual and formula clarification reported the lowest satisfaction levels (whereas those using them for quantitative purposes reported the highest) in those 4 areas. Rating generated exclusively from students who used GPT applications only for concept/formula explanations also had a low average rating of 3.25. Given the relatively high usage and the positive feedback on this area (in the open-ended question), the low rating might suggest that satisfaction might have influenced the intended use. That is, students were likely to have tried GPT applications in various functions and then decided on their primary use based on the perceived effectiveness in those functions. For example, students not satisfied with the tools' capacities in quantitative tasks might choose to use them for other purposes, such as concept or formula explanation. Therefore, the overall satisfaction from students with concept or formula explanation purpose was lower than expected, because it partly reflected a dissatisfaction with other areas of use. This assumption was also supported by the limited number of students using these tools for quantitative tasks.

Qualitative Analysis of Open-Ended Responses

Perceived Benefits and Limitations

Out of the 59 students who participated in the survey, 35 students (59%) provided feedback to the open-ended question, "Please explain your level of satisfaction. What do you think are the

benefits and limitations of ChatGPT and other GPT applications in your studies for Finance courses?" Their responses were then categorized into nine main themes, which were further divided into two groups: advantages and limitations.

Figure 7 summarized the feedback to the open-ended question about students' satisfaction level with the GPT applications.

Figure 7
Feedback to the Open-ended Question about Satisfaction

Group	Theme	Number of comments	% of total comment	% of total comment
Advantages	Easy to use and quick to respond	5	7.81%	68.75%
Advantages	Useful for ideas and starting points	14	21.88%	
Advantages	Useful for research paper or essay	6	9.38%	
Advantages	Useful for conceptual or theorical questions or explanations and other simple tasks	16	25.00%	
Advantages	Accuracy	3	4.69%	
Limitations	Inaccuracy	8	12.50%	31.25%
Limitations	Require human input or additional research	3	4.69%	
Limitations	Not efficient for quantitative problems	6	9.38%	
Limitations	Lack real-time update, system update cutoff	3	4.69%	
Total comment		64	100%	100%

**Note: one student might leave multiple comments*

Out of the 64 distinct feedback points provided by 35 students, the majority of 69% were positive, acknowledging the advantages. Students mainly valued assistance with ideas, research/writing tasks, and conceptual explanation. The easy usage and quick responses also added to the appreciation.

On the other hand, 31% of the comments were negative, with primary concerns related to inaccuracies and unreliability for quantitative problems. System update cutoff and lack of real-time update were also of concern. Some students commented as well about the applications requiring human input or additional research. Many of the benefits and limitations recognized by students are in line with current findings in literature discussed earlier.

Comparison of Positive and Negative Feedback

Figure 8
Average Rating for Different Feedback

	Positive only	Positive & negative	Only negative
# of students	17	12	6
Average rating	3.94	3.83	3.17

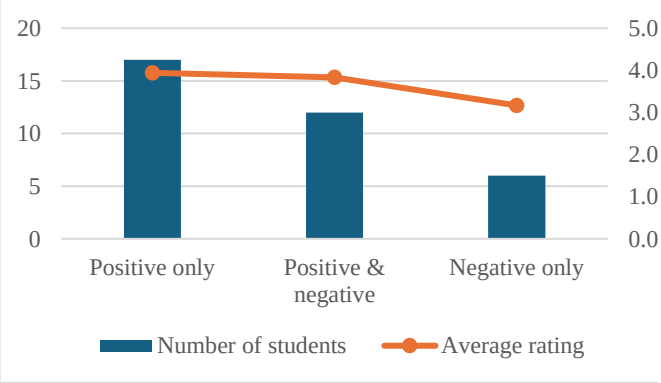


Figure 8 illustrated the average rating for different feedback. Of all the students who provided both positive and negative feedback in response to the open-ended question, none gave a rating below "Neutral". Among the 6 students who exclusively left negative feedback, only one rated their experience as "Unsatisfied". Thus, it appeared that even when students found challenges or limitations with the tools, their overall satisfaction tended to be at least neutral. This further supports our earlier conclusion that students were likely to find ways to optimize the functions they found most beneficial, therefore partially mitigating dissatisfaction and enhancing their overall experience.

Students' Perceptions of Ethical Concerns

Level of Ethical Concerns

The responses to the question regarding ethical concerns, "Do you believe the use of ChatGPT and other GPT applications in education can lead to ethical concerns such as plagiarism or cheating?" were converted from an ordinal scale ranging from "Definitely no" to "Definitely yes" into an interval scale of 1 to 5.

The overall arithmetic mean for ethical concern was 4.0. This corresponds to a general view in current literature that the use of ChatGPT and other GPT applications in education "likely" leads to ethical concerns, such as the potential for plagiarism or cheating.

The Spearman's correlation was tested between the ethical concern and the frequency of usage, and between the ethical concern and the satisfaction level to examine potential fluctuation of ethical concern from change in frequency of use or satisfaction with the tools. Again, N/A values were excluded from the analysis to ensure the accuracy and validity of the results.

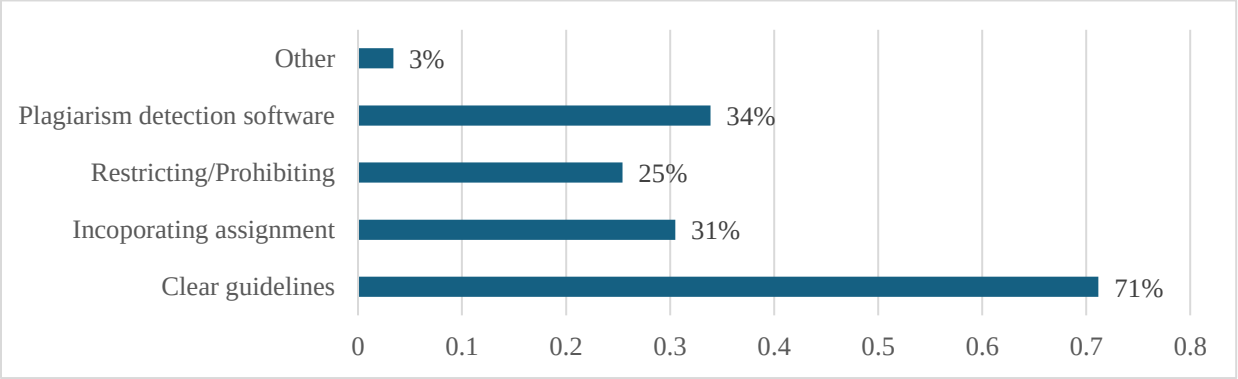
Both tests returned very weak Spearman's correlation coefficient, close to 0, with weak negative coefficient for ethical concern vs frequency of use, and weak positive coefficient for ethical concern vs the satisfaction level. There was almost no relationship between the ethical concern and these two other variables. In other words, the level of ethical concern remained indifferent to how often or how satisfied students were with the tools. Ethical concerns appeared to be a separate matter for students, not fluctuating with their usage patterns or their satisfaction with the GPT applications.

Recommendation for Ethical Issues

When examining the suggested measures to manage ethical concerns while using ChatGPT and other GPT applications in education, the majority of students were in favor of the measures that accept the use and integration of the tools in education instead of trying to avoid them.

Figure 9 showed the percentage of different measures for ethical concerns chosen by students.

Figure 9
Percentage of Different Ethical Measures



Note: the total percentage exceeded 100% since each student had the option to select multiple measures for using GPT applications.

- Providing clear guidelines (71%): The majority of students sought transparency and clarity on the acceptable use of the tools. By including clear guidelines in syllabi or policies, professors can help define the boundaries of acceptable use.
- Incorporating the tools in assignments (31%): A considerable portion of students recommended assignments that incorporate the use of GPT tools, suggesting embracing the capabilities of AI rather than ignoring or avoiding it.
- Plagiarism detection software (34%): A significant portion of students raised the need to apply technical measures to detect plagiarism.
- Restrictions on use for certain assignments or under specific conditions (25%): A smaller percentage of students suggested that restrictions might be necessary in certain cases where the use of GPT tools is not appropriate.

Overall, these responses suggested that students were generally supportive of the integration of GPT tools in education but with the need for different measures such as clear guidelines to maintain academic integrity. Only a minority of students wanted to restrict or prohibit the use of these tools, even just for certain assignments or under specific conditions.

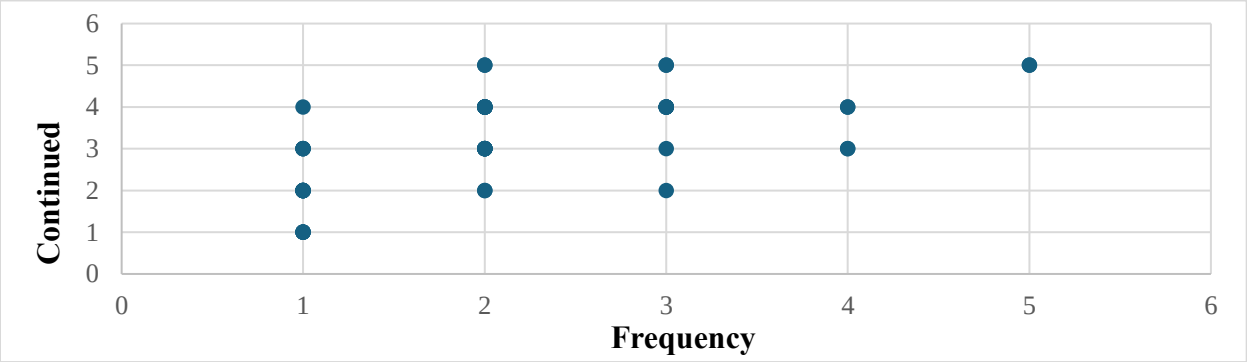
Students' Intended Future Usage

Correlation with Current Usage and Satisfaction

The relationship between the current frequency level of use and the intended future usage was examined using the Spearman correlation coefficient. The coefficient yielded a strong positive correlation of 0.66, indicating a highly monotonic relationship. This suggests that students who currently used the applications had a high probability for continued future usage, while those who did not currently use the applications were less likely to use them in the future.

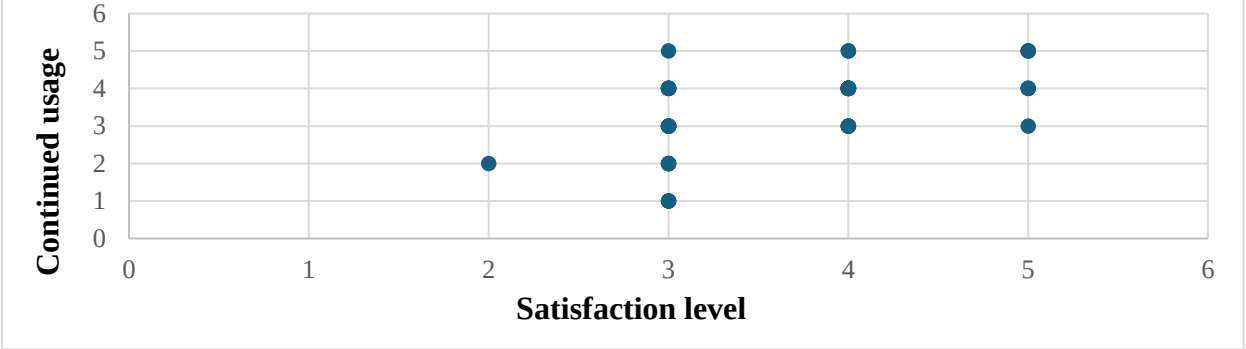
Figure 10 below showed the correlation between continued usage and frequency level, while Figure 11 illustrated the correlation between continued usage and satisfaction level.

Figure 10
Correlation between Continued Usage and Frequency Level



The intended future use was also moderately correlated with the satisfaction level, with a positive Spearman's coefficient of 0.55. This trend suggested that with an increase in satisfaction, students would more likely continue to use the tools in the future.

Figure 11
Correlation between Continued Usage and Satisfaction Level



Impact of Ethical Concerns on Future Usage

Ethical concerns had no correlation with intended future use. Again, ethical concerns appeared to be a separate consideration for students, neither fluctuating with the current usage patterns or the satisfaction with the GPT applications, nor affecting the intended future usage of the tools.

Discussion

The study aimed to examine the perception of students on the use of GPT applications in their finance classes and studies. This was done by analyzing the frequency and purposes of use, the perceived benefits and limitations, evaluating the satisfaction level, ethical concerns and intent for continued use, as well as assessing the correlation between these variables. The data from the survey suggested many aspects of students' perception when utilizing ChatGPT and other GPT applications for their finance studies. The findings provided a comprehensive overview of how students engaged with GPT tools and the factors that influenced their perceptions and future intentions.

Of the 59 students who participated in the survey, approximately 32% reported that they never used ChatGPT or other GPT applications for their finance studies, 41% used them for less than 1

hour per week, 17% used them between 1 and 3 hours per week, and 10% used them for more than 3 hours per week. An interesting observation here was that a higher rate of Finance major students than non-finance majors did not use ChatGPT at all for their finance studies, while a much higher rate of non-finance majors used ChatGPT for up to 3 hours per week for their finance studies. One possible explanation for this difference was that students from non-finance majors, on average, might require more help from external sources, such as ChatGPT, due to a possible lack of prior knowledge in the area. In contrast, finance majors might already possess a foundational knowledge of the field and, therefore, did not need to seek help from ChatGPT as frequently.

The primary use of the tools was to assist with generating ideas for research papers and essays and providing concept/formula explanations. A much smaller usage was for solving quantitative problems or preparing for exams. There was a distinction between finance and non-finance majors in terms of usage and satisfaction. While a larger percentage of non-finance majors than finance majors relied on the tool for quantitative assistance, finance majors more frequently raised concerns about the tool's quantitative limitations. This is in line with current literature which suggests that a current limitation of GPT applications is their ability to handle quantitative problems effectively. However, it requires background knowledge to recognize incorrect answers, especially when no solutions are yet available for comparison. For this reason, finance majors might have an advantage due to their foundational knowledge, which helped them assess the accuracy of a solution. Conversely, a larger percentage of finance majors than non-finance majors used ChatGPT to clarify concepts and formulas and generate ideas.

Through their use, a majority of students acknowledged the benefits of these tools, especially for aiding in ideas, research, and conceptual question clarification. The quick response time and ease of use further added to the overall appreciation. On the other hand, a significant portion of the feedback pointed out limitations, especially in quantitative tasks. The tools' possible inaccuracies, their requirement for human input or additional research, and their cutoff on system updates (rather than real-time information) were also pointed out as areas of concern by students. Many of these perceived benefits and limitations are in line with current findings in the literature.

Overall, the average satisfaction rating was 3.67, leaning more toward a "Satisfaction" level. The use of these tools for idea generation resulted in a high level of satisfaction, with an average rating of 4.0. On the other hand, despite the opposite trend of use (more for concept/formula explanation, less for quantitative assignments) and feedback on the open-ended question, students using the tools for quantitative tasks left the highest overall rating, while students utilizing concept and formula explanation gave lower overall ratings. This trend can partly be explained by satisfaction levels shaping the intended use. That is, after trying GPT applications in different areas, students might select their primary use based on the perceived effectiveness in these areas. For example, those not satisfied with the tools' capacities in quantitative tasks might switch to using them for concept or formula explanation only. Therefore, the overall satisfaction from students with concept or formula explanation purpose was lower than expected because it partly reflected a dissatisfaction with other areas of use. This assumption was supported by the limited number of students using these tools for quantitative tasks. This might suggest that satisfaction levels were influenced by the purpose for which students utilized these tools, and the intended use of the tools were also influenced by the satisfaction levels with different areas of the applications.

Generally, even when facing challenges or limitations, most students maintained at least a neutral or positive rating toward the tools. This could be because students would over time adjust their expectations and learn to optimize the applications' strengths while understanding their weaknesses. In fact, the frequency of use showed a weak to moderate positive correlation with

satisfaction, indicating that greater use of ChatGPT was slightly associated with an increase in satisfaction. This implied that despite unsatisfactory experiences due to current limitations, satisfaction could grow as students familiarized themselves with the tools and adapted them based on different areas of effectiveness. Conversely, if students became more satisfied with the tools (such as due to tool improvements), they would likely use them more frequently in their studies.

For ethical concerns, the average rating was 4.0 (equivalent to "likely yes") suggesting that students acknowledge the potential for ethical issues like plagiarism or cheating. There was almost no correlation between the ethical concerns and either the frequency of use or the satisfaction level. In other words, the level of ethical concerns remained indifferent to how often or how satisfied students were with the tools. Ethical concerns appeared to be a separate consideration for users, not fluctuating with their usage patterns or their satisfaction with the GPT applications. Despite the general concerns about ethical issues, students generally advocated for a proactive approach to integrating these tools into education instead of avoiding them. They recommended clear guidelines and policies to define the boundaries of accepted use, incorporating the tools into the assignments and employing plagarism software, among others. Only a minority of students wanted to restrict or prohibit the use of these tools, even just for certain assignments or under specific conditions.

Finally, there was a positive monotonic correlation between intended future use and both current usage and satisfaction levels. This indicated that students who currently used the applications were likely to continue future usage. Besides, as satisfaction with the tools increased, students would more likely continue to use them in the future. Ethical concerns had no correlation with intended future use. Again, ethical concerns appeared to be a separate consideration for students, neither fluctuating with the current usage patterns or the satisfaction with the GPT applications, nor affecting the intended future usage of the tools.

In conclusion, ChatGPT and other GPT applications were currently generally perceived as valuable tools by students, despite room for improvement. The relatively high satisfaction level and current use likely indicated continued further uses in the future. In addition, though expressing a high concern for ethical issues, students preferred a proactive approach for measures to mitigate these problems rather than avoiding the use of the tools. As a result, as these tools continue to evolve and improve their current limitations, it's important to anticipate an increase in their usage in education, particularly within finance studies. Additionally, there is a risk of students being misled by incorrect content when using GPT applications due to the lack of prior knowledge in a field. Therefore, training and education about the GPT tools need to be taken into consideration to ensure that students are aware of the advantages and limitations and how to tailor the tools to their best use.

The findings of this study reflect key principles of technology adoption models like TAM (Davis, 1989) and UTAUT (Venkatesh et al., 2003), particularly in how perceived usefulness influences students' satisfaction and their intention to continue using GPT tools. Grounding our analysis in these theoretical models provides a firmer foundation for the survey results, enhancing our interpretation of the factors driving technology adoption in finance education.

Practical Implications

Based on the findings of this study, several recommendations can be made for finance educators and curriculum developers to effectively integrate GPT tools into finance education.

The generally positive perception of students, their intended future usage, and their advocacy for proactive measures to mitigate ethical concerns rather than avoiding the use of GPT tools

suggest that integrating these applications into finance education is an important issue that needs to be addressed.

The strong ethical concerns raised by students underscore the need for clear guidelines on the appropriate use of GPT tools in academic work. Educators should develop and communicate clear policies that define how these tools can be used to support learning while avoiding academic dishonesty, such as plagiarism. This might include incorporating GPT tools into structured assignments where their use is guided and closely monitored.

Given the possibility of misinformation and the evolving nature of GPT applications, it is essential to offer brief but regular training sessions at the start of each semester. These sessions should inform students about the benefits and limitations of the tools, helping them to use the applications effectively while being aware of potential misinformation that could hinder the learning process. Keeping students updated on the latest developments in GPT tools will ensure that they remain informed as these technologies evolve.

The integration of GPT tools into finance curricula should be a dynamic, evolving process. This approach requires ongoing research and adaptation as the tools improve. Practical examples include general suggestions from OpenAI, like using GPT in role-playing, creating quizzes, or teaching critical thinking (Teaching With AI, 2023). More specific teaching cases, such as using ChatGPT to generate R code for data analysis (Zhong and Kim, 2024), can also be explored. Given that students currently express high satisfaction with GPT for generating ideas and clarifying concepts, educators should consider integrating these tools into assignments that demand creativity and critical thinking, such as brainstorming research topics or explaining complex financial theories. The approach to using GPT tools in teaching should evolve as the technology itself advances.

As AI tools like GPT become more prevalent in both finance education and the industry, it is crucial to prepare students by fostering critical thinking and adaptability. Educators should encourage students to critically evaluate GPT outputs, cross-referencing them with traditional sources to develop a deeper understanding. Moreover, promoting a mindset of continuous learning will ensure that students are not only proficient with current technologies but also equipped to adapt to future innovations, bringing value beyond what GPT applications can offer.

Limitation and Future Research

This study has several limitations that should be considered when interpreting the results. First, the sample size was relatively small, with only 59 students participating, which may limit the generalizability of the findings to the broader population of finance students. Additionally, the study was conducted at a single institution, which may introduce biases related to the specific educational context or student demographics at that university.

Given these limitations, there are several suggestions for future research that could expand upon the findings of this study. Larger-scale studies involving diverse student populations across multiple institutions would help to enhance the generalizability of the results. Additionally, longitudinal studies that track changes in students' perceptions and usage of GPT tools over time could provide more robust insights into the long-term impacts of these technologies in finance education.

It is important to clarify that this preliminary study does not seek to evaluate the advantages and benefits of such AI tools in education. Instead it aims to explore the students' viewpoint of these tools, as perceptions of technology are likely to influence intention then in turn behaviors (Davis, 1989). Findings from this article will assist in informing future research to recommend

different policies and measures that take into consideration the students' perceptions and behaviors. This research highlights the need for future educational frameworks that leverage AI tools like GPT, address their weaknesses, and mitigate ethical concerns through proactive policies, ensuring the benefits of GPT technologies are fully realized in education, especially in finance.

References

Cao, Y., & Zhai, J. (2023). Bridging the gap – the impact of ChatGPT on financial research. *Journal of Chinese Economic and Business Studies*, *21*(2), 177–191. https://doi.org/10.1080/14765284.2023.2212434

ChatGPT

Chaudhry, I. S., Sarwary, S. a. M., Refae, G. a. E., & Chabchoub, H. (2023). Time to revisit existing student's performance evaluation approach in higher education sector in a new era of CHATGPT — a case study. *Cogent Education*, *10*(1). https://doi.org/10.1080/2331186x.2023.2210461

Chemaya, N., & Martin, D. (2024). Perceptions and detection of AI use in manuscript preparation for academic journals. *PLoS ONE*, *19*(7), e0304807. https://doi.org/10.1371/journal.pone.0304807

Chu, M. (2023). Assessing the Benefits of CHATGPT for Business: An Empirical Study on Organizational performance. *IEEE Access*, *11*, 76427–76436. https://doi.org/10.1109/access.2023.3297447

Dai, Y., Liu, A., & Lim, C. P. (2023). Reconceptualizing ChatGPT and generative AI as a student-driven innovation in higher education. *Procedia CIRP*, *119*, 84–90. https://doi.org/10.1016/j.procir.2023.05.002

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

Dowling, M., & Lucey, B. M. (2023). ChatGPT for (Finance) research: The Bananarama Conjecture. *Finance Research Letters*, *53*, 103662. https://doi.org/10.1016/j.frl.2023.103662

Fütterer, T., Fischer, C., Alekseeva, A., Chen, X., Tate, T., Warschauer, M., & Gerjets, P. (2023). ChatGPT in Education: Global Reactions to AI Innovations. *Research Square (Research Square)*. https://doi.org/10.21203/rs.3.rs-2840105/v1

Gill, S. S., Xu, M., Patros, P., Wu, H., Kaur, R., Kaur, K., Fuller, S., Singh, M., Arora, P. K., Parlikad, A. K., Stankovski, V., Abraham, A., Ghosh, S. K., Lutfiyya, H., Kanhere, S. S., Bahsoon, R., Rana, O., Dustdar, S., Sakellariou, R., . . . Buyya, R. (2023). Transformative Effects of ChatGPT on Modern Education: Emerging era of AI Chatbots. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2306.03823

Holland, A., & Ciachir, C. (2024). A qualitative study of students' lived experience and perceptions of using ChatGPT: immediacy, equity and integrity. *Interactive Learning Environments*, 1–12. https://doi.org/10.1080/10494820.2024.2350655

Javaid, M., Haleem, A., Singh, R. P., Khan, S., & Khan, I. H. (2023). Unlocking the opportunities through ChatGPT Tool towards ameliorating the education system. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, *3*(2), 100115. https://doi.org/10.1016/j.tbench.2023.100115

Lin, J. (2021). Design and Research of Inverted Classroom Teaching of Information Technology Integrating into the Major of Finance and Economics. *2021 2nd Asia-Pacific Conference on Image Processing, Electronics and Computers*. https://doi.org/10.1145/3452446.3452660

Livberber, T., & Ayvaz, S. (2023). The impact of Artificial Intelligence in academia: Views of Turkish academics on ChatGPT. *Heliyon*, *9*(9), e19688. https://doi.org/10.1016/j.heliyon.2023.e19688

Lopez-Lira, A., & Tang, Y. (2023). Can ChatGPT forecast stock price movements? Return predictability and large language models. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2304.07619

Malladi, R. K. (2023). Emerging Frontiers: Exploring the impact of generative AI platforms on university quantitative finance examinations. *arXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2308.07979

Ogurlu, U., & Mossholder, J. (2023). The Perception of ChatGPT among Educators: Preliminary Findings. *Research in Social Sciences and Technology*, *8*(4), 196–215. https://doi.org/10.46303/ressat.2023.39

Romanko, O., Narayan, A., & Kwon, R. H. (2023). ChatGPT-based investment portfolio selection. *Social Science Research Network*. https://doi.org/10.2139/ssrn.4538502

Shoufan, A. (2023). Exploring Students' Perceptions of CHATGPT: Thematic Analysis and Follow-up survey. *IEEE Access*, 1. https://doi.org/10.1109/access.2023.3268224

Teaching with AI. (2023, August). OpenIA. https://openai.com/index/teaching-with-ai/

Tossell, C. C., Tenhundfeld, N. L., Momen, A., Cooley, K., & De Visser, E. J. (2024). Student Perceptions of ChatGPT use in a college essay Assignment: Implications for learning, grading, and trust in Artificial intelligence. *IEEE Transactions on Learning Technologies*, 1–15. https://doi.org/10.1109/tlt.2024.3355015

Valova, I., Mladenova, T., & Kanev, G. (2024). Students' perception of ChatGPT usage in education. *International Journal of Advanced Computer Science and Applications*, *15*(1). https://doi.org/10.14569/ijacsa.2024.0150143

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information Technology: toward a unified view. *MIS Quarterly*, *27*(3), 425. https://doi.org/10.2307/30036540

Virmani, J. R. V. a. V. (2022). Web applications for teaching portfolio analysis and option pricing. *Journal of Financial Education*, *48*(1), 61–78. https://www.jstor.org/stable/48748392

West, T., Malin, M., Kakhkharov, J., Johnson, D., & Wong, V. (2021). Quantifying the Use of Bloomberg in Finance. *Journal of Financial Education*, *47*(2), 35–50. https://www.jstor.org/stable/48738992

Zhai, N. (2020). Practical Teaching Methods of Finance and Economics Based on Information Technology. *2020 International Conference on Computers, Information Processing and Advanced Education (CIPAE)*. https://doi.org/10.1109/cipae51077.2020.00033

Zhong, C., & Kim, J. (2024). Teaching Case: Teaching Business students Logistic Regression in R with the aid of CHATGPT. *Journal of Information Systems Education*, *35*(2), 138–143. https://doi.org/10.62273/dyli2468

Financial Knowledge among College Students at a Research University in the Southern Region of the United States

Jeantyl Norze
University of Arkansas Systems Division of Agriculture

Eric N. Monday
University of Kentucky

Ruben Twijukye
Alabama A&M University

Michael F. Burnett
Louisiana State University

In today's economy, financial literacy is becoming ever increasingly important. This is nowhere more important than among college students who must deal with the expenses of their education which often translates to large amounts of student loan debt.

The purpose of this study was to determine if a relationship exists between financial knowledge and selected demographic characteristics among college students at a public research university in the southern region of the United States.

Findings of the study revealed that students who persisted from the second to the third year of college at a public research university had a low level of financial knowledge. Additionally, the following variables were found to be related to financial knowledge: race, gender, first generation college, amount of loan debt incurred through the second year of college, and academic achievement at both the high school and college levels.

Conclusions of the study included that first-generation college students tended to have higher levels of financial knowledge than students with one or both parents having completed a college degree. The researchers also concluded that students with lower levels of student loan debt tended to have higher levels of financial knowledge.

Based on the findings and conclusions, the researchers recommend that a one semester course in financial literacy/knowledge be required as part of the high school curriculum. The researchers further recommend that colleges and universities require students to complete a course (probably offered as an online course) in personal financial management during their first semester of college enrollment.

Keywords: first generation students, student loan debt, college students, financial knowledge, financial management

Introduction

In today's world, the need for individuals to possess financial knowledge has become increasingly important. In fact, there has never been a time when financial knowledge was more important than it is today. This is clearly true in the United States for an individual who wants to plan for long-term investments for his/her retirement and/or children's education. He/she must have the ability to manage personal finances such as insurance, short-term savings and borrowing for vacations, down payment for a house, car loan, and so forth. Nonetheless, research have shown that financial knowledge among Americans has declined. A recent study focusing on financial knowledge among millennials found that only one-in-four exhibited basic financial knowledge (PricewaterhouseCoopers, 2015).

Many Americans have inadequate financial knowledge and, therefore, fail to make sound personal financial decisions (EBRI, 1995; KPMG, 1995; PSRA, 1996, 1997; Oppenheimer Funds/Girls Inc., 1997; Vanguard Group/Money Magazine, 1997, HSR, 1993; Hira, 1993; O'Neill, 1993). A study found that the U.S household decision makers had poor understanding of the basic finance concepts (Princeton Survey Research Associates, 1997). The same study found adult women had poorer levels of understanding of the basic finance concepts than their male counterparts. Another study found that most Americans did not have sufficient retirement funds (Employee Benefit Research Institute, 1995). In addition, two national studies found that even U.S investors did not have a solid financial knowledge of investment issues (Princeton Survey Research Associates, 1996; Vanguard Group/Money Magazine, 1997).

Many scholars have argued that this problem is due to the lack of a sound personal finance education (HSR, 1993; Hira, 1993; O'Neill, 1993). Research has consistently found that a high school education does not provide students a good foundation in personal financial fundamentals and therefore, they exhibited poor financial knowledge (Bakken, 1967; CFAJAMEX, 1991; HSR, 1993; Langrehr, 1979; NAEP, 1979). Those who pursue a college education enter ill-prepared to manage their finances (Chen & Volpe, 1998; Crain & Ragan, 2012; Mandell, 2008). Only one-third of states require a personal finance course to be completed by high-schoolers (Council for Economic Education, 2016; Jump$tart Coalition for Financial Literacy, 2016). All of these factors suggest that a personal finance education is needed and is an important consideration for college students.

Considering the significant financial decisions college students must make today and the importance of these decisions, financial knowledge is an important topic to consider. Students make dozens of decisions in college – where to live, where to eat, their academic major, organizations to join, student loans, and many others. These decisions may have a long-term impact on their life. The proliferation of credit cards on college and university campuses remains a concern as a great number of students fail to understand the terms of financial agreements and frequently make uniformed financial decisions (Mandell, 2008; National Student Financial Wellness Study, 2015). The need for financial knowledge has become even more critical as an increasing number of students continue to bear the financial burden of student loan debt. In fact, the federally-backed student loan debt continues to grow and now accounts for a total value of approximately one trillion dollars, and there appears to be no end in sight (Chopra, 2013).

Many colleges and universities are responding to these needs by launching financial readiness programs on their campuses. These programs exist under various departmental names including financial knowledge, financial management, financial wellness, and financial literacy centers. Most of these programs have the common theme of trying to increase a student's financial

knowledge and help them make better financial decisions during college as well as after graduation. More research is needed to determine if these programs are effective and if they are meeting the desired goals.

Purpose of the Study

The primary purpose of this study was to determine if a relationship exists between financial knowledge and selected demographic characteristics among college students at a public research university in the southern region of the United States.

Objectives

1. To describe students who persisted from the second to the third year at a public research university in the southern region of the United States on selected demographic characteristics;
2. To describe students who persisted from the second to the third year at a public research university in the southern region of the United States on their level of financial knowledge; and
3. To determine if a relationship exists between financial knowledge and selected demographic characteristics among students who persisted from the second to the third year at a public research university in the southern region of the United States.

Methodology

Population and Sample

The target population of this study was college students at public research universities in the southern region of the United States. The accessible population was defined as an entering Fall semester freshmen cohort at one selected public research universities in the southern region of the United States. The study sample was defined as 100% of the accessible population, which consisted of 4,407 students who persisted from the second to the third year of college enrollment.

Instrumentation

Two instruments were used to collect data for this study. The first instrument consisted of two parts. The first part consisted of 13 items designing to measure the financial knowledge of the study participants. These 13 items resulted from a combination of previous research conducted by Lusardi (3 items) and Britt (5 items) and Items (5) developed by the researchers to address the objectives of this study. Permission was granted by Drs. Lusardi and Britt to use the selected items from their respective instruments, and the items developed by the researchers were derived from the review of related literature. The instrument was reviewed by a panel of experts to establish the content validity of the instrument to meet the objectives of the current study. The second part of this instrument consisted of seven items designed to measure selected demographic characteristics that were not available in the university's electronic information system.

The second instrument was a computerized recording form into which 12 selected items were downloaded from the university's electronic student information system. These items were

personal and academic demographic characteristics that were identified as variables of interest in the review of related literature.

Data Collection

Once the instrument was validated, the researchers requested and obtained approval to conduct the study from the university's Institutional Review Board (IRB). Next, the researchers requested and received e-mail addresses of students in the study sample. The first instrument and the email addresses of the students were loaded in the Qualtrics survey software product for distribution. After three follow-up reminders and the use of response incentives (6 gift cards in amounts ranging from $50.00 to $100.00), a total of 695 useable responses were received.

Results/Findings

Objective One

The first objective of this study was to describe the students in the study on the selected demographic characteristics including race, gender, state residency status, whether or not they lived on campus, college grade point average, employment status, amount of loan debt, amount of credit card debt, and whether or not a first-generation college student and level of education of parents. The results are presented as follows:

Race

The first characteristic on which the students of the study were characterized was race. The data revealed that of the 665 students who responded to the survey, 70.2% (n = 466) were White, 12.1% (n = 80) were Black or African American, 7.2% (n = 48) were Hispanic, 5.4% (n = 36) were Asian, 4.5% (n = 30) were Multi-Racial, 0.3% (n = 2) were American Indian or Alaskan Native, and 0.3% (n = 2) were Native Hawaiian or Other Pacific Islander. One of the respondents did not provide information about race.

Gender

Gender was the second characteristic on which the students in the study were described. The data revealed that of the 665 respondents who responded to the survey, 471 (70.8%) were female students and 194 (29.2%) were male students.

State Residency Status

Whether or not the students were residents of the state in which they studied was another characteristic on which the respondents in the study were described. The data revealed that of the 665 students who responded to the survey, 568 (85.4%) were residents and 97(14.6%) were non-residents of the state in which they studied.

Whether or Student Lived on Campus

The fourth characteristic that the students were described on was whether or not they lived on-campus. Of the 665 students who completed the survey, 517 (77.7%) lived off-campus and only 148 (22.3%) lived on-campus of the university in which they studied.

College Grade Point Average

College grade point average (GPA) was the sixth characteristic in which the students in the study were described (see Table 1). College GPA was defined as the cumulative grade point average at the end of the spring semester of the second year of enrollment. The mean college GPA was 3.245 (*SD* = .518) for the students who persisted from the second to third year at a research university in the southern east region of the U.S. The College GPA for this group ranged from 1.739 to 4.000.

Table 1
College Grade Point Average (GPA) for Students Who Persisted From the Second to the Third Year at a Public Research University in the Southern Region of the United States.

College GPA Range	Frequency	Percent
4.000	36	5.4
3.500 – 3.999	213	32.0
3.000 – 3.499	212	31.9
2.500 – 2.999	144	21.7
2.000 – 2.499	54	8.1
Less than 2.000	6	.9
Total	665	100.0

Note. The mean college GPA was 3.245 (SD = .518). GPA scores ranged from 1.739 to 4.000.

Employment Status

Employment status was another characteristic on which the students in the study were described. Of the 665 students who completed the survey, 225 (33.8%) worked 10 to 19 hours per week, 119 (17.9%) worked less than 10 hours per week, 88 (13.2%) worked 20 to 29 hours per week, 57 (8.6%) worked 30 hours or more per week, and 176 (26.5%) were not employed.

Amount of Student Loan Debt

Loan debt was the eighth characteristic on which the students in the study were described (see Table 2). Of the 665 students who responded to the survey, 412 (62%) reported that they did not have loan debt and only 253 (38.0%) reported that they had loan debt of between $1 and $50,000 or more.

Table 2
Loan Debt for Students Who Persisted From the Second to the Third Year at a Public Research University in the Southern Region of the United States.

Loan Debt	Frequency	Percent
$0	412	62.0
$1 - $14,999	168	25.3
$15,000 - $29,999	53	8.0
$30,000 - $49,999	24	3.6
$50,000 or more	8	1.2
Total	665	100.1[a]

[a] *Percentages do not sum to 100.0 due to rounding error*

Amount of Credit Card Debt

Credit card debt was the ninth characteristic on which the students in the study were described. Of the 665 students who completed the survey, 552 (83%) reported that they had no credit card

debt and only 113 (17%) reported that they did have credit card debt in response categories of from $1.00 to $1,499.00 and up to 3,500 or more (see Table 3).

Table 3
Credit Card Debt for Students Who Persisted From the Second to the Third Year at a Public Research University in the Southern Region of the United States.

Credit Card Debt	Frequency	Percent
$0	552	83.0
$1 - $1,499	80	12.0
$1,500 - $2,499	15	2.3
$2,500 - $3,499	10	1.5
$3,500 or more	8	1.2
Total	665	100.0

First-Generation College Student

Study subjects were also described on whether or not they were first-generation college students. The analysis revealed that only 32% (n = 213) of the students who persisted from the second to third year in the study were first-generation college students. The remaining participants who represented 68% (n = 452) of the usable sample were not first-generation college students.

Level of Education of the Parents of the Students

The last characteristic used to describe the students who persisted from the second to the third year at a public research university in the southern region of the United States was the education level of the parents of the students. This self-reported characteristic was described as whether or not either the mother/guardian or father/guardian had obtained a four year college degree or higher.

Examination of the data revealed that the majority of the students' mother/guardian (n = 360, 54.1%) had a four year college degree or higher. In addition, the majority of the students' father/guardian (n = 353, 53.1%) had a four year college degree or higher (see Table 4).

Table 4
Mother/Guardian and Father/Guardian Education for Students Who Persisted From the Second to the Third Year at a Public Research University in the Southern Region of the United States.

Level of Education	Mother/Guardian		Father/Guardian	
	Frequency	Percent	Frequency	Percent
Less than high school	13	2.0	30	4.5
High school graduate or GED	102	15.3	123	18.5
Some college	183	27.5	146	22.0
Four year college degree or higher	360	54.1	353	53.1
Do not know	7	1.1	13	2.0
Total	665	100.0	665	100.1[a]

[a] *Percentages do not sum to 100.0 due to rounding error.*

Objective Two

The second objective of the study was to describe students who persisted from the second to the third year at a public research university in the southern region of the United States based on their level of financial knowledge. There were 665 students who met the criteria of this objective. The 13 questions designed to measure financial knowledge consisted of nine true/false questions

and four multiple-choice questions. The multiple-choice questions provided five answer choices for the students.

The item that was answered correctly by the largest percentage of students (n = 629, 94.6%) was "The budgeting process starts with establishing financial goals." The next highest percentage correct (n = 593, 89.2%) was for "A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage but the total interest over the life of the loan will be less." The two questions that were answered correctly by the lowest percentage of students were "A 401 (k) retirement plan is a defined benefits plan." (n = 173, 26.0%) and "If you qualify for both options but can only claim one, is it generally better to utilize a tax credit or a tax deduction?" (n = 132, 19.8%).

The answers to the financial questions were also evaluated to calculate a financial knowledge score. This score was determined by evaluating the number of questions correct divided by the total number of questions and then converted to a percentage. The average score of students who persisted from the second to the third year at a public research university in the southern region of the United States was 68% (SD = 14.66). The score for this group of students ranged from 15% to 100%. Three students achieved a perfect score of 100% while the largest number (n = 132, 19.8%) scored a 69%. Table 5 presents the financial knowledge scores for students who persisted from the second to the third year.

Table 5
Financial Knowledge Score for Students Who Persisted From the Second to the Third Year at a Public Research University in the Southern Region of the United States.

Score	Frequency	Percent
100%	3	.5
92%	36	5.4
84%	98	14.7
77%	128	19.2
69%	132	19.8
62%	121	18.2
54%	65	9.8
46%	50	7.5`
38%	17	2.6
31%	11	1.7
23%	3	.5
15%	1	.2
Total	665	100.1[a]

[a] *Percentages do not sum to 100.0 due to rounding error.*

Objective Three

Objective three of the study was to determine if a relationship exists between financial knowledge and selected demographic characteristics among students who persisted from the second to the third year at a public research university in the southern region of the United States.

Comparison among Race of the Students in the Study on Their Financial Knowledge

The researchers examined the financial knowledge scores of the students in the study by race using one way ANOVA procedure and found that there were statistically significant differences by race, $F(4, 655) = 7.12$, $p < .001$ (see Table 6).

The financial knowledge scores of the students were further examined using a post hoc comparison technique (Tukey's procedure). The data showed that African Americans had significantly lower financial knowledge scores than their White ($p < .001$), Hispanics, Asian and Multi-racial counterparts (see Table 6).

Table 6
Comparison of Financial Knowledge among Race of Students at a Research University

Source	***df***	***SS***	***MS***	***F***	***Sig.***
Between groups	4	5896.74	1474.19	7.12	$p <$ .001
Within groups	655	142730	207		
Total	659	141479.20			

Group	***n***	***M***	**Post Hoc[a]**
Black	80	60.39	A
Asian	36	66.24	A B
Hispanic	48	66.99	A B
Milti-Racial	30	67.44	A B
White	466	69.53	B

[a]*Groups without a common letter are significantly different.*

Comparison between Genders of the Students

The researchers also compared male students to female students in the study on their level of financial knowledge, using the Independent *t*-test to determine whether significant differences existed between genders. The data showed that male students ($M = 72.72$, $SD = 13.29$, $n = 194$)) had a significantly higher level of financial knowledge than their female counterparts ($M = 66.08$, $SD = 14.77$, $n = 471$) in the study ($t\ (663) = 5.42$, $p < .001$).

Comparison between First and Non-First-Generation Students

Another comparison was drawn between the first-generation college students and the non-first-generation college students in the study who persisted from the second to the third year using the Independent Sample *t*-test. When examining the data, the researchers found that the firs-generation college students ($M = 69.23$, $SD = 14.31$, $n = 452$) had a significantly higher level of financial knowledge than those ($M = 65.44$, $SD = 15.08$, $n = 213$) who are not first-generation college students ($t\ (663) = -3.13$, $p = .002$).

Financial Knowledge among Resident and Non-Resident Students and On and Off-Campus Students in the Study

Moreover, the researchers compared the level of financial knowledge of the students in the study who persisted from the second to the third year by the following selected demographic variables: residency status (in/out-of- state), whether or not live on campus, whether or not have credit card debt owed, employment status and found no statistical significant differences, for $p < .05$, using Independent Sample *t*-test and One way ANOVA procedures (See Table 7 and Table 8).

Table 7
Comparison among Students on their Financial Knowledge based on the selected demographic variables

Variables	*n*	*M*	*SD*	*t*	*df*	*Sig.*
Resident	568	67.71	15.07	1.52	154.17	.13
Non-Resident	97	69.79	11.87			
On-Campus	148	68.50	14.79	.46	663	.65
Off-Campus	517	67.88	14.22			
No Credit Card Debt	552	68.51	14.14	1.70	146.07	.091
Credit Card Debt	**113**	**65.52**	**18.83**			

Table 8
Financial Knowledge of Students by Number of Hours Worked per Week While Enrolled

Source	*df*	*MS*	*F*	*Sig.*
Between Groups	4	127.281	.59	.669
Within Groups	660	215.332		
Total	664			

Financial Knowledge among Students who had Loan Debt and Students Who did not Have Loan Debt

The researchers also explored the relationship between loan debt and the level of financial knowledge of the students in the study who persisted from the second to the third year using One Way ANOVA. The data showed that the level of financial knowledge of the students were significantly associated with the amount of loan debt they had, (F (3, 661) = 5.25, p = 0.001). Those who had $30,000 or more in student loan debt had a lower level of financial knowledge (see Table 9).

Relationships between Students' Financial Knowledge and Their College and High School GPA.

Furthermore, the researchers examined the associations between financial knowledge of the students in the study and their college GPA and High School GPA.

Table 9
Comparison of Financial Knowledge of Students at a Research University by Level of Loan Debt

Source	*df*	*SS*	*MS*	*F*	*Sig.*
Between groups	3	3319.05	1106.35	5.25	.001
Within groups	661	139309.42	210.76		
Total	**664**	**141479.20**			

Group	*n*	*M*	Post Hoc[a]
$30,000 or more	32	60.58	A
$15,000 - $29,999	53	65.31	A B
$1.00 - $14,999	168	66.71	A B
$0.00	412	69.47	B

[a]*Groups without a common letter are significantly different*

The analyses revealed that both college GPA (r = .23, p < .001, n = 665) and high school GPA (r = .11, p = .006, n = 653) had a significant, positive relationship with the student's financial

knowledge. It was also important to acknowledge that college GPA had a greater relationship with financial knowledge of the students in the study.

Conclusions

The findings indicate that the students in the study who persisted from the second to the third year at a public research university in the southern region of the United States had a relatively low level of financial knowledge as measured by the financial knowledge questionnaire. This conclusion is supported by several other research studies (Mandell, 2008, Eitel & Martin, 2009; Lyons, 2004, 2008). Many students go to college financially unprepared. This results in students making emotional decisions that may have long-term impact in their life.

The findings also suggest that the first-generation college students in the study who persisted from the second to the third year had higher level of financial knowledge than the students who were not first-generation college students. This conclusion is found to be plausible since many first-generation college students lack or do not have the financial support from their parents. They have to work to meet their basic needs, and sometimes to cover their college tuitions and fees. Their life situation might make them become more frugal or conscious of their spending. However, other research studies have found the contrary. Tierney, Corwin and Colyar (2005) argue that students of low-income families typically grow up with less access to financial knowledge than the students of higher income families. In addition, Flores (2014) found that the financial knowledge score (57.78) of the first-generation students in her study was somewhat below the passing score (60) as measured by Mendell (2008). Lyons (2004) and Zhou and Su (2000) found that low income college students are likely to have more student loan and credit card debt than high income college students.

The findings further indicate that among the college students in the study who persisted from the second to the third year, those who had greater amount of student loan debt had lower level of financial knowledge. This conclusion suggests an inverse relationship between student loan debt and financial knowledge of the students in the study indicating as financial knowledge of the students increases the amount of student loan debt decreases. Other research studies have shown that six out of 10 students take students loan to pay their tuition and fees (Wood, 2019) and many of the students are not fully aware of the consequences it may have on their life in the future. Consequently, the number of college students who are financially at risk is growing because of mismanagement of credit cards and accumulation of credit card debt (Lyons, 2008; Norvilitis et al., 2006).

Recommendations

Given the findings of this study, colleges and universities should require an online course in personal financial management of all students admitted in their programs. If they do not have it, they should require completing one during their first semester of college. In fact, a one-semester course in personal financial management should be required of all high school students. Additionally, a more consistent financial education program, more than just one course, seems to be more appropriate to help students to rationalize more (with a financial lens) as they make personal financial decisions. Colleges and universities should also make information and resources more available to students to help them make financially sound decisions. The researchers also recommend that students be administered a financial knowledge quiz to qualify for student loan.

References

Bakken, R. (1967). Money management understandings of tenth grade students. *National Business Education Quarterly, 36, 6.*

Chen, H. & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. *Financial Services Review*, 7, 102-128.

Chopra, R. (2013). Student Debt Swells, Federal Loans Now Top a Trillion. *Consumer Finance Protection Bureau.*

Consumer Federation of America and American Express Company (CFAJAMEX). (1991). *Student consumer knowledge: Results of a national test.* Washington, D.C.

Council for Economic Education (2016). Survey of the States: Economic and Financial Education in Our Nation's Schools. Retrieved from https://www.councilforeconed.org/wp-content/uploads/2016/02/sos-16-final.pdf.

Crain, S. J. and Ragan, K. P. (2012). Designing a financial literacy course for a liberal arts curriculum. *International Journal of Consumer Studies*, 36, 515–522.

Eitel, S., & Martin, J. (2009). First-generation female college students' financial literacy: real and perceived barriers to degree completion. *College Student Journal, 43* (2), 616–630.

Employee Benefit Research Institute (EBRI). (1995). *Are workers kidding themselves? Results of the 1995 Retirement Confidence Survey.* December, Washington, DC.

Harris/Scholastic Research (HSR). (1993). *Liberty financial young investor survey.* New York, NY.

Hira, T. (1993). *Financial management knowledge and practices: Implications for financial health.* Paper presented at the Personal Economic Summit '93, Washington, D.C.

Jump$tart Coalition for Financial Literacy. (2016). *State financial education requirements*. Retrieved from http://www.jumpstart.org/financial-education-requirements.html.

KPMG Peat Marwick LLP (KPMG). (1995). *Retirement benefits in the 1990s: 1995 survey data.* June. New York, NY.

Langrehr, F. W. (1979). Consumer education: Does it change students' competencies and attitudes? *The Journal of Consumer Affairs, 13,* 41-53.

Lyons, A. C. (2004). A profile of financially at-risk college students. *The Journal of Consumer Affairs, 38*(1), 56-80.

Lyons, A. C. (2008). Risky credit card behavior of college students. In J. J. Xiao (Ed.), Advances in Consumer Financial Behavior Research, 185–207. New York, NY: Springer Publishing Company.

Mandell, L. (2008). The financial literacy of young americans: Results of the 2008 Jump$tart coalition survey of high school seniors and college students. Retrieved from http://www.jumpstart.org/assets/files/2008SurveyBook.pdf.

National Assessment of Educational Progress (NAEP). (1979). *Teenage consumers: A profile.* Denver, CO

National Student Financial Wellness Study (2015). *National Student Financial Wellness Study: Key findings report*. Retrieved from http://cssl.osu.edu/national-student-financial-wellness-study/results/.

Norvilitis, J. M., Merwin, M. M., Osberg, T. M., Roehling, P. V., Young, P., & Kamas, M. M. (2006). Personality Factors, Money Attitudes, Financial Knowledge, and Credit-Card Debt in College Students. *Journal of Applied Social Psychology, 36* (6), 1395-1413.

O'Neill, B. (1993). *Assessing America's financial IQ: Reality, consequences, and potential for change.* Paper presented at the Personal Economic Summit '93, Washington, D.C.

Oppenheimer Funds/Girls Inc. (1997, March). *Girls, money and independence.* New York, NY.
PricewaterhouseCoopers. (2015). "Millennials and Financial Literacy – The Struggle with Personal Finance." Retrieved from https://www.pwc.com/us/en/about-us/corporate-responsibility/publications/millenials-financial-literacy-personal-finance.html.
Princeton Survey Research Associates (PSRA). (1996). Investor knowledge survey. *Investor Protection Trust,* May. Arlington, VA.
Princeton Survey Research Associates (PSRA). (1997, January/February). Planning for the future: Are Americans prepared to meet their financial goals? *Nations Bank~Consumer Federation of America.* Princeton, NJ.1997). *Financial literacy of mutual fund investors,* January, New York, NY.
Tierney, W., Corwin, Z., Colyar, J., (2005), Preparing for college: nine element of effective outreach. SUNY Press.
Vanguard Group/MVanguard Group/Money Magazine. (1997). *Financial literacy of mutual fund investors,* January, New York, NY. Money Magazine.
Zhou, L., & Su, H.J. (2000). Predicting college student debt: An exploratory study of behavioral determinants. *Proceedings of the Association of Financial Counseling and Planning Education*, 133-140.

Financial literacy among higher education students: The Case of Prayagraj

Praveen Kumar
Finance and Accounting Area, Indian Institute of Management Jammu, Jammu, Jammu and Kashmir, India

The study investigated the impact of students' Gender, education, awareness, and usage on financial literacy. The study was conducted using a sample of 80 respondents. Most of the respondents were educated, college students, and were aware of finance-related products and services. However, the investigation found that Gender plays no essential role in determining the financial literacy of any individual. Further, some respondents were older and unaware of the basics of finance; they need a proper income and belonged to the hand-to-mouth category of earners. Savings are the only means for these people to stay alive during recessions, but the savingsonly last for a few days. Traditional business communities also need to be made aware of the principle of growth by investing. There were few institutions where one could go and learn about financial literacy irrespective of age; the only medium they had was a smartphone. Smartphones are common nowadays, but people need to understand the proper channel to learn about financial stuff; they lack awareness and approach because they need to know where to start. The younger generation is skeptical about the stock market investing tools that are growing day by day.

*Keywords**:** Financial literacy, investment, savings, students, wealth*

Introduction

The rapid development of the Indian economy throughout the most recent twenty years and the extension of the monetary business sectors through advancement, privatization, and globalization has offered a way to excess financial products in banking, speculation, and credit items. Demographically, India utilizes 2.4% of the world's territory and 17.5% portion of the total populace. A nation's efficient monetary system is vital to financial growth. Since the onset of freedom, Indian pioneers have expected to eradicate destitution, transform India into a confident worldwide economy, and embed financial education needs in each resident's life (Naidu, 2017). Financial proficiency in the capacity to comprehend and viably utilize monetary abilities. These economic abilities are as straightforward as planning, contributing, and crediting the executives and monetary administration. Financial proficiency is the capacity to oversee cash. A solid establishment of these abilities will help accomplish different life objectives like retirement, training, and, surprisingly, going on a getaway.

The study investigated the impact of students' Gender, education, awareness, and usage on financial literacy. The study was conducted using a sample of 80 respondents. Most respondents were educated, belonged to colleges, and were aware of finance-related products and services. However, the article further observed that Gender plays no essential role in determining the financial literacy of any individual. Some respondents were older and unaware of the basics of finance; they needed a proper income and belonged to the hand-to-mouth category of earners. Savings are the only means for these people to stay alive during recessions, but the savingsonly last

for a few days. Traditional business communities also needed to be made aware of the principle of growth by investing. There were few institutions where one could go and learn about financial literacy irrespective of age; the only medium they had was a smartphone. Smartphones are common nowadays, but people need to understand the proper channel to learn about financial stuff; they lack awareness and approach because they need to know where to start. The younger generation is skeptical about the stock market investing tools that are growing daily.

You don't need to be a technical expert to understand cash and to be a monetary master to encounter the advantages of financial information. Learning the nuts and bolts of money can assist you with keeping away from economic issues, arriving at your objectives, and incrementing your satisfaction. Finding out about cash implies knowing and achieving regular cash. The executives like taking care of bills on schedule, dealing with the money they make, and putting something aside for your retirement. Financial education implies numerous things; however, the most famous are overseeing spending plans and individual costs, taking care of obligations, and understanding the risk-return trade-off in speculative items.

Financial education regularly shows people how to settle on major monetary choices. It prompts significant life changes like saving and contributing consistently. Financial education is necessary for the activities and preferences one makes concerning reserve funds and speculations to have a solid establishment (Langford, 2020). The recent downfall that the Indian economy has seen in the era of the COVID-19 pandemic has left a lot of people with no jobs and only a handful amount of savings that are lying dormant in banks. If only these people had known how to put their money into use efficiently to create a stream of passive income that would last longer than a lifetime, they would be in a better position than they are in the era of economic downfall and joblessness. A lot of individuals have taken a loan to start their venture, but they are not aware of the globalscenarios and the risks that they acquire with extra credit; the ventures sometimes fail, and they don't have a backup plan to compensate for the losses which have been avoided if they have plannedproperly.

The remainder of this paper continues: The following section overviews relevant literature. The methodology section depicts the investigation strategy adopted and the variables utilized in this investigation. Then, the study presents the outcomes of this analysis. At last, the article discusses the ramifications of the research and makes a couple of concluding remarks.

Literature Review

Research related to financial literacy is becoming a matter of growing interest among the research community. Naidu (2017) revealed that a low degree of monetary proficiency keeps people from making the best economic decisions. Even so, financial education in India needs to be improved, and effort must be made to patch the degree of proficiency. Subsequently, Agarwalla, Barua, Jacob, & Varma (2013) studied the impact of different socio-segment factors on financial ability among the functioning youth in Urban India. The effect of a few factors like sexual orientation, training, and pay is like what has been accounted for in different settings; a couple of elements explicit to India, for example, joint-family and consultative dynamic interaction, are found to impact financial education altogether.

Gupta and Kaur (2014) showed that micro-business people in the Kangra region have low monetary abilities. These are uncovered by insufficient record-keeping, ill-advised saving propensities, and less mindfulness concerning various financial items and instruments. The mix of these requirements is contributing to their pay as development. Further, Dube and Asthana (2017)

reported that the monetary literacy in Uttar Pradesh is only 50% of the economic education in India. It likewise recommends that Uttar Pradesh needs improvement regarding family financial plans, acquiring to meet finishes, cautious buys, taking care of bills and reasonableness as long as possible, and so forth.

Moreover, Prasad, Meghwal, & Dayaman (2018) found that males of families were more acquainted with computerized monetary stages and were likewise more mindful. Again, the training level assumes a critical role and is a significant determinant for mindfulness about the motorized stage and its employment. Similarly, Arora (2016) showed that financial information is more far-reaching among profoundly taught and metropolitan ladies; it likewise shows numerous ladies have positive conduct about cash and money matters, mirroring their discipline, judiciousness, and readiness while managing family finance matters. Despite being from a center pay bunch, they are careful about setting aside cash for the future.

Arya (2018) reported that more than 44% of Indian families depend on investment funds banks to keep their excess, and they detailed that they won't endure a year if a pay deficiency occurs. Additionally, Bhushan & Medury (2013) stated that the monetary proficiency level of 58.30% among all respondents needs to be more empowering. The outcome recommends that respondents' degree of economic proficiency change depending on different segments and financial variables. Moreover, financial literacy level is influenced by sex, schooling, pay, nature of business, and work environment, while it isn't influenced by age and geographic areas.

Huston (2010) uncovered that financially educated people should exhibit information and abilities expected to settle on monetary decisions. This might have all the earmarks of being a fits-all way to deal with economic education estimation. However, it mirrors the truth that everyone decides between standard monetary items and administrations. In this vein, Bhushan (2014) found that the respondents in the high economic education bunch have a higher mindfulness level of all monetary items besides post office savings. Respondents with low Financial education put resources into conventional and safe monetary things and don't put resources into dangerous monetary items with more significant yields.

Subha & Priya (2014) revealed that individual monetary ability and information are procured chiefly through experimentation. An examination has yet to explore what economic encounters and attributes have been generally compelling on a person's financial education and capability. In addition, Joseph (2014) also found that the drive and trial administration have been dispatched to place the approach into impact; we can't become smug and casualties of our prosperity. In addition to the fact that individuals should approach essential monetary administrations, they ought to utilize them effectively. However, there is still significantly more to do, such as animating the utilization of financial administrations just as access, guaranteeing long-haul steadiness of current drives, and handling new types of prohibition and minimization as they emerge.

Nunoo & Andoh (2012) proved that the financial proficiency of proprietors of SMEs is fundamental in clarifying the usage of monetary administrations by SMEs in Ghana. In addition, the review has uncovered that the economic education of proprietors of SMEs is humble. The study has likewise enlightened that monetary schooling was sometimes gotten all together, which clarifies financial education. In addition, the review has uncovered that ladies are less inclined to be monetarily proficient. Kebede, Kaur, & Kaur (2015) identified that monetary proficiency relates to socio-segment factors: sexual orientation, age, training fulfillment pay, living in a country or metropolitan region, identity, and work status. All the more explicitly, it is discovered that ladies, youthful and advanced age, individuals with low instructive accomplishment and low-pay level, jobless, provincial occupants, and individuals with less involvement with the created monetary

market are found to have a statically significant relationship with a low degree of monetary proficiency. In this way, economic proficiency training strategies must distinguish how to further develop financial education levels in these portions of the populace.

Nalini, Alamelu, Amudha, & Motha (2016) documented more premiums in putting their cash in various monetary protections. The vast majority of them are searching for tax cuts. The joint family framework and interaction of participative dynamics in India impact the level of financial education. Moreover, Bendre & Singh (2017) concluded that there is a requirement for monetary proficiency mindfulness all over the nation, where people in provincial regions have a low degree of education. Likewise, the circumstance of ladies is very unsettling as they have scored exceptionally low in monetary proficiency, just as in consideration. Kefela (2010) argued that financial literacy is significant at many levels. It is a fundamental component in empowering individuals to deal with their monetary undertakings and can make a substantial commitment to the sufficiency and effectiveness of the financial framework. A low degree of public economic information can imply that wrong danger return choices are being made and that individuals must be mindful of the dangers they face in their everyday monetary decisions. Further developed economic education can help people and families by giving them more authority over their cash and assisting them with settling on better monetary choices. Furthermore, Chijwani & Vidyapeeth (2014) also suggested that individuals inculcate the habit of financial planning as soonas they start earning as they know their long-term goals.

Research Methodology

Objective of Study

This article investigated Financial literacy among higher education students using a sample of 80 postgraduate students.

Data collection

The study used a structured questionnaire to collect primary data from students of Prayagraj and its suburbs. A response of 80 students was recorded based on convenience sampling. Further, cumulative frequency analysis, percentages, and graphs are being used to analyze the impact of students' Gender, education, awareness, and usage on financial literacy using a sample of 80 respondents.

Research questions

1. What is the impact of financial literacy on financial outcomes for postgraduate students?
2. How does financial literacy impact financial outcomes for Prayagraj vs. non-Prayagraj residents?
3. How do male and female respondents differ in the impact of financial literacy on financial outcomes?
4. How do financial literacy impact financial outcomes, and how does it differ between 20-40 years vs. 40-60 years?

Data Analysis and Findings

Demographics

It is clear from Figure 1 that most respondents belong to Prayagraj City of Uttar Pradesh and its suburbs.

Table 1
Survey Questions and descriptive statistics

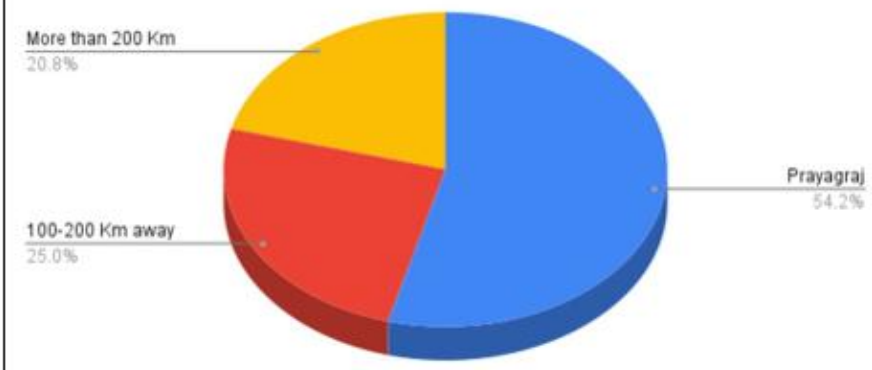
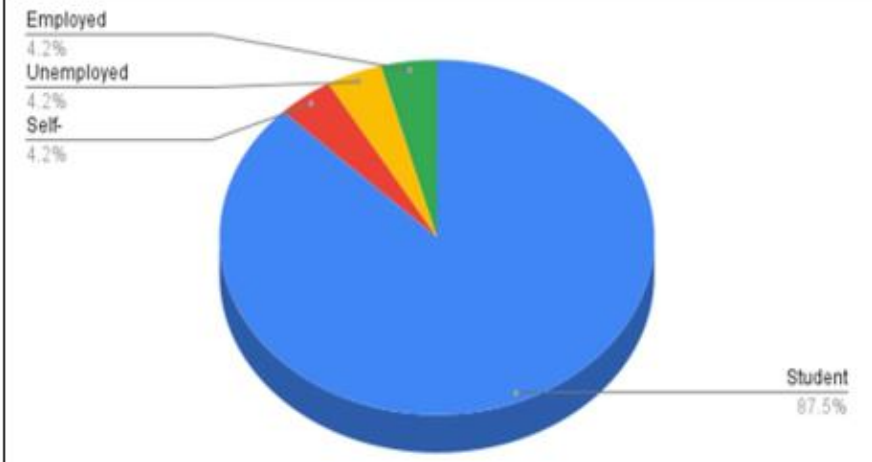
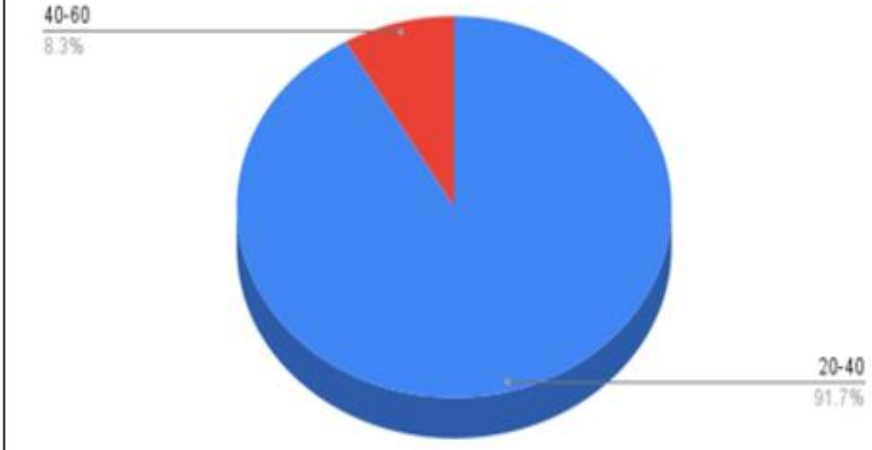
Survey Questions	Figure
Fig. 1: Place of residence	
Fig. 2: Occupation of respondents	
Fig. 3: Age of respondents	

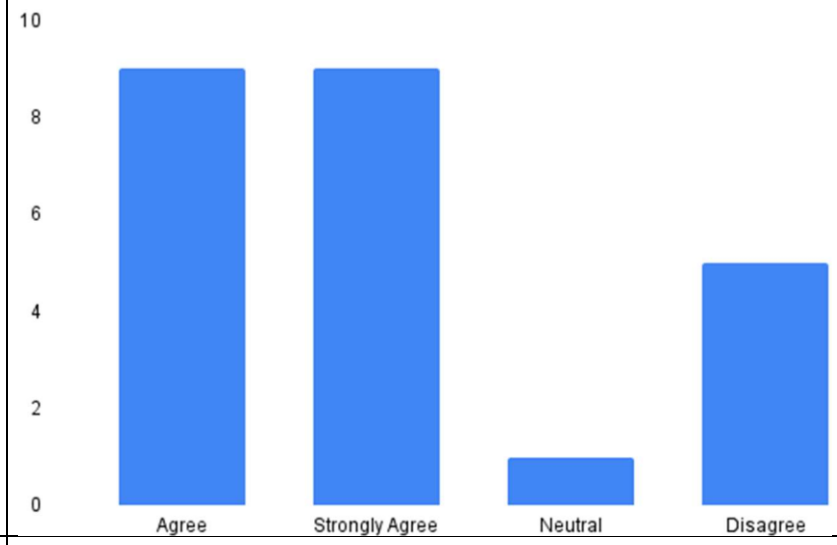
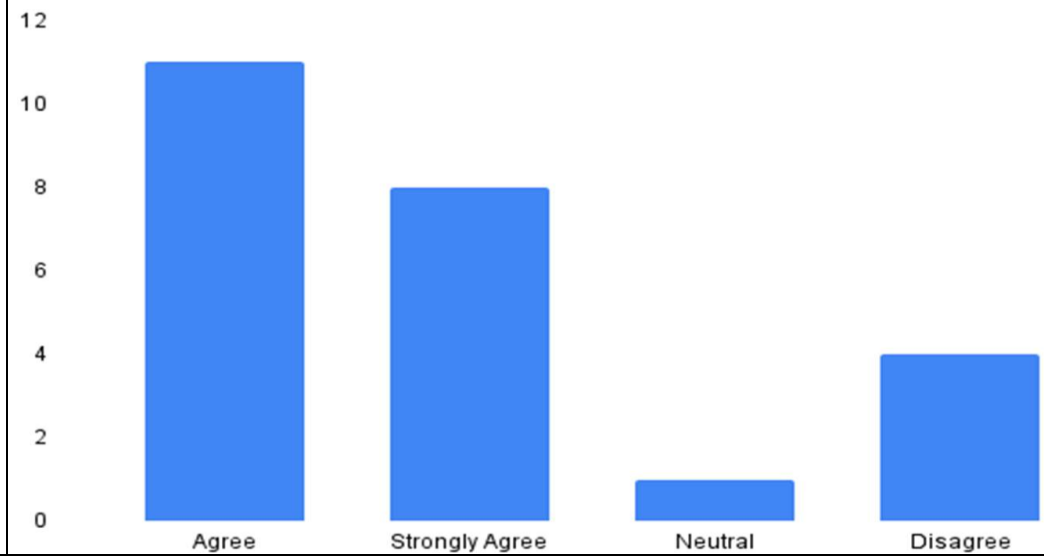
Fig. 4: Awareness of Factors like GDP, per capita income, etc.	
Fig. 5: Awareness of the stock market	

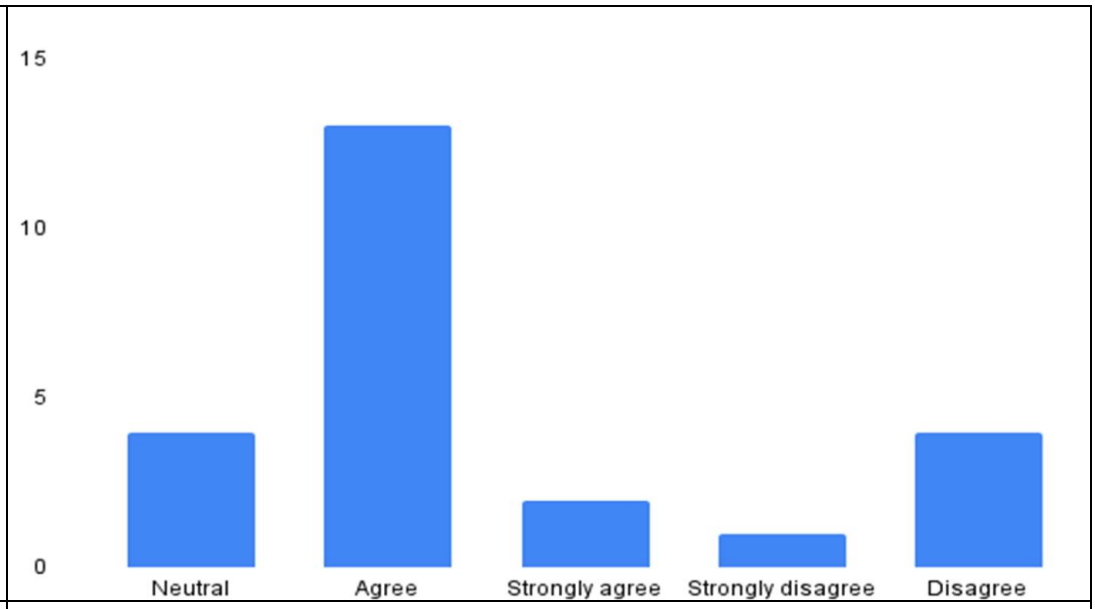
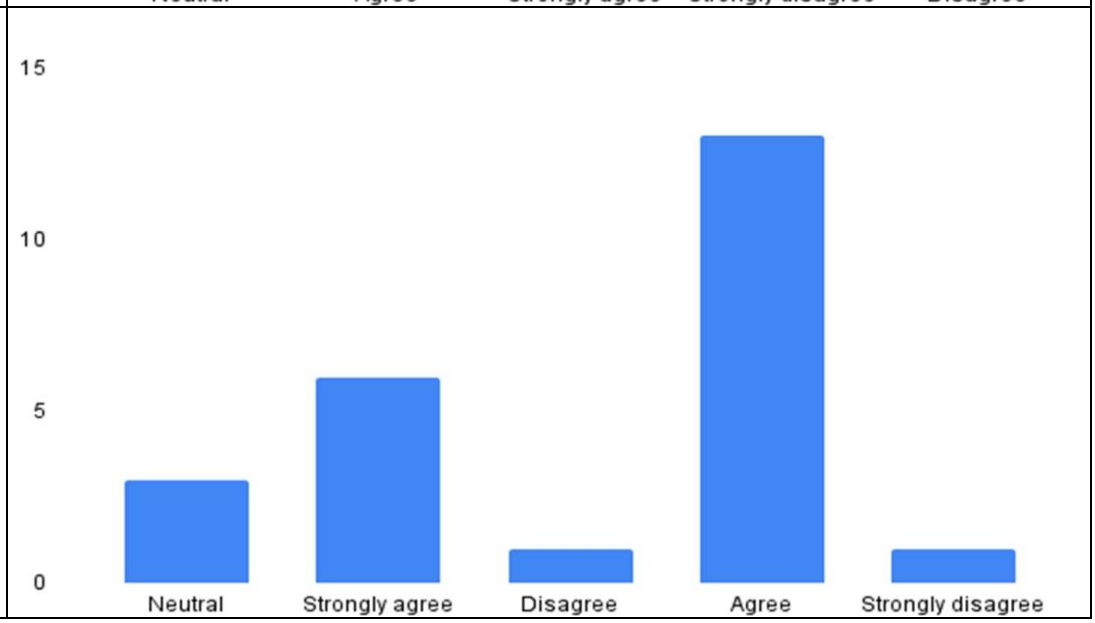
Fig. 6: Safety regarding Internet banking	
Fig. 7: Safety regarding savings bank account	

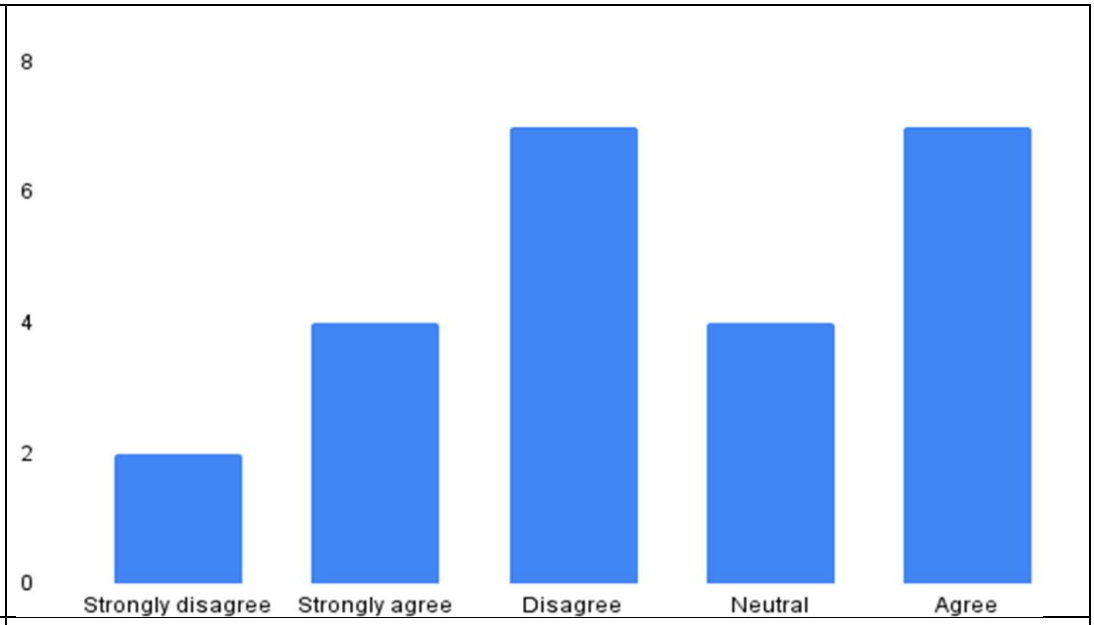
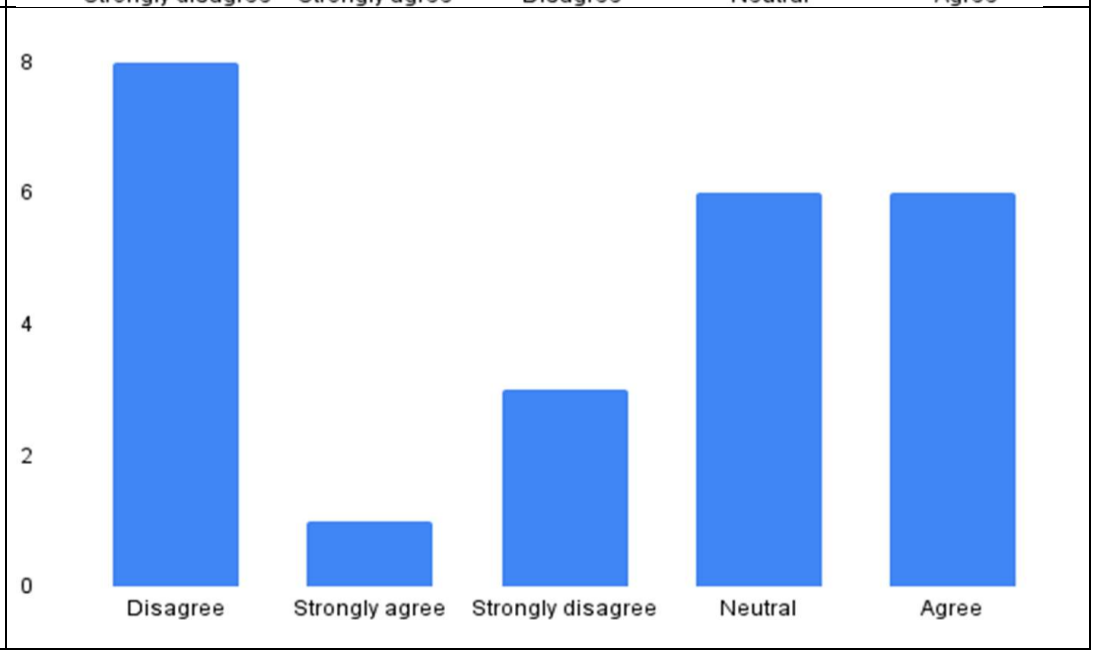
Fig. 8: Taking financial decisions on behalf of the family	
Fig. 9: Usage for investing apps	

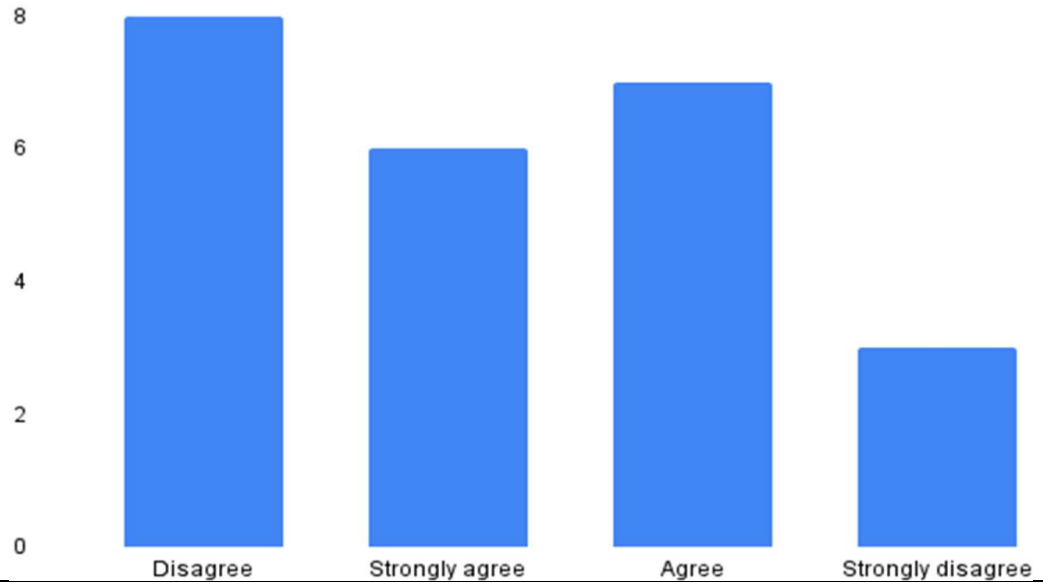
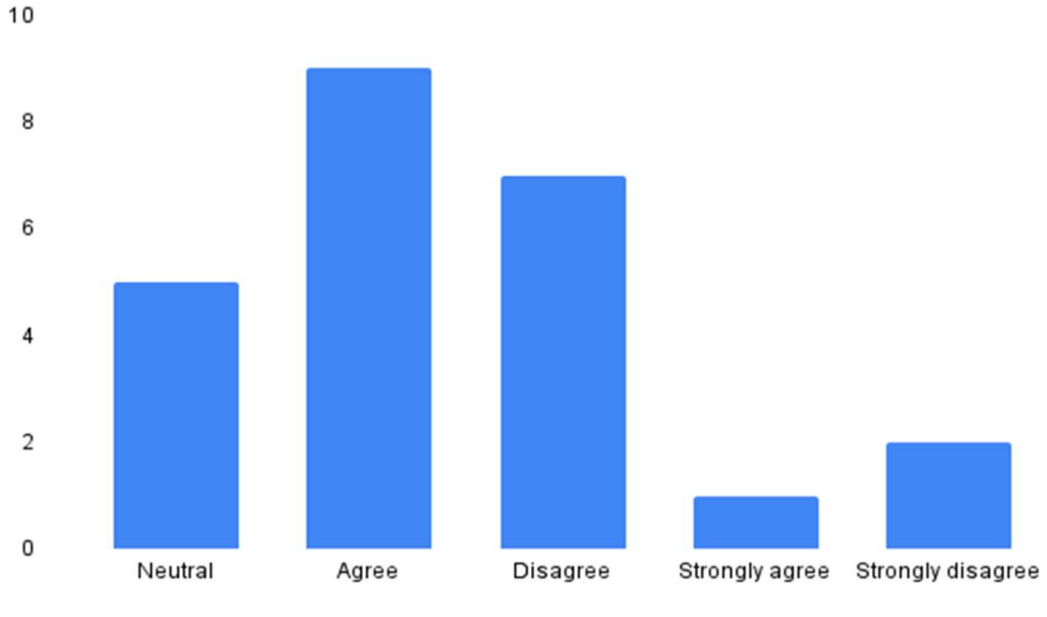
Fig. 10: Financial Planning for Retirement	
Fig. 11: Perception of financial knowledge	

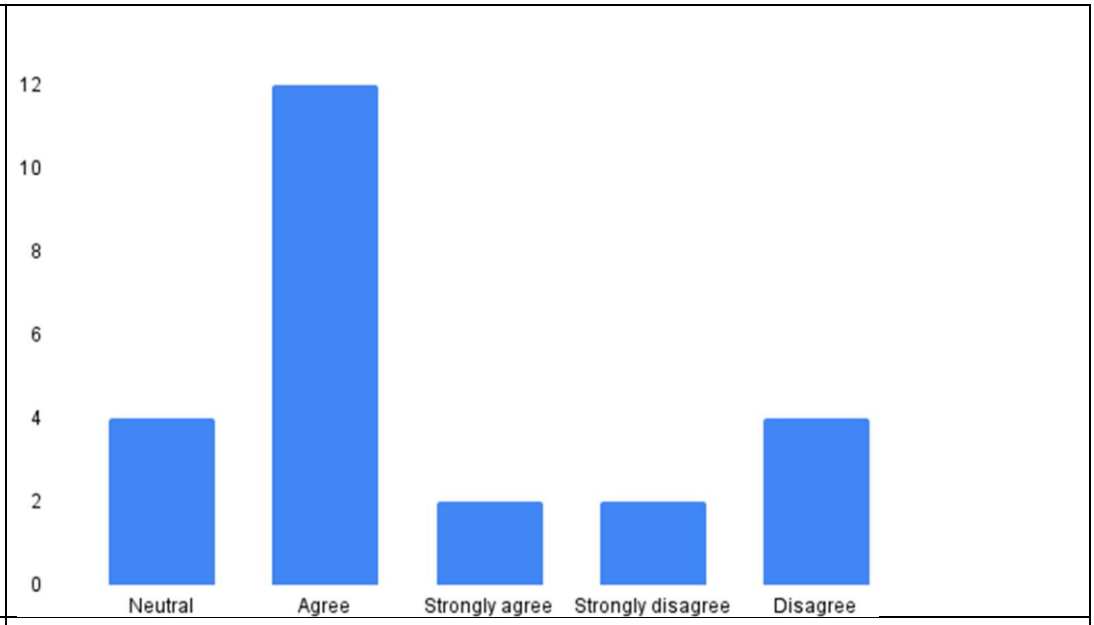
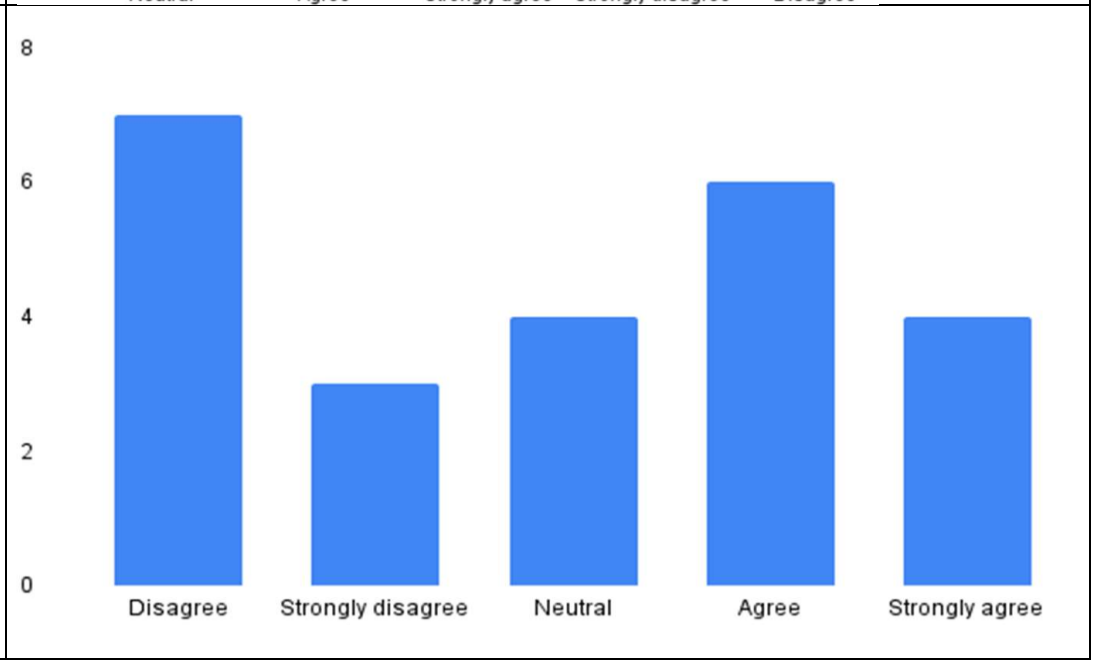
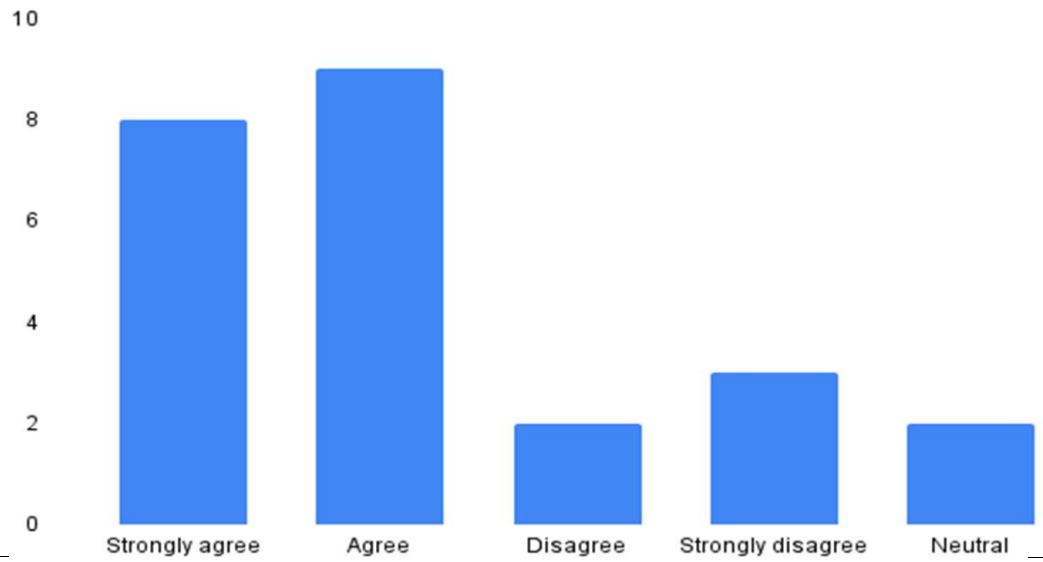
Fig. 12: Perception of knowing measure to judge economic conditions	
Fig. 13: Perception of Government initiatives	

Fig. 14: Perception of necessary financial education



Research findings and important factors affect financial literacy

What is the impact of financial literacy on economic outcomes for postgraduate students?

Figure 2 shows that most respondents are students, which denotes that the research findings can be generalized only to students' communities.

Most importantly, it is clear from Figure 3 that most respondents are young and aged 20 to 40 years (91.7%).

Factor 1: Perceived Education

Sixty percent believe that necessary financial education should be provided in school to everyone, and90 percent believe that it is essential for everyone's life. Seventy-five percent believed that being financiallyliterate helps them make an informed decision about investing and financial planning for their family. Thirty-five percent thought the government needed to do more to teach people about generalfinancial literacy.

However, a significant number of students (around 94%) feel financial education should be compulsory at the school level.

How does financial literacy impact financial outcomes for Prayagraj vs. non-Prayagraj residents?

Factor 2: Perceived awareness

Around 60 percent of the sample respondents are aware of inflation, stocks and the concept of nominal and genuine returns, bank interest rates and different types of deposits, and things like GDP, investing, etc. 24 percent of the population didn't know anything about these topics while the remaining have someidea about it.

However, financial literacy and knowledge about inflation, stocks, and the concept of nominal and genuine returns and bank interest rates are higher for Prayagraj residents (around 70%) than

Non-Prayagraj residents (about 20%). These findings depict the need for more financial literacy in rural populations than in urban ones (Berry & Syal, 2021).

How do financial literacy impact financial outcomes, and how does it differ between 20-40 years vs. 40-60 years?

Factor 3: Perceived Safety

Seventy percent of the population agreed on keeping their money in their savings bank account and feeling safeusing Internet banking services. The remaining felt safe to invest their money at a rate more than inflation to keep growing money. Few people felt safe purchasing stocks independently, and most believed in investing in mutual funds.

However, a significant number of older respondents between 40 and 60 (around 90%) feel safe keeping their money in their savings bank accounts. Further, a higher number of young respondents between 20 and 40 years old (about 62%) invest in the stock market independently. These findings show that risk profiling changes with age and financial goals. Younger investors can afford to be more aggressive, while those in their 40s should balance risk and catch up on investments. Beginners should take an aggressive stance. The most significant risk for a 40-year-old is failing to achieve financial goals and accumulating loans (Brooks *et al.*, 2018).

Factor 4: Perceived Usage

Eighty percent of the population reported keeping track of their investments with mobile-based applications and Internet banking; they use payment apps to increase digital payments while purchasing and ordering. Twenty percent of the population makes investment decisions on behalf of theirfamilies and has also taken life insurance policies as investment and risk coverage. Thirty-five percent of people have prepared for retirement and started investing early.

How do male and female respondents differ in the impact of financial literacy on financial outcomes?

Factor 5: Perceived Behavior

Forty-five percent of the population considered themselves capable of handling their investments independently. Seventy-eight percent know the measures to judge a country's economy, while 80 percent believethat the economy is not in good condition. Forty percent considered themselves as risk-taking individuals, while 60 percent considered they had the propensity to save. Only 20 percent have a long-term financial goal in their minds.

However, only 15% of females considered themselves capable of handling their investments and risk-taking individuals, compared to 85% of males. These findings portray female respondents' lack of financial literacy (Arora, 2016). Females are traditionally seen as the caregivers and homemakers and are not expected to be involved in financial decision-making.

Conclusion, Limitations, and Future Research Directions

The study was conducted online, and no physical contact was made with any respondents. The respondents belonged to Prayagraj and areas nearby, so the study has a narrow scope in determining the basic financial literacy of the general public. The study had80 respondents, which could be a

more attractive number to choose something, but it was only a possibilityand an exaggerated hypothesis. The data analysis section has been kept in descriptive form to give the reader insights intothe survey findings and the variables used to identify them. Most of the respondents were educated and belonged to colleges; it can be a reason why the data shows so many financially literate individuals in the region. Gender plays no essential role in determining the financial literacy of any individual. Some respondents were older and unaware of the basics of finance; they didn't have a good income and belonged to the hand-to-mouth category of earners.

Savings are the only means for these people to stay alive during recessions, but the savingsonly last for a few days. Traditional business people also needed to be made aware of the principle of growth by investing. There were few institutions where one could go and learn about financial literacy irrespective of age; the only medium they had was a smartphone. Smartphones are common nowadays, but people need to understand the proper channel to learn about financial stuff; they lack awareness and approach because they need to know where to start.

The younger generation is skeptical about the stock market investing tools that are growing daily. The increasing number of applications gives them more options but isequally daunting regarding brokerage transparency and perceived safety while makingsignificant investments.

- There is a need to create more awareness among the people regarding financial literacy and its components, factors of a good economy, and how to evaluate those factors.
- Government initiatives should be started to teach people about the basics of financial literacy to understand one's economic growth better. Introductory finance courses should be conducted at the school level, irrespective of which board the school belongs to.
- There is a concern among people about the reliability of investing apps that are blooming nowadays; security concerns and transparency are things that scare most people. Transparency in the fees of a brokerage should be done to inspire confidence among consumers.
- Digital payment applications are the easiest to use, but there is alwayssome scope for improvements that can be made so that the old and less educated can also use them without any fuss.

Acknowledgement

I want to extend my gratitude and thanks to Saurabh Chandra, MBA Student at the School of Management Studies Motilal Nehru National Institute of Technology Prayagraj, for his efforts in the collection and analysis of data. His expertise and support have greatly benefited the study.

References

Agarwalla, S. K., Barua, S. K., Jacob, J., & Varma, J. R. (2015). Financial literacy among working young in urban India. *World Development, 67*, 101-109.

Arora, A. (2016). Assessment of financial literacy among working Indian women. *Business Analyst, 36*(2), 219-237.

Arya, P. (2018). Financial literacy and financial education in India: An assessment. *International Research Journal of Commerce Arts and Science, 9*(3), 72-80.

Agarwalla, S. K., Barua, S. K., Jacob, J., & Varma, J. R. (2015). Financial literacy among working young in urban India. *World Development, 67*, 101-109.

Arora, A. (2016). Assessment of financial literacy among working Indian women. *Business Analyst, 36*(2), 219-237.
Arya, P. (2018). Financial literacy and financial education in India: An assessment. *International Research Journal of Commerce Arts and Science, 9*(3), 72-80.
Berry, R., & Syal, S. (2021). A Study on Financial Literacy Level of Individuals of Urban and Rural Areas of Shimla. *Knowledge Management in Higher Education Institutions*, 147.
Bendre, A., & Singh, V. (2017). Financial literacy paving the way for financial inclusion in India. *International Journal of Engineering Technology Science and Research, 4*(12), 359-370.
Bhushan, P. (2014). Relationship between financial literacy and investment behavior of salaried individuals. *Journal of Business Management & Social Sciences Research, 3*(5), 82-87.
Bhushan, P., & Medury, Y. (2013). Financial literacy and its determinants. International Journal of Engineering, *Business and Enterprise Applications, 4*(2), 155-160.
Brooks, C., Sangiorgi, I., Hillenbrand, C., & Money, K. (2018). Why are older investors less willing to take financial risks?. *International Review of Financial Analysis*, 56, 52-72.
Chijwani, M., & Vidyapeeth, D. Y. P. (2014). A study of financial literacy among working women in Pune. *International Journal for Scientific Research & Development, 1*(11), 2456-2458.
Dube, V. S., & Asthana, P. K. (2017). A comparative study on Financial Literacy of Uttar Pradesh with Central Zone states in India. *IOSR Journal of Business and Management, 19*(10), 22-27.
Gupta, K., & Kaur, J. (2014). A study of financial literacy among micro-entrepreneurs in district Kangra. International journal of research in business management, 2(2), 63-70.
Huston, S. J. (2010). Measuring financial literacy. *Journal of Consumer Affairs, 44*(2), 296-316.
Joseph, D. (2014). A study on financial inclusion and financial literacy. *International Journal of Business and Administration Research Review, 2*(4), 126-134.
Kebede, M., & Kuar, J. (2015). Financial literacy and management of personal finance: a review of recent literatures. *Research Journal of Finance and Accounting, 6*(13), 92-106.
Kefela, G. T. (2010). Promoting access to finance by empowering consumers-Financial literacy in developing countries. *Educational research and reviews, 5*(5), 205.
Langford, L. (2020). Financial Literacy for Beginners: The Basics. Retrieved from: https://www.self.inc/blog/financial-literacy-for-beginners
Naidu, J. G. (2017). Financial literacy in India: A review of literature. *International Journal of Research in Business Studies and Management, 4*(6), 30-32.
Nalini, R., Alamelu, R., Amudha, R., & Motha, L. C. S. (2016). Financial literacy and its contributing factors in investment decisions among urban populace. *Indian Journal of Science and Technology, 9*(27), 1-9.
Nunoo, J., & Andoh, F. K. (2012). Sustaining small and medium enterprises through financial service utilization: does financial literacy matter?
Prasad, H., Meghwal, D., & Dayama, V. (2018). Digital financial literacy: A study of households of Udaipur. *Journal of Business and Management, 5*, 23-32.
Subha, M. V., & Priya, P. S. (2014). The emerging role of financial literacy financial planning. *International Journal of Innovative Science, Engineering & Technology, 1*(5), 400-408.

Teaching Early Exercise, the Asymmetry of Changes in Payoff, and the Speculative Value of Options

Jonathan Bitting
Appalachian State University

Jeff Hobbs
Appalachian State University

Alex Holcomb
Appalachian State University

To understand options well, one must understand the early exercise decision. Derivatives textbooks, however, tend to give this topic short shrift. This paper advocates a more thorough treatment focusing on potential changes in payoff, intrinsic value, and the time value of money. First, it splits what is commonly referred to as an option's "speculative value" into a time value of money component and a "true speculative value" component. Second, it shows how payoff asymmetry affects the option's true speculative value and establishes the underlying asset's current price, relative to the option's strike price, as the owner's principal reference point. Third, it uses put-call parity to calculate an American put option's early exercise "indifference point" in relation to the value of an identical call and to reveal the early exercise premium as a tradeoff. These concepts extend beyond early exercise and are fundamental to European option valuation. By emphasizing them, derivatives instructors can provide a much richer understanding of the essence of options.

Keywords: options, derivatives, pedagogy, speculative value, early exercise.

Introduction

Financial derivatives textbooks often give a substantially lighter treatment to the early exercise of call and put options than to the binomial pricing model, the Black-Scholes-Merton formula (see Black and Scholes, 1973 and Merton, 1973), the "Greeks," and other key subjects. For example, the seventh edition of Options, Futures, and Other Derivatives (Hull, 2017) uses an example of a forthcoming dividend to discuss the early exercise of a call option as well as an extreme case in which early exercise would be preferable for a put option. In An Introduction to Derivative Securities, Financial Markets, and Risk Management (2013), Jarrow and Chatterjea use similar examples to Hull (2017) to show how early exercise is sometimes advisable. In An Introduction to Derivatives and Risk Management (2016), Chance and Brooks illustrate the early exercise decision for both calls and puts using binomial trees (as do the aforementioned books) and briefly discuss the tradeoffs therein.

Unlike this paper, most of the options pedagogy literature focuses on games and other classroom exercises (see Smolira and Travis, 2011, Saunders, 2014, and Brous, 2017). On the specific topics of speculative value and early exercise, however, a more generalized, theoretical approach can work if the instructor keeps the mathematics simple.

This paper argues that derivatives instructors should emphasize the early exercise decision considerably more than the most influential derivatives textbooks do. Rather than relegate this topic to an example within the binomial pricing model or a brief discussion of cases that may trigger early exercise, we suggest an integrative approach incorporating the time value of money, speculative value, and current versus potential payoffs. The relationships between these concepts are significant within the early exercise decision and, if emphasized, should provide students with a better understanding of the nature of options and their inherent tradeoffs.

In the next section of this paper, we discuss speculative value and divide it into two components. In the following section, we discuss the asymmetry of potential changes in payoff and examine its relationship to speculative value. After that, we provide a simple calculation of the "critical point" where the holder of a put option is indifferent toward exercising early. We then provide an example that allows the derivatives student to view the early exercise premium as the net result of a simple tradeoff. Last, we outline some additional ways to view the relationships between the different components of options' values. If implemented, we estimate that the main examples and discussion provided in this paper will take roughly one hour of class time. As a result, we do not recommend that our suggestions be incorporated into a non-derivatives-specific class such as financial management or investments. However, we strongly suggest that classes focusing on derivatives take the necessary time to cover these topics.

Speculative Value

We recommend that instructors begin their discussion of the early exercise decision with intrinsic value (hereafter sometimes denoted "IV") and speculative value ("SV"), given that those ideas are typically presented within the first few lectures of a derivatives course and thus should already be familiar to the students. Because SV is an abstruse concept and is often simply defined as the part of an option's total value that is not its IV, we recommend that instructors follow the lead of most textbooks and discuss intrinsic value before speculative value.

It is important to note that an option's IV equals its total value only if a) there is no time remaining until expiration or b) the option is at least as valuable if it is exercised now as if it is not. When the time to expiry is nonzero, one must consider the time value of money ("TVM") as part of the option's value. The TVM represents a benefit for call options as the owner may delay paying the exercise price ("X") and a cost for put options as the owner may delay receiving X. In the case of European-style options, this benefit to a call or cost to a put is guaranteed by the inability to exercise early.

We suggest that the instructor now turn to the Black-Scholes-Merton model, which prices European options. Consider a call with X = 100 and one year until expiration. The annualized risk-free rate in the economy ("r") is 5% and the underlying asset's volatility ("σ") is 49%. The table below provides Black-Scholes-Merton call option values for four different prices of the underlying asset, denoted "S_0". The total values of the call ("C") are given. We suggest that the teacher begin by asking the students to measure the TVM, which is a positive number given that it represents the benefit of paying X later rather than now. The calculation is: $X - Xe^{-rT} = \$4.88$.

Here the instructor may highlight several relationships, such as that between the TVM, IV, and the minimum value of a call, which is written $\text{Max}(0, S_0 - Xe^{-rT})$. The difference between this minimum value and the intrinsic value of $\text{Max}(0, S_0 - X)$ is the TVM. Because speculative value is typically defined as the part of an option's value that is not intrinsic, it stands to reason that this difference between the minimum and intrinsic values would be part of the extrinsic ("speculative") value.

It is at this point that we argue for separating what is usually called the option's speculative value into two parts: TVM, which is not speculative at all, and the remainder, which we term "true speculative value" or "TSV." Herein lies the most important contribution of the paper. Splitting up SV in this manner not only clarifies the different components of an option's total value but, as we will see later, also shows the early exercise of calls to be inadvisable and reveals the tradeoff within the early exercise decision for puts. It can also be calculated very easily using put-call parity, which in turn illustrates some interesting pricing relationships.

We continue our earlier example via the table below, but recommend that the students be provided only the values of S_0 and C. If those students already know that total value equals the sum of intrinsic and speculative value, then they should be able to fill in the rest of the table given their earlier calculation of TVM:

Table 1
Components of the total value of a call option (given as "C") given current values of the underlying asset, S_0. For all cases, X = 100, r = 5%, σ = 49%.

S_0	C	*IV*	*SV*	*TVM*	*TSV*
80	10.41	*0*	*10.41*	*4.88*	*5.53*
100	21.42	*0*	*21.42*	*4.88*	*16.54*
120	35.50	*20*	*15.50*	*4.88*	*10.62*
1000	904.88	*900*	*4.88*	*4.88*	*0*

The most extreme example above (S_0 = 1000, X = 100), illustrates how the TVM advantage of waiting to pay X clearly falls within the part of the option's total price that most refer to as its "speculative value". Here the instructor may mention that where the TSV is zero, the option is worth its IV plus the TVM advantage of delaying payment of the strike price. This is clearly more than just the IV that would be captured by early exercise and thus all call options on non-dividend-paying stocks, regardless of their speculative values, are worth more "alive" (unexercised) than "dead" (exercised).

True Speculative Value and the Asymmetry of Changes in Payoff

TSV, owing to its abstract and highly mathematical nature, is rarely explored in depth in undergraduate-level derivatives courses. We posit, however, that it can be taught without complicated formulas or elaborate theorizing. If we once again look back to Table 1, we can see that the TSV of the option when S_0 = 1000 is zero. This is because the already-realized gains of $900 are attributed to intrinsic value whereas future gains and losses produced by reasonable moves in the underlying asset (incremental to the $900 that we already have earned) are symmetrical.

While most textbooks focus on the strike price as the option holder's primary reference point, we suggest using the current payoff instead. With that amount already accounted for as the option's IV, the prospective additions to and subtractions from IV are what determine any additional value (beyond TVM) that might accrue to the option. Notice that within Table 1, TSV is highest when the call is at-the-money (S_0 = 100, X = 100). Here, there is perfect *asymmetry*; every dollar that the underlying asset rises is a $1 gain relative to our current position whereas every dollar that the underlying falls produces no loss of payoff – it stays at zero.

Next, the instructor may want to discuss how forthcoming dividends can outweigh the TVM advantage of not exercising call options early, thus making them worth more "dead" (exercised)

than "alive" (unexercised). This again emphasizes the tradeoffs that are the key to the early exercise decision.

Put Options

Many derivatives textbooks including those by Hull (2009), as well as Chance and Brooks (2016), discuss call options first and put options second in long sections dealing with binomial trees, price boundaries, or the Greeks. We suggest a similar approach here, given that in our experience students have less difficulty with calls than they do with puts. The table below uses the same assumptions as Table 1 but provides prices for the underlying stock and a European-style put, rather than a call, on that stock.

Table 2
Components of the total value of a put option (given as "P") given current values of the underlying asset, S_0. For all cases, X = 100, r = 5%, σ = 49%.

S_0	P	*IV*	*SV*	*TVM*	*TSV*
100	16.54	*0*	*16.54*	*-4.88*	*21.42*
85	22.94	*15*	*7.94*	*-4.88*	*12.82*
65	34.86	*35*	*-0.14*	*-4.88*	*4.74*
.00001	95.12	*100*	*-4.88*	*-4.88*	*0*

To begin, the instructor should ask the students to calculate the TVM part of the option's speculative value. This calculation is $-(X - Xe^{-rT})$, given that European-style options force the holder to receive a fixed amount (X) at expiration rather than now, which is a disadvantage in present value terms. Each IV, SV, and TSV should then be easy to calculate.

Once the students have filled out the table, they will find themselves in a position to make more connections. First, as with the call option from earlier, the put has its highest TSV when it is at-the-money. Here we again have perfect asymmetry of potential changes in payoff; this time, down-moves in the stock increase the option's payoff whereas up-moves keep it at zero, thus illustrating the heads-I-win, tails-I-tie (excluding the premium, which is a sunk cost) nature of options.

Second, notice that TSV in the extreme case (S_0 = .00001, X = 100) is zero. Here we again have perfect asymmetry, but this is a potentially harmful asymmetry to the owner of the put; there is only $.00001 more to possibly gain and about $100 to lose. Clearly, there is no speculative value for the option holder in that situation.

Third, notice that if the put is at-the-money (S_0 = 100, X = 100), its TSV of $21.42 equals the total value of the identical call from Table 1. Depending on the amount of time the instructor wishes to devote to this topic, he or she may expound upon this. We discuss these relationships in more detail later in this paper.

Fourth and most important, by splitting speculative value into its two components, we see the inherent tradeoff in the early exercise decision. While most textbooks use binomial trees to explain early exercise, our example in Table 2 clearly shows the tradeoff between TVM and TSV. In the case where S_0 = 65, the owner of an identical American-style put weighs giving up the option's TSV of $4.74 in order to gain $4.88 in TVM. This is clearly advisable, and therefore the American-style put is worth its IV of $35, giving it an early exercise premium over its European-style twin of $35 - $34.86 = $0.14. This premium exactly equals the benefit/cost differential of exercising the option now.

Possible Additions

In this section, we offer some additional topics that are related to the preceding material. We consider them to be less important for an undergraduate-level derivatives course than the topics discussed earlier in the paper, but they are interesting enough to merit consideration. We strongly recommend that an instructor of an MBA- or Masters of Finance-level derivatives course include them.

The Early Exercise Premium: Exercising Now vs. Possibly Exercising Early in the Future

We concluded the last section of this paper with an explanation of the early exercise premium. The instructor may also wish to impress upon the students that the mere existence of an early exercise premium does not imply that one should exercise the American-style put now. This concept is best explained through a binomial option-pricing example, where an American-style put may be worth more than both its European-style twin and its own intrinsic value.

Consider the two-period binomial tree for a European-style put where the strike price is $100, the per-period risk-free rate is 2.5%, the "up-factor" (i.e. the gross return on the underlying asset if its price moves upward) is 1.2, the "down-factor" (the gross return on the underlying asset if its price moves downward) is 0.8, and the underlying asset is worth $75. These parameters produce a tree with a current value of $27.47 for the put, which implies $2.47 of speculative value:

Table 3
Two-period binomial pricing tree for a European-style put option. Assumptions are that X = 100, r = 2%, u = 1.2, d = 0.8.

Period 0	Period 1	Period 2
		$S_{uu} = 111.75$
		$P_{uu} = 0$
	$S_u = 91.55$	
	$P_u = 14.78$	
$S_0 = 75.00$		$S_{ud} = 65.38$
$P_e = 27.47$		$P_{ud} = 34.62$
	$S_d = 53.56$	
	$P_d = 45.36$	
		$S_{dd} = 38.25$
		$P_{dd} = 61.75$

To convert the above tree from a European- to American-style put, one replaces the put's value in the Period 1 down-state with that state's IV of $46.44. This increases the current value of the option to $27.93 in anticipation of early exercise should the underlying stock fall in Period 1. That possibility of early exercise is solely what gives the put its early exercise premium of $27.93 - $27.47 = $0.46; the holder would not exercise now, given that doing so would yield only $25, whereas selling the option would yield $27.93. A similar table to Table 2 shows the tradeoff inherent in the early exercise decision today, where the time value of money is $100/(1.025)^2 - 100 = -4.82$:

Table 4
Components of the total value of an American put option (given as "P") given current values of the underlying asset, S_0. For all cases, X = 100, r = .05, σ = 49%.

S_0	P	*I.V.*	*S.V.*	*TVM*	*TSV*
75	28.54	*25*	*3.54*	*-4.82*	*8.36*

In the previous section of this paper, Table 2 showed how if the underlying stock is priced at $65, the TVM outweighs the option's TSV, creating an early exercise premium. Tables 3 and 4 show how, if the stock is priced at $75 instead, the early exercise premium exists because the TVM *might* outweigh the option's TSV in the future. This distinction is important to help the students better understand the early exercise decision.

Finding the Critical Point for a Put Option

It takes little time to calculate the "critical" point, which is the price of the underlying asset that makes the owner of a put option indifferent to exercising early. The instructor may briefly explain, as follows, why the critical point exists where an otherwise-identical-but-European put is worth exactly its intrinsic value. If the stock price were higher, the European put would be worth more than its IV and thus the owner would prefer to wait rather than exercise now. If the stock price were lower, the put would be worth less than its IV, making early exercise preferable. It is only at the point where $P_e = X - S_0$ (or, from the perspective of the stock, $S_0 = X - P_e$) that the owner of this put's American-style twin would be indifferent to early exercise.

The perceptive student may detect shades of put-call parity in the above result. We now advise the instructor to go one step further and use that result within the equation for put-call parity as follows:

(1) Put-Call Parity: $S_0 = C_e - P_e + Xe^{-rT}$.
(2) Substitute the result $P_e = X - S_0$ in for P_e such that $S_0 = C_e - (X - S_0) + Xe^{-rT}$.
(3) Cancel S_0 and rearrange such that $C_e = X - Xe^{-rT}$.

Thus, the critical stock price for an American-style put is the one that makes an identical-but-European-style call worth exactly the time value of money. This relates to the world of theoretical options research and is something of a pedagogical analogue, using much simpler mathematics, to Battauz, De Donno, Gajda and Sbuelz (2022). It can also serve as an extension to Hobbs (2021), which uses the concept of payoff asymmetry to offer a new, alternative proof of minimum option values.

Calculating the True Speculative Value of In-the-Money Options

Although derivatives courses often gloss over speculative value, we have shown that its TVM component is easy to both calculate and intuit. It turns out that owing to put-call parity, TSV is also easy to calculate. We recommend that the instructor delve into this calculation, for it produces some interesting results and cleanly illustrates the nature of several important relationships in the options world. To begin our discovery of an option's true speculative value, we write the equation for put-call parity:

(1) $C + Xe^{-rT} = P + S_0$.

Now rearrange (1) to solve for the total value of either option (here we choose the put):

(2) $P = C - S_0 + Xe^{-rT}$.

Since we are trying to find the put's TSV, first consider the other part of its SV, the TVM. The put option's TVM is written $-(X - Xe^{-rT})$ or $Xe^{-rT} - X$. We already have Xe^{-rT} on the right-hand side of the equation, so let us both add and subtract X to create $Xe^{-rT} - X$:

(3) $P = C - S_0 + Xe^{-rT} - X + X$.

We can then rearrange the above equation as follows:

(4) $P = X - S_0 + Xe^{-rT} - X + C$.

Recall that the total value of an option is the sum of IV, TVM, and TSV. If the put is in the money, then the $(X - S_0)$ part of equation (4) is its IV. $(Xe^{-rT} - X)$ is TVM. Thus, the remainder (C) must be the TSV. This means that the TSV of any in-the-money put option exactly equals the full value of an identical call – an interesting finding.

Now we will rearrange equation (4) to isolate the total value of a call:

(5) $C = S_0 - X + X - Xe^{-rT} + P$.

If the call is in the money, then $(S_0 - X)$ is its IV. The next component on the right-hand side of the equation above, $(X - Xe^{-rT})$, is the call's TVM. This leaves P as the remainder of the call's total value, which is its TSV. Therefore, we conclude that the true speculative value of any in-the-money call option is exactly equal to the total value of an identical put. These relationships should be easy for students to understand and to compare to those that we discuss next.

Calculating the True Speculative Value of Out-of-the-Money Options

The above exercise determines the TSV of in-the-money options. For at-the-money options, $X = S_0$, thus simplifying the equations to produce the same result. For out-of-the-money options, however, we must conduct a separate exercise. Let us begin with put-call parity, presented in terms of the value of a call:

(1) $C = P + S_0 - Xe^{-rT}$.

Now we split up "C" into its components, where the subscript denotes a call option:

(2) $IV_c + TVM_c + TSV_c = P + S_0 - Xe^{-rT}$.

If the call is out-of-the-money, then $IV_c = 0$. Given that $TVM_c = X - Xe^{-rT}$, we can write the equation:

(3) $X - Xe^{-rT} + TSV_c = P + S_0 - Xe^{-rT}$.

We then rearrange the above equation to find the TSV:

(4) $TSV_c = S_0 - X + P$.

It is interesting to compare this with the TSV of an in-the-money call, which equals the total value of an identical put. For out-of-the-money calls, however, the TSV equals the total value of an identical put minus how far out of the money the call is ($S_0 - X$ is a negative number).

If one begins at step (1) and isolates P rather than C and proceeds similarly through the subsequent steps, one arrives at a TSV of $X - S_0 + C$. This means that the true speculative value

of an out-of-the-money put equals the total value of an identical call minus how far out of the money the put is.

Implementation

Given that we have covered many topics in this paper, we now suggest an order in which to teach them. The primary objective is to help the students become better at thinking in the abstract. This is always difficult, but the simplicity of the math that we use, especially in relation to that used in Battauz, De Donno, Gajda and Sbuelz (2022) and in graduate-level derivatives textbooks, should be very helpful. We firmly believe that undergraduate-level students can learn these topics.

We recommend the following plan for one 75-minute lecture. First, the instructor explains the division of "speculative value" into its TVM and TSV components. He or she then gives the students a range of stock and corresponding call values for the same strike price and asks them to calculate the option's IV, TVM and TSV, then explains the effect of payoff asymmetry on TSV. The instructor then does the same for puts. Following that is a segment on early exercise, which is a simple question of whether the option is worth more dead (IV) or alive (IV + TVM + TSV). Given that 1) early exercise is considered only when options are in-the-money, 2) TSV is always non-negative in those cases, and 3) the pre-expiry TVM for calls is always positive, calls are worth more alive than dead and thus not exercised early (the instructor may then consider discussing the counterexample of dividend-paying stocks).

For puts, the pre-expiry TVM is negative, making the early exercise question a very simple one: does TVM outweigh TSV? The instructor then shows how an early exercise premium may imply the possibility of early exercise in the future rather than immediately. A binomial tree in Chance and Brooks (2016) prices a European put at $5.03 and its American twin at $7.48. The puts have no intrinsic value, however, and thus the TVM gained from early exercise is outweighed by the TSV lost. Last, and with time permitting, we suggest that the instructor calculate the TSV of in- and out-of-the-money options. For in-the-money options, this displays the amusing "trick" of creating the IV component by adding X to the put-call parity equation, which requires also subtracting X, which happens to create the TVM component, which implies that the final component (TSV) simply equals the remainder (C or P).

There are always potential pitfalls in the implementation of challenging material. Obviously, the above lecture should occur late in the term, after the students have not only been introduced to implied and speculative value but have used them many times over. Some of the subjects discussed here are simple at their cores and should be taught simply. For example, we have found that describing TVM and TSV as opposing forces on a put's speculative value is very easy for students to comprehend. From there, it is easy to get them to see that if the TVM outweighs the TSV, a negative speculative value and immediate exercise are implied.

One of the authors of this paper teaches an undergraduate-level derivatives course that includes a lecture on this material. The others attended that lecture last semester and we were all pleasantly surprised by how well the students followed and understood it. Despite the perceived difficulty of both, the lecture and course received extremely positive comments in class and on student evaluations. In the future, the teacher plans to evaluate the students' learning via quizzes or exams on the topics of true speculative value, asymmetry, and the early exercise of puts. The "hard skills" emphasized here such as logical and abstract thinking are likely to help students both inside and (more often) outside the derivatives world.

Conclusions

In this paper, we began by splitting an option's speculative value into “time value of money” and "true speculative value" components. This is important because TVM is not speculative and thus should be considered its own portion of total value. Moreover, TVM shows that even (non-dividend-paying) calls that have zero TSV are worth more than their intrinsic values and thus should not be exercised early.

We then discussed the nature of true speculative value. We advised instructors to forgo high mathematics in favor of more intuitive discussions of the symmetry or asymmetry of possible changes in the option's payoff relative to its current status. For example, it is easy for students to understand that deep-in-the-money put options often have much more to lose than gain and thus may have very little speculative value. Training the students to focus on the underlying asset's current price will make them less likely to "anchor" on the exercise price and should help them better understand TSV.

Following this, we showed that the early exercise premium for a put option is a direct measure of the tradeoff between the two parts of the option’s “speculative value.” This should give students a clear picture of the cost and benefit of exercising early versus holding or selling the option.

Last, we introduced several additions. We first pointed out that the existence of an early exercise premium does not imply immediate exercise; it may arise instead from the possibility of early exercise in the future. We also provided a brief calculation of a put option’s early exercise “indifference point.” Last, we used IV, TVM, and put-call parity to provide proofs of the TSV of both in-the-money and out-of-the-money options, yielding interesting relationships for the students to ponder.

We estimate the core topics in this paper to take the typical derivatives instructor about one hour of class time to cover and the proposed additions another 40-60 minutes. However, we feel that the additions are worth the extra time, for they show more clearly the different components of an option's value and the tradeoffs between them. They also show the relationships between and within several different topics in the options world.

References

Battauz, A., De Donno, M., Gajda, J., & Sbuelz, A. (2022). Optimal Exercise of American Put Options Near Maturity: A New Economic Perspective. *Review of Derivatives Research*, 25(1), 23-46.

Black, F., & Scholes, M. (1973). The Pricing of Options and Corporate Liabilities. *Journal of Political Economy*, 81(3), 637-659.

Brous, P. (2017). Real Option Application Project: Enhancing Students' Analytical and Critical Thinking Skills. *Journal of Financial Education*, 43(1), 63-83.

Chance, D., & Brooks, R. (2016). *An Introduction to Derivatives and Risk Management*. Cengage Learning.

Hobbs, J. (2021). A Simple Alternative Method of Teaching Option Price Boundaries. *Journal of Financial Education*, 47(1), 54-61.

Hull, J. (2017). *Options, Futures, and Other Derivatives*. Prentice-Hall.

Jarrow, J. & Chatterjea, A. (2013). *Derivative Securities, Financial Markets, and Risk Management*. W. W. Norton & Company.

Merton, R. (1973). Theory of Rational Option Pricing. *Bell Journal of Economics and Management Science*, 4(1), 141-183.

Saunders, K. (2014). Option Trading Strategies in a Student Managed Investment Fund. *Advances in Financial Education*, 12, 48-64.

Smolira, J. & Travis, D. (2011). Applying Options in the Classroom: Selling Calls and Puts on Grades. *Journal of Financial Education*, 37(1), 43-54.

Foreign Exchange Operating Exposure: A Practical Teaching Approach

Scott McCarthy
University of Queensland

This paper serves as a pedagogical tool to assist students to understand the challenging concept of foreign exchange operating exposure. Operating exposure refers to how exchange rate changes can impact on a firm's future cash flows and consequently affect the firm's value. The cash flows may be contractual or anticipated. The idea of an exposure without contracted cash flows can prove a difficult concept to grasp. Equally difficult to comprehend, unlike transaction and translation exposure, operating exposure can impact on firms that do not themselves have foreign currency dealings; they may feel the impact indirectly through their market competition. From experience with graduate and MBA students, a theoretical introduction followed by a comprehensive example applied to a real multinational company has proven successful in facilitating student learning.

Introduction

The purpose of this paper is to assist students to understand foreign exchange (FX) exposure, specifically, FX operating exposure. Of the three forms of exposure: translation, transaction and operating, the latter is usually the most difficult for students to understand, as unlike the other two forms, it does not necessarily (though may) involve actual contracts to engage in foreign transactions or record actual events. Rather, it considers what may happen. As a result, it is often difficult for students to comprehend it as a problem, let alone consider methods to manage it. Experience in teaching the concept of operating exposure shows that, after a theoretical introduction to FX exposure, students need to be presented with a real situation where they can "see" the exposure, appreciate the impact it may have on the firm, and finally discuss ways to manage it. This paper documents such an approach to teaching this difficult finance concept. It is not designed as a standalone case, but rather as a pedagogical tool culminating in a comprehensive in-class real-life case, which can then be built upon by setting the students similar real-life complex problems to work on themselves. The article contributes to the FX exposure literature by offering an important bridge between a typical academic rigorous paper and traditional text book coverage. The paper's objective is to serve as a pedagogical tool, aimed specifically at graduate level students with some research requirement who have moved beyond text books. It introduces them to a more scholarly coverage of FX exposure in that it follows the typical structure of a journal article with background and literature review before using a real multinational company with actual freely available data to explain the topic. The advantage of this is that students gain exposure to an alternative source of learning, namely scholarly journals, but written with a focus and at a level appropriate for graduate students.

The paper is organized as follows. First, the broad concept of FX exposure is discussed before the three specific forms of FX exposure are introduced. The paper then focusses on operating exposure, considers some of the literature, and outlines a stepped process to identify and analyse it. Foster's Group Limited (FGL) is then introduced and the stepped process is applied. A selection

of sensitivity and scenario analyses is then used to show the impact on the firm's value as a result of exchange rate changes. Finally, some alternatives are proposed to manage the exposure based.

Foreign Exchange Exposure

The vagaries of exchange rates are important to all firms. Whether they are multinationals with a complex web of interrelated subsidiaries and joint ventures, exporters and/or importers, or firms that are purely domestic in their target market and source of suppliers. The sensitivity of firms to exchange rate movements is becoming more so with the increasing globalization and the size of the FX market at USD 5.3 trillion per day. Specifically how firms are subject to such movements is the subject of much academic research.

At the broadest level, this paper is about how firms manage risk. At this level, there are a number of research strands including those that seek to build a theoretical framework for hedging as part of a corporations overall financing policy (Froot, Scharfstein and Stein, 1993; Smith and Stulz, 1985; Stulz, 1996).

Foreign exchange exposure management is a specific type of risk management. The theoretical argument for FX exposure being important seems obvious. As stated by Bartram (2008), because cash flows from import and export activity are impacted by exchange rate changes, so too is firm value. The greater the size of the firm's involvement in foreign activity, the more the exposure and the greater the impact on firm value.

Empirically, researchers sought to measure this exposure. Generally this was done with a simple model such as that of Adler and Dumas (1984) where the firm's stock returns are regressed on a stock market index and the percentage change in the foreign exchange rate. The a priori is that as theory would suggest that exposure is important, this should be reflected in significant findings between exchange rate changes and the firm's stock prices. The however is not shown to be the case; in fact the results show only a weak or non-existent relationship (Bodnar and Gentry, 1993; Dukas, Fatemi and Tavakkol, 1994; Jorion, 1990; Loudon, 1993).

This unexpected finding is known as the "exposure puzzle". Bartram and Bodnar (2007) offered an important explanation for this apparent anomaly, that is, that firms are in fact behaving as they should and hedging their exposures. As a result, the impact of a change in the exchange rate on the firm's value is not showing as significant, it has been successfully managed (Bartram, Brown and Minton, 2010). Bartram and Bodnar (2007) found that for a typical firm in their study, exchange rate pass through and operational hedges reduced exposure by about 10-15% each. Financial hedges such as foreign currency debt and derivatives reduced exposure by about 40%. These findings are central to this current study which will focus on exchange rate pass thorough and operational type hedges. While financial hedges are clearly important, because of their complexities and intricacies they are beyond the goals and scope of this paper.

Exchange rate exposure classifications

Central to this research and this paper is the FX exposure classification system. At the most general level, there are two types of FX exposure: translation and economic. Translation exposure, also known as accounting exposure, concerns the impact that exchange rate changes can have on a firm's value from producing a consolidated set of accounts.

Economic exposures are cash flows, which fall into two types, transaction and operating. Transaction exposure is defined as the potential change in the value of a financial position resulting from changes in the exchange rate between the inception and the settlement of the contract.

Operating exposure describes the extent to which an exchange rate change can impact on a company's future operating cash flows. This is different from transaction exposure, as it includes cash flows that may not be contracted. Measuring and managing operating exposure makes translation and transaction exposure appear simple by comparison.

Measuring and managing operating exposure

According to Moffet, Stonehill and Eiteman (2013) measuring operating exposure of a firm requires forecasting and analysing the firm's entire future individual transaction exposures together with the future exposures of the firm's entire competitors and potential competitors worldwide. Because this is an onerous task, they divide it into levels depending on the time horizon used; specifically, the short run (one year), the medium run (two to 5 years) and the long run. This distinction is important, as it impacts on how the exposure can be managed. For instance, in the short run it is unlikely the firm can do much as contracts details such as price and quantity are set. However, in the medium run, the firm may be able to, for example, raise prices to offset a home currency depreciation of a foreign currency priced good. When firms can adjust prices to offset exchange rate movements it is referred to as exchange rate pass through. While this is a very effective strategy, it may be short lived, as the product's price elasticity will determine whether buyers are prepared to continue purchasing the product as its price increases. In any case, this is a short run solution, to a more strategic issue.

Eun and Resnick (2012) suggest that since the firm's exposure to exchange risk is mainly through the effect of exchange rate changes on its competitive position which affects all aspect of the firm's operation, it should be managed in the context of the firm's long-term strategic planning and should also be integrated with all areas of corporate decision making. This long-term nature of operating exposure means that it cannot be dealt with by using only pass through and financial hedging strategies because the ability of financial instruments such as foreign currency forward contracts and options to hedge long-term exposure are limited. Rather, operating exposure should be managed using a combination of both financial and operational hedging strategies. Operating exposure management needs to be viewed as an important strategic consideration to be included in long-term planning decisions rather than risk it being hedged on a reactive basis (Shapiro, 2014).

Fosters group limited

In 2003, Fosters Group Limited (FGL) is an Australian-based, global producer and marketer of alcoholic and non-alcoholic beverages with core operations in brewing and wine. The company also has major investments in licensed properties. FGL has four operating divisions:

- CUB: domestic beer
- BBWE: international wine
- FBI: international beer
- Lensworth Group: Australian real estate

The analysis of FGL employs a three step process.

1. Identify the exchange risk faced by FGL by analysing its operations.
2. Identify factors that affect FGL's cash flow with respect to changes in exchange rates and to determine the sensitivity of the company's value to changes in exchange rates by using sensitivity and scenario analyses.
3. Offer options as to how FGL could manage its operating exposure.

To meet the first step of the process, identifying the exchange rate risk, Shapiro's (2014, p394) framework is applied using the following questions:

1. Where is the company selling?
2. Who are the company's key competitors?
3. How sensitive is demand to price?
4. Where is the company producing?
5. Where are the company's inputs coming from?
6. How are the company's inputs or outputs priced?

To achieve the second step of the process, to measure FGL's operating exposure and to determine the sensitivity of the group's future cash flow and value with respect to change in exchange rates, sensitivity and scenario analyses are used. The analyses will be conducted by initially establishing a base case using data drawn from the company's reports. The sensitivity of the company's present value will then be measured by applying some plausible events. For each of the events, the common change will be to appreciate the AUD against the USD and the EUR.

Given the complexities of international trade, there are any number of company variables that can change as a result of movements in the exchange rate. An analysis that attempts to combine too many outcomes will become intractable and lose its value as a pedagogical tool which is the goal of this paper. It is far more useful and hence practical to identify a small number of key variables and study these. To this end, this paper will follow Eiteman et al (2013), who suggests that operating exposure depends on whether an unexpected change in exchange rates causes unanticipated changes in sales volume, sales prices or operating costs. These three variables will be used for the analyses and applied as the following 5 cases:

1. All variables remain the same; AUD appreciates.
2. Sales volume increases; other variables remain constant; AUD appreciates.
3. Sales price increases; sales volume decreases; operating cost is constant; AUD appreciates.
4. Sales volume and sales price is constant; operating cost increases; AUD appreciates.
5. Partial increase in sales volume, sales price, and operating cost; AUD appreciates.

Other important inputs to the analyses include the discounting period and the discount rate for the Net Present Value (NPV) calculation. The period that is used to calculate the group's NPV is five years. While this is subjective, choosing this timeframe can be justified. According to Holland (1992, p11), the strategic decisions taken to manage operating exposure would take effect within five years. While Eiteman et al (2013) consider that exchange rate takes effect within a time framework, either short-run (up to one year), medium-run (up to 5 years), or long-run (beyond 5 years). Arguments could be made for other periods for analysis; however, up to 5 years seems a reasonable starting point. The discount rate that will be used is 13.8 percent, which is based on the company's return on capital employed calculated as the company's weighted average cost of capital.

Analysis

Step 1: Exchange Risk Identification

As stated above, identifying the exchange risk will be done by answering some key questions about our focus company, FGL. The explanations for each question are as follows:

- Where is the company selling?
  The domestic market is still the most important market for FGL — around 61 percent of the company's operating revenue from sales is generated in Australia. The company's overseas sales are primarily in North America and Canada (around 23 percent) and in Europe, primarily the UK.
- Who are the company's key competitors?
  The company's key competitor for beer products in the domestic market is Lion Nathan, a company that is jointly owned by Japanese and New Zealand companies. In the overseas market, the key competitors are Heineken NV (a Dutch Company) and the Robert Mondavi Corporation (http://biz.yahoo.com).
  For wine products, the company's main competitors in the domestic market are Southport and Lion Nathan Limited.
- How sensitive is demand to price?
  Price sensitivity depends on the degree of competition and the location of the key competitors. Since there is fierce competition in beer and wine production that is marked by acquisition and rationalization in the industry, the product itself is not differentiated, meaning there are many substitutes for the product. The demand for beer and wine products is therefore price sensitive.
- Where is the company producing?
  Most of all FGL's beer, cider, spirit and soft drink products are manufactured in Australia and New Zealand, except for Foster's Lager that is made in ten countries (www.fosters.com.au).
- Where are the company's inputs coming from?
  The most important inputs for beer and wine products are wheat, grape and labour. The wheat that is used in beer making is mostly Australian wheat. Regarding the wine products, as FGL produces its wine in 25 wineries in five countries, the grapes that are used come from each of the wineries. The labour that is used in the company's operations is sourced from each country in which FGL has operations (www.fosters.com.au).
- How are the company's inputs or outputs priced?

From the description of the company's operation, an appreciation of the AUD will clearly affect the company's revenue. This is because, as discussed, demand for beer and wine products are price sensitive; therefore, FGL cannot easily increase its foreign currency price to maintain its AUD price. Furthermore, FGL has competitors such as G and J Gallo whose competitive position is enhanced after a USD depreciation. FGL is also affected by AUD appreciation because some of its products are made in Australia and are exported overseas, particularly to the US market.

Step 2: Calculating Operating Exposure: Sensitivity and Scenario Analysis

Base Case. To measure the company's operating exposure, the first step is to calculate the base case, that is, the company's cash flow before the appreciation of AUD. To simplify the calculation, it is assumed that the company has exposure to only two major foreign currencies: the EUR and the USD. It is also assumed that 92 percent of the company's beer sales are in Australia, 4 percent in Europe and another 4 percent in the US (based on the figures on FGL beer sales). For wine sales, 24 percent of the wine sales are in Australia, 16 percent in Europe and the remaining 60 percent in the US (based on BBWE sales volume figures.) Another assumption that is made for the base case

is that the overseas sales prices (that is, both US and European) are set equal to the domestic sales price. According to the base case, the company has net sales revenue of AUD 4,732m and projected net cash flow of AUD 680m. Table 1 shows the summary of the projected operation for FGL — the base case.

Table 1: Summary of Projected Operation: The Base Case

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,760,400	AUD 258.77		2,525	
overseas: US[1]	428,080	USD 151.61	USD 0.5859/AUD	111	
Europe	428,080	EUR 146.72	EUR 0.5670/AUD	111	
Net beer sales					2,747
Wine	9 litre cases				
Domestic	4,551,048	AUD 103.04		469	
overseas: US	11,377,523	USD 60.37	USD 0.5859/AUD	1,172	
Europe	3,033,967	EUR 58.42	EUR 0.5670/AUD	313	
Net wine sales					1,954
Royalties				41	
Inter-segment sales[2]				(11)	
Net sales revenue					4,732
Other operating revenue					365
Total revenue					5,097
Total operating expenditure					(4,072)
Depreciation					(213)
Other income[3]					9
Earnings before interest & tax					820
Interest expense					(153)
Profit before tax					667
Income tax@ 30%[4]					(200)
Profit after tax					467
Add back depreciation[5]					213
Net cash flow[6]					680

Adapted from FGL Limited Financial Statement (with some modification)

[1]As an example of the sales calculation, US beer: 428,080 x 151.61 = USD64,901,208, at an exchange rate of USD 0.5859/AUD = AUD 110,771,819, rounded to AUD 111 million.

[2]As the name suggests, inter-segment transfer include the sale or transfer of, say beer, from one segment of the company to another. A negative figure would suggest a transfer out from this segment.

[3]Share of net profits of associates and joint ventures

[4]The Australian company tax rate is set at 30%

[5]Depreciation is added back on as it is a non-cash flow. This then allows the net cash flow to be calculated which is required for NPV calculations.

[6]The net cash flow of AUD 680 is used in tables 3, 5, 7, 9, 11 and 12 to compare to the outcomes of the various analyses.

The following 5 cases assume the base case as their starting point. All analyses reflect an appreciation of the AUD, and then cases 2 to 5 combine this with the impact of, isolated and combined, changes to sales prices, sales volume and operating expenditure.

Case 1: All Variables Remain the Same — AUD Appreciates. For the appreciates by around five percent against the EUR to EUR 0.5954/AUD (based on average interbank rate for period

01/07/2003 TO 26/01/2004 www.oanda.com). It is also assumed that, in the five years ahead, no changes occur in sales volume, sales price and operating cost. Table 2 first analysis, it is assumed that the AUD appreciates by around 19 percent against the USD to USD 0.6976/AUD and also summarizes projected operations for FGL for case 1.

Table 2: Summary of Projected Operation: Case 1

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,760,400	AUD 258.77		2,526	
overseas: US	428,080	USD 151.61	USD 0.6976/AUD	93	
Europe	428,080	EUR 146.72	EUR 0.5954/AUD	106	
Net beer sales					2,724
Wine	9 litre cases				
Domestic	4,551,048	AUD 103.04		469	
overseas: US	11,377,523	USD 60.37	USD 0.6976/AUD	985	
Europe	3,033,967	EUR 58.42	EUR 0.5954/AUD	298	
Net wine sales					1,751
Royalties				41	
Inter-segment sales				(11)	
Net sales revenue					4,506
Other operating revenue					365
Total revenue					4,871
Total operating expenditure					(4,072)
Depreciation					(213)
Other income					8.70
Earnings before interest & tax					595
Interest expense					(153)
Profit before tax					441
Income tax@ 30%					(132)
Profit after tax					309
Add back depreciation					213
Net cash flow					522

Adapted from FGL Financial Statement (with some modification)

According to this case, the AUD appreciation has reduced the overseas sales revenue by 4.8 percent. The reduction of the net sales revenue has caused a reduction in the company's net cash flow 23%. For the five year period the present value of the AUD 522m using a 13.8 percent discount rate equals AUD 545m. This is due primarily to the inability to raise the foreign currency sales price to equal the domestic currency sales price. Table 3 shows the calculation of the present value of the loss.

Table 3
Economic Exposure Impact of AUD Appreciation: Case 1

Year	Year-end Cash flow (m) AUD		Change (m) AUD	PVF (13.8%)	PV of incremental CF (m) AUD
	case 1	base case			
1	522	680	(158)	0.8787	(138)
2	522	680	(158)	0.7722	(122)
3	522	680	(158)	0.6785	(107)
4	522	680	(158)	0.5963	(94)
5	522	680	(158)	0.5239	(83)
NPV of incremental cash flow					**(545)**

Case 2: Sales Volume Increases — Other Variables Remain Constant — AUD Appreciates. For this case, it is assumed that the company could increase the beer sales volume in Australia by about 2.3 percent, which is based on historical change. Beer sales volume in Europe would increase about 2 percent regardless of the competitive position of the company because all the beer that is sold in Europe is also made in Europe. This sales volume increase is also based on historical change. In the US market, there is no sales volume change because all the beer is imported from Australia to the US market. As this market is highly competitive, the AUD appreciation has weakened the company's competitive position. (A more realistic scenario would in fact be for the US sales to fall; however, for the purposes of the exercise, it is assumed to be constant.) For wine products, it is assumed that there will be a 16.8 percent increase in sales volume for the Australian market, a 9.8 percent increase for the US market, and an 11.8 percent increase for the European market. These increases are based on historical sales volume change. The operating expenditure is assumed constant. Another assumption in this case is that the company will not increase its foreign currency sales price. Table 4 summarizes the projected operation for FGL for case 2.

Table 4: Summary of Projected Operation: Case 2

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,984,889	AUD 258.77		2,583	
overseas: US	428,080	USD 151.61	USD 0.6976/AUD	93	
Europe	436,642	EUR 146.72	EUR 0.5954/AUD	107	
Net beer sales					2,783
Wine	9 litre cases				
Domestic	5,315,624	AUD 103.04		547	
overseas: US	12,492,520	USD 60.37	USD 0.6976/AUD	1,081	
Europe	3,391,975	EUR 58.42	EUR 0.5954/AUD	332	
Net wine sales					1,960
Royalties				41	
Inter-segment sales				(11)	
Net sales revenue					4,773
Other operating revenue					365
Total revenue					5,138
Total operating expenditure					(4,072)
Depreciation					(213)
Other income					9
Earnings before interest & tax					862
Interest expense					(153)
Profit before tax					709
Income tax@ 30%					212
Profit after tax					497
Add back depreciation					213
Net cash flow					710

Adapted from FGL Financial Statement (with some modification)

The impact of the above assumptions is an increase of the company's net sales revenue to AUD 4,773m despite the AUD appreciation. In this case, the increase of the net sales revenue is mainly attributable to the company's sales force. This results in an increase in the company's net cash flow of 5%. If there is no further appreciation of the AUD in the five-year period, and the company could maintain its sales volume, the operating exposure is AUD 103m. Table 5 shows the calculation of the present value of the gain.

Table 5
Economic Exposure Impact of AUD Appreciation: Case 2

Year	Year-end Cash flow (m) AUD		Change (m) AUD	PVF (13.8%)	PV of incremental CF (m) AUD
	case 2	base case			
1	710	680	30	0.8787	26
2	710	680	30	0.7722	23
3	710	680	30	0.6785	20
4	710	680	30	0.5963	18
5	710	680	30	0.5239	16
NPV of incremental cash flow					**103**

Case 3: Sales Price Increases — Sales Volume Decreases — Operating Expenditure Is Constant — AUD Appreciates. In case 3, it is assumed that the company wishes to maintain the same AUD equivalent price in both overseas markets. This strategy, known as exchange rate pass-through, offsets the USD and EUR depreciation in that the company is passing on the impact of exchange rate movements to the customer.

An important consideration when using exchange rate pass through as an exposure management alternative is the product's price elasticity. Because the demand for beer and wine products is price sensitive and the increasing price has made the company's product uncompetitive there will be a decrease in sales volume for both European and US markets. This is assumed to be the same percentage as the price increase, that is, 19 percent in the US market and 5 percent in the European market. The operating expenditure is assumed to remain constant.

The change in the company's projected operation is summarized in Table 6.

Table 6: Summary of Projected Operation: Case 3

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,760,400	AUD 258.77		2,525	
overseas: US	346,745	USD 180.52	USD 0.6976/AUD	89	
Europe	406,676	EUR 154.07	EUR 0.5954/AUD	105	
Net beer sales					2,719
Wine	9 litre cases				
Domestic	4,551,048	AUD 103.04		469	
overseas: US	9,215,794	USD 71.88	USD 0.6976/AUD	950	
Europe	2,882,269	EUR 61.35	EUR 0.5954/AUD	297	
Net wine sales					1,716
Royalties				41	
Inter-segment sales				(11)	
Net sales revenue					4,465
Other operating revenue					365
Total revenue					4,830
Total operating expenditure					(4,072)
Depreciation					(213)
Other income					9
Earnings before interest & tax					554
Interest expense					(153)
Profit before tax					401
Income tax@ 30%					(120)
Profit after tax					281
Add back depreciation					213
Net cash flow					494

Adapted from FGL Financial Statement (with some modification)

Under this case, the company's net sales revenue falls to AUD 4,465m because the sales price increase in the US and European markets has decreased the sales volume. As it is assumed that any other factors are constant, the company's projected cash flow fell by 28%. If it were assumed that there is no further change in sales volume, sales price and operating expenditure in the 5-year period, the operating exposure for the company would be AUD 642m, even larger than the loss that occurs in the first case. This result shows that increasing the foreign currency price to equal

the domestic currency price is a costly decision for the company. Table 7 shows the calculation of the present value of the loss.

Table 7: Economic Exposure Impact of AUD Appreciation: Case 3

Year	Year-end Cash flow (m) AUD		Change (m) AUD	PVF (13.8%)	PV of incremental CF (m) AUD
	case 3	base case			
1	494	680	(186)	0.8787	(163)
2	494	680	(186)	0.7722	(144)
3	494	680	(186)	0.6785	(126)
4	494	680	(186)	0.5963	(111)
5	494	680	(186)	0.5239	(97)
NPV of incremental cash flow					(642)

Case 4: Sales Volume and Sales Price is Constant — Operating Cost Increases — AUD Appreciates. This case assumes that the company could maintain sales volume equal to the base case and that the company would not increase its foreign currency sales price although the AUD appreciates. Another assumption is that the operating cost that is incurred in Europe and the US would increase in terms of the EUR and USD respectively. Total operating expenditure for the company is AUD 4,072m (base case). It is assumed that 58 percent of total operating expenditure is incurred from beer production and sales as well as from that amount 92 percent is incurred in Australia, four percent in the US and another four percent in Europe (the same proportion as the beer sales in the base case). It is assumed also that the remaining 42 percent of the total operating expenditure is from wine production and sales. From that amount, 24 percent is incurred in Australia, 16 percent in Europe, and 60 percent in the US (the same proportion as the wine sales in the base case).

For the purpose of the case, assume the costs incurred in the US and Europe will increase by 20% and 10% respectively. For simplicity the above AUD costs for both the US and Europe are adjusted by these percentages.

The change on the company's projected operation is summarized in Table 8.

Table 8: Summary of Projected Operation: Case 4

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,760,400	AUD 258.77		2,525	
overseas: US	428,080	USD 151.61	USD 0.6976/AUD	93	
Europe	428,080	EUR 146.72	EUR 0.5954/AUD	106	
Net beer sales					2,724
Wine	9 litre cases				
Domestic	4,551,048	AUD 103.04		469	
overseas: US	11,377,523	USD 60.37	USD 0.6976/AUD	985	
Europe	3,033,967	EUR 58.42	EUR 0.5954/AUD	298	
Net wine sales					1,751
Royalties				41	
Inter-segment sales				(11)	
Net sales revenue					4,506
Other operating revenue					365
Total revenue					4,871
Total operating expenditure					(4,147)
Depreciation					(213)
Other income					9
Earnings before interest & tax					520
Interest expense					(153)
Profit before tax					367
Income tax@ 30%					(110)
Profit after tax					257
Add back depreciation					213
Net cash flow					470

Adapted from FGL Financial Statement (with some modification)

In this case, as sales volume and sales price are constant, the net sales revenue is the same as in case 1, that is, AUD 4,506m. The difference is that the operating expenditure increases to AUD 4,147m. This results in the company's net cash flow decreasing by 30%. Over the five-year period the present value of the operating exposure is AUD 725m. Table 9 shows the calculations.

Table 9 - Economic Exposure Impact of AUD Appreciation: Case 4

Year	Year-end Cash flow (m) AUD		Change (m) AUD	PVF (13.8%)	PV of incremental CF (m) AUD
	case 4	base case			
1	470	680	(210)	0.8787	(184)
2	470	680	(210)	0.7722	(163)
3	470	680	(210)	0.6785	(143)
4	470	680	(210)	0.5963	(125)
5	470	680	(210)	0.5239	(110)
NPV of incremental cash flow					(725)

Case 5: Partial Increase in Sales Volume, Sales Price and Operating Cost — AUD Appreciates. It is assumed that, after the AUD appreciation has impacted upon the company's competitive position, the company is somehow able to increase the sales volume, although it is not as much as expected in case 2. The company has also decided to increase the sales price. Sales price for beer in Europe will be increased by 1 percent as will the sales volume. Because of the highly competitive US beer market, the sale price for beer will not be increased so as to maintain sales volume. The sale price for wine in Europe and the US will be increased by 1 percent and sales volume will increase by 3 percent. For the domestic market, the sales price for both beer and wine do not change. Another assumption to be applied in this scenario is that the operating cost that is incurred in both Europe and the US would increase in terms of the EUR and USD respectively, as it is assumed in case 4 (that result in total operating expenditure of AUD 4,147m). The change on the company's projected operation is summarized in Table 10.

Table 10 - Summary of Projected Operation: Case 5

	Units	Price	Exchange rate	Sub Total (m) AUD	Total (m) AUD
Sales					
Beer	Hectolitres				
Domestic	9,984,889	AUD 258.77		2,584	
overseas: US	428,080	USD 151.61	USD 0.6976/AUD	93	
Europe	432,360	EUR 148.19	EUR 0.5954/AUD	108	
Net beer sales					2,785
Wine	9 litre cases				
Domestic	5,315,624	AUD 103.04		548	
overseas: US	11,718,848	USD 60.97	USD 0.6976/AUD	1,024	
Europe	3,124,986	EUR 59.00	EUR 0.5954/AUD	310	
Net wine sales					1,882
Royalties				41	
Inter-segment sales				(11)	
Net sales revenue					4,697
Other operating revenue					365
Total revenue					5,062
Total operating expenditure					(4,147)
Depreciation					(213)
Other income					9
Earnings before interest & tax					711
Interest expense					(153)
Profit before tax					558
Income tax@ 30%					168
Profit after tax					390
Add back depreciation					213
Net cash flow					603

Adapted from FGL Financial Statement (with some modification)

Table 11 shows the calculation of the present value.

Table 11 - Economic Exposure Impact of AUD Appreciation: Case 5

Year	Year-end Cash flow (m) AUD			Change (m) AUD	PVF (13.8%)	PV of incremental CF (m) AUD
	case 5	base case				
1	603	680		(77)	0.8787	(67)
2	603	680		(77)	0.7722	(60)
3	603	680		(77)	0.6785	(52)
4	603	680		(77)	0.5963	(46)
5	603	680		(77)	0.5239	(40)
NPV of incremental cash flow						(265)

Table 12 provides a summary of the operating exposure impact for each scenario compared to the base case.

Table 12 - Economic Exposure Impact of AUD Appreciation on FGL: Summary

	Net Cash Flow (m) AUD	Annual difference from base case	PV of 5 year incremental CF (m) AUD
Base case	680		
Case 1	522	(158)	(545)
Case 2	710	30	103
Case 3	494	(186)	(642)
Case 4	470	(210)	(725)
Case 5	603	(77)	(265)

Summary of cases. As shown in case 1, and as expected intuitively, an appreciation of the AUD vis-à-vis the USD and the EUR causes a fall of revenue as the foreign currencies convert into less AUD. An obvious solution to this would be to increase the foreign price (case 3) but, given the competitive nature of the markets, this will lead to a fall in volume which, in this case, leads to a greater revenue fall than that caused by the appreciation alone. Cases 2 and 4 have obvious outcomes. Holding all else constant, they assume increased volume resulting in increased revenue and increased costs resulting in decreased revenue. The most realistic case is 5, where prices are increased, but costs are also increased (most likely in marketing) to combat the impact that rising prices will have. The case assumes that the marketing is successful and volume is also increased.

Step 3: Operating Exposure Management for FGL

This step is in two parts, first we consider the actual practices of FGL as described in its annual report. Second we draw on the results of step 2 and discuss strategies and their effectiveness for hedging operating exposure and also consider other hedging alternatives.

How does FGL hedge?

According to company documents, responsibility for the management of foreign exchange exposure is held by the treasurer with the objective to minimize both risk and the cost of risk management. The policy is to fund foreign currency assets in the respective currencies in which

such assets are denominated. The company uses financial hedging strategies such as forward contracts, foreign currency interest rates and cross currency swaps, and option contracts to hedge the foreign currency net assets and exposures. The company also matches currency cash flow by acquiring debt in USD to hedge operation in the US. The company's approach to foreign exchange management is consistent with Bartram, Brown and Minton's (2010) findings that companies use a combination of financial, operating and other techniques.

What could FGL do?

By examining the results of the sensitivity and scenario analyses, a number of recommendations can be made, but, it is necessary to bear in mind the objective of this study. The previous section was designed as an analysis to show how cash flow changes, bought on by exchange rate movements, can impact on a company's value. Specifically, the impact of an AUD appreciation against the USD and EUR. The analysis is very simple in that other than those specific to the example, all else is assumed to be held constant. Hence it is not a true reflection of the complexities of operating exposure management. The objective was to highlight the impact of operating exposure without the distraction of too many changes that would make the analysis intractable. It is useful to examine the results and use them as a stepping stone to understand how to develop appropriate management alternatives.

In case 1, where the only change was the AUD appreciation, the change in company value was negative AUD 545 million. Clearly a significant impact and designed with no other changes to show the impact changes in the exchange rate can have. There are two obvious ways to counter this and they form the core of the remaining cases; increase sales and increase price. Case 2 increases the sales volume (based on FGL's historical sales changes) which successfully offsets the appreciation resulting in a company value improvement of AUD 103 million. Clearly a good result, however, it is important to recognise that the majority of the good work being done by the sales force in increasing the market has been undone by the exchange rate change. The company has shown only a relatively small value increase as a result of the sales volume increase. Put another way, it is most likely that the sales volumes would have increased anyway, so the company would have had a significant increase in value, the exchange rate eroded this value. The sales volume was not really a hedge; it was simply the company creating value through the normal course of its activities.

Case 3 introduces exchange rate pass through to counter the appreciation, but does it in isolation, however this proves costly, a loss of value of AUD 642m. As discussed in hedging alternatives, exchange rate pass through involves FGL passing on the impact of the exchange rate change to customers. The problem for FGL is the sensitivity of the sale of FGLs products to prices changes. Both beer and wine markets are competitive and customers quickly change buying habits.

Setting aside price and volume changes, case 4 showed the impact of an increase in operating costs in the US and Europe. This resulted in a loss of value over the five years of 265m.

The final case, case 5, showed a combination of all the changes. The AUD appreciates, FGL increases its sales volume and sales prices, and the operating costs increase. The net effect of all these changes is a loss of company value of 265 million.

Conclusion

Foreign exchange operating exposure is an important concern for firms, whether they operate as MNCs, export and/or import, or operate exclusively domestically. One of the difficulties in

understanding the importance of the exposure is that, unlike transaction exposure, operating exposure includes future, or anticipated cash flows, not just those that are contracted. Actual exposures are far easier to manage through various financial hedges. This paper serves as a pedagogical tool to help learners understand operating exposure, by introducing the theory of the concept and then applying it within a MNC.

From the analysis, it can be seen that the company faces exchange risks because it has overseas sales and operations, meaning it has revenues and costs denominated in foreign currencies. Moreover, the demand for the company's products is price sensitive to the extent that the company has competitors whose competitive position is enhanced after home currency appreciation. Therefore, the change in exchange rate will affect the company's cash flows.

The analysis of FGL's operations show that managing operating exposure is a complex issue that requires a multi-faceted strategy. It requires FGL to alter its product strategy to differentiate its product from that of its competitors and to reposition its product, adjust its pricing strategy, and also to shift production among its plants.

References

Alder, M., & Dumas, B. (1984). Exposure to currency risk: Definitions and Measurement. *Financial Management*, 13(2), 41-50.

Bartram, S.M., G.W. Brown & Minton, B. A. (2010). Resolving the exposure puzzle: The many facets of exchange rate exposure. *Journal of Financial Economics,* 95, 148-173.

Bartram, S. M., & Bodnar, G.M. (2007).The exchange rate exposure puzzle. Managerial Finance, 33(9), 642-666.

Beringer Blass Global: Beringer Blass Wine Estates website (Homepage of Beringer Blass Wine Estates) (Online) 2003-last update, Available: http://www.beringerblass.com/ (Accessed 2 Dec. 2003).

Bodnar, G.M. & Gentry, W.M. (1993). Exchange rate exposure and industry characteristics: Evidence from Canada, Japan and the USA. *Journal of International Money and Finance*, 12(1), 29-45.

Dukas, S.P., Fatemi, A.M., & Tavakkol, A. (1996). Foreign exchange rate exposure and the pricing of exchange rate risk. *Global Finance Journal*, 7(2), 169-189.

Eiteman, D.K., A.I. Stonehill, & Moffet, M.H. (2013). *Multinational Business Finance*. Boston, Addison Wesley.

Eun, C.C., & Resnick, B. G. (2012). *International Financial Management.* New York, McGraw Hill.

Foster's Group Limited Company Profile (Online), (2003). Available: http://biz.yahoo.com/ic/42/42414.html (Accessed: 3 Dec. 2003).

Foster's Group Limited 2003 Concise Annual Report (Online), (2003). Available: http://www.forsters.com.au/corporate/investor/reports/annual_reports.asp (Accessed 2nd Dec. 2003).

Froot, K.A., D.S. Scharfstein, & Stein, J. C. (1993). Risk management: Coordinating corporate investment and financing policies. *Journal of Finance*, 48, 1629-1658.

Griffin, J., & Stulz, R. (2001). International competition and exchange rate shocks: A cross-country industry analysis of stock returns. *Review of Financial Studies*, 14, 215-241.

Holland, J.B. (1992). Foreign exchange management – a balanced portfolio. *Managerial Finance*, 18(3/4), 2-20.
Jorion, P. (1990). The exchange-rate exposure of US multinationals. *Journal of Business*, 63(3), 331-345.
Loudon, G.F. (1993). The foreign exchange operating exposure of Australian stocks. *Accounting and Finance*, 33(1), 19-32.
Shapiro, A.C. (2014). *Foundations of Multinational Financial Management.* New Jersey, John Wiley & Sons.
Smith, C. W. & Stulz, R.M. (1985). The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis,* 20(4), 391–405.
Stulz, R.M. (1996). Rethinking risk management. *Journal of Applied Corporate Finance*, 9, 8–24.

Getting it Write! – Teaching Written Communication in Upper Division Courses Equitably and Sustainably

Franziska M. Renz
California State University, Sacramento

Julian U. N. Vogel
San José State University

This study demonstrates the benefits of integrating written communication education into major-specific upper division courses. Written communication is regularly mentioned as one of the most important, if not the most important hard skill. Yet, recent college graduates are often reported to fall short of employers' expectations. We develop a written communication curricular enhancement that consists of assignments, instructional interventions, and frequent feedback over the course of a semester. Using a pretest-posttest study design, we show that the curricular enhancement is effective in increasing students' written communication skills, as well as their self-efficacy. Both quantitative and qualitative data reveal that the written communication assignments increase students' learning and engagement, and motivate them to learn more about the content presented in class. Demographic factor regressions also demonstrate that the written communication assignments support all students, while having a particularly large positive impact on non-traditional students, non-male students, non-White students, and non-finance students, in line with the equity perspective of universal design.
Keywords: Curricular Enhancement, Equity, Regression Analysis, Sustainability, Written Communication

Introduction

Written communication skills are frequently cited as among the most important skills of college graduates. 73.3% of managers believe that written communication skills are the most desirable soft skills of recent college graduates (Walker, 2023), are included in virtually all business job postings (Poláková, Suleimanová, Madzík, Copuš, Molnárová, & Polednová, 2023; Rios, Ling, Pugh, Becker, & Bacall, 2020), and 90% of employers categorize written communication skills as either "very important" or "important" (Association of American Colleges and Universities, 2021).

However, only 44% of employers rate recent college graduates as "very well prepared" (Association of American Colleges and Universities, 2021; Brower, 2024). While there have been recent exacerbating circumstances, such as personnel cuts or virtual-only learning over the pandemic (Higher Ed Dive, 2022), another main reason exists for this gap between college education and employer expectations. Many universities place written communication education in designated writing courses that are usually taken as part of the general education in the first two years of degree plans (e.g., Florida International University, 2023; Tulane University, 2023). Existing research on the integration of written communication into the curricula of business degree programs is very sparse, and only describes written communication education within the first two years (e.g., Cox, Bobrowski, & Spector, 2004; Mitchell, 1988). In these courses, writing assignments generally focus on language use and conventions or the writing process, but largely

disregard other crucial written communication skills such as social, rhetorical, or domain knowledge (Sparks, Song, Brantley, & Liu, 2014). Hence, students often only write about their opinions and do not learn to analyze and integrate data and knowledge into their writing (Sutter Fichtner, 2000). The result can be limited engagement or motivation of students, as well as deterioration of written communication skills in the two to three years from their general education courses to the beginning of the first full-time job after graduation.

To mitigate these problems, written communication has to be integrated into courses across different levels of students' degree plans (Sparks et al., 2014). Particular attention has to be paid to social equity gaps, for example between traditional and non-traditional students (e.g., Hittepole, 2019; Wood, 2023), male and non-male students (e.g., Loureiro, Loureiro, & Silva, 2020), or White and non-White students (American Psychological Association, Presidential Task Force on Educational Disparities, 2012). To overcome challenges arising from the time lag between written communication training and graduation, written communication has to be taught sustainably. Sustainable education is marked by two characteristics, perceived learning and transfer of knowledge. Students have to perceive that they have gained knowledge or improved their skills (e.g., Gagne & Medsker, 1996). Additionally, students have to be confident enough with their knowledge and skills to apply them to their professional career or other, previously unfamiliar situations (Broad & Newstrom, 1992; Noe, 2020).

Therefore, this study builds on the findings of previous literature and makes several important contributions. First, we develop a written communication curricular enhancement that comprises a number of assignments, instructional interventions, and frequent feedback over the course of a semester. The curricular enhancement implements best practices and recommendations made by research and employers and aims to address all major challenges of written communication education.

Second, we confirm both quantitatively, through a pretest-posttest study design, and qualitatively that the written communication assignments are successful in supporting student learning, and motivate students to spend more time learning about the course content. Furthermore, we demonstrate that by integrating written communication assignments into a major-specific upper division course, students' engagement and learning are considerably increased.

Third, we show that the written communication assignments enhance students' self-efficacy. This attitudinal change paves the way to more sustainable learning and further enhances students' written communication skills upon entry into their first post-graduation full-time job (Bandura, 1982, 1986; Noe, 2020).

Fourth, we analyze differences across demographic groups of students. The findings of demographic factor regressions show that, while the written communication assignments support all students, the assignments particularly benefit non-traditional students, non-male students, and non-White students. We also demonstrate that the written communication assignments significantly benefit students with a non-finance major. Hence, we establish that integrating written communication assignments into major-specific upper division courses is the best way to sustainably teach written communication skills to students, and to foster their employability.

Description of Curricular Enhancement

The written communication curricular enhancement was designed to complement the curriculum of a major-specific upper division course on managerial finance. To that end, two individual writing assignments, as well as one team writing assignment was implemented in the

course. Each of the individual writing assignments accounted for 5%, and the team writing assignment accounted for 9% of the total course grade. Thus, the written communication assignments could be added to the course and aligned with established grading systems or departmental norms. At the same time, the written communication assignments accounted for a significant portion of the overall course grade and provided sufficient incentive for students to take them seriously.

The first individual written communication assignment centered around share allocations in initial public offerings that used the services of an underwriter. After reading a brief introduction to the topic, students had to answer three short questions in 500 words or more. While researching additional information was given as an option, the questions could be answered based on the brief introduction and the information presented in class. The second individual written communication assignment complemented the course topic of share valuation. Students were tasked to evaluate the trading strategy of Warren Buffett and provide empirical support for their evaluation, again in 500 words or more. The team writing assignment asked students to select an S&P 500 company and then conduct a financial statement analysis, a share valuation with the Capital Asset Pricing Model and the Gordon Growth Model, and a risk analysis that included potential remedies for the risks the company was facing. This assignment did not have a minimum word requirement. All three written communication assignments were graded on a five-dimensional rubric that was provided to students along with the assignment instructions.

In order to avoid any confusion about the assignment instructions, the written communication assignments were presented to a finance student assistant who provided feedback on the wording of the assignment instructions. When the first individual written communication assignment was made available to students through the learning management system, the first instructional intervention was performed during class. This intervention re-iterated the basics of formal writing, along with frequent mistakes, and provided an opportunity for students to ask any questions they might have about the assignment or about writing in general. After the due date, the assignment was graded on the rubric. Additionally, each student was provided with individual feedback about strengths and areas of improvement. In the next class session after all assignments had been graded, another instructional intervention went over the most common mistakes, and strategies to avoid and correct them. The intervention also addressed general strategies to improve students' written communication.

When the second individual written communication assignment was made available to students through the learning management system, students were reminded of the strategies to improve their writing, and given another opportunity to ask questions about the second individual written communication assignment, as well as written communication in general. After the due date of the assignment, each student again received an individual rubric-based grade, as well as extensive individual feedback. In the subsequent class session, the common mistakes from the second individual written communication assignment and strategies to further improve on writing were discussed.

Finally, when the team written communication assignment was made available, the assignment was discussed in class and the previous instructional interventions were synthesized. Students again were given an opportunity to ask any questions they might have about the assignment or about writing in general. The team assignment was also graded using a rubric for each team submission, and specific feedback was provided to each team. Throughout the semester, students were additionally encouraged to discuss individual writing challenges in office hours to ensure that students could learn from the provided feedback.

Methodology

To test the effectiveness of the written communication assignments, an ex-ante survey and an ex-post survey were conducted at the beginning and the end of the Fall 2022 semester. Approval from the Institutional Review Board for human subject research was granted on August 1, 2022. Since the written communication curricular enhancement and the related assignments and feedback were implemented in a major-specific upper division finance course, no other section of the same course was available to serve as a control group. Thus, a pretest-posttest study design was used. The total course enrollment was 47 students. At the beginning of the semester, 45 usable surveys were returned, at an initial response rate of 95.74%.

The ex-ante survey contained two open-form items to measure students' quality of written communication. Both items comprised a short question in the context of the course content, to which students should answer with about 200 words or 10 sentences each. The questions were open to allow for variation in responses to measure students' written communication skills. At the same time, the questions were closely related to the course content and the written communication assignments to measure learning and transfer of learning (Broad & Newsom, 1992; Gagne & Medsker, 1996; Noe, 2020). Furthermore, the ex-ante survey asked students to rate their logical thinking, argumentation, and convincingness skills to measure student's self-efficacy. Self-efficacy is crucial for sustainable learning, as it describes the belief in oneself to succeed in a task. Self-efficacy thus is a measure of the maintenance and sustainability of gained knowledge (Bandura, 1982, 1986; Noe, 2020; Vogel & Renz, 2021). Additional items gathered demographic information such as age, gender, ethnicity, race, major, degree progress, and professional experience. The complete ex-ante survey is provided in Appendix 1.

The ex-post survey included the same two open-form items as the ex-ante survey to measure students' quality of written communication and the three items to measure self-efficacy. Two items asked whether the written communication assignments were engaging, and whether they increased students' learning. Finally, two open-form items allowed students to share anything they particularly liked or disliked about the written communication assignments. The complete ex-post survey is provided in Appendix 2.

Ex-ante and ex-post surveys were matched by a participant number that was randomly assigned in the ex-ante survey. Students were asked to record their participant number until the end of the semester, and to include their participant number on the ex-post survey. Changes in enrollment led to 43 usable ex-post surveys with complete information, and 44 usable ex-post surveys with data on self-efficacy and a rating of the written communication assignments. The resulting overall response rate is 91.49% for the matched sample with complete information on both the ex-ante and the ex-post survey.

Self-selection bias cannot be ruled out completely. However, only 2 out of 47 students did not initially participate in the surveys, and for 91.49% of students, ex-ante and ex-post survey responses could be matched. Thus, sample-selection bias is highly unlikely. Furthermore, since no other course was available for a control group, and because the written communication assignments were not communicated to students prior to the semester, self-selection by choosing to enroll or not enroll is also unlikely.

Results

Descriptive Statistics and Reception of Projects

Table 1
Descriptive Statistics

Variable	n	Mean	Std. Dev.	Median
delivery ex-ante	45	4.29	0.73	4
organization ex-ante	45	4.02	0.94	4
content ex-ante	45	3.73	0.99	4
logical thinking ex-ante	44	3.61	0.65	4
argumentation ex-ante	44	3.11	0.92	3
convincingness ex-ante	44	3.30	0.73	3
delivery ex-post	43	5.58	0.70	6
organization ex-post	43	5.49	0.83	6
content ex-post	43	5.30	0.91	6
logical thinking ex-post	44	4.00	0.61	4
argumentation ex-post	44	3.66	0.81	4
convincingness ex-post	44	3.66	0.78	4
engagement	44	4.11	0.69	4
learning	44	4.23	0.64	4

Note: n = number of participants, Std. Dev. = standard deviation.

The overall quality of students' written communication was assessed on three dimensions, *delivery*, *organization*, and *content*. For each category, the answers of each student to questions 1 and 2 of the ex-ante and ex-post surveys were graded on a three-point rubric, so that each answer was graded with a value of either one, two, or three in each category. Grading was performed independently by two researchers who were also experienced in teaching and grading. Each question thus was graded twice, and if discrepancies arose, they were discussed and resolved before the data analysis. Furthermore, questions 13 to 15 of the ex-ante and ex-post surveys asked students to indicate their *logical thinking*, *argumentation*, and *convincingness* skills at the beginning and end of the semester. If students indicated that they were "very proficient" in a particular skill, their answer was coded as 5. If they indicated that they were "not proficient at all", their answer was coded as 1. Finally, the variables *engagement* and *learning* were based on questions 16 and 17 of the ex-post survey. If students selected "strongly agree" that the communication assignments throughout the semester were engaging or enhanced their learning, their selection was coded as 5. If students selected "strongly disagree", their selection was coded as 1.

The descriptive statistics of the sample in Table 1 show the means and medians of *delivery*, *organization*, and *content* of students' written communication increased after students completed the written communication assignments and received ample feedback over the course of the semester. Students' *logical thinking*, *argumentation*, and *convincingness* skills were also higher at the end of the semester in the means and medians, after students completed the written communication assignments and received ample feedback. These preliminary results indicate an increase in students' written communication skills, which was the main goal of the written communication curricular enhancement. Additionally, the written communication curricular enhancement improved students' self-efficacy, allowing them to be more confident in applying

their written communication skills, and leading to a more sustainable learning, with longer retention and less knowledge decay.

Finally, the results also show that students perceived the written communication assignments as both engaging and conducive to their learning. This speaks to the quality of the student-centered instruction, which requires employing learning activities that are perceived favorably by learners. Furthermore, positive reception of learning activities constitutes an important tool for classroom morale management (Towler & Dipboye, 2001).

Students' comments revealed why the written communication assignments were received positively. Students stated that the written communication assignments in fact helped them improve their written communication skills, as well as their logical thinking, argumentation, and convincingness skills. Students also appreciated that the written communication assignments focused on topic areas from their major concentration (i.e., financial topics), as opposed to general business topics. This focus led to increased engagement, which animated students to perform extensive research beyond what was required in the assignments, thus deepening their understanding of the topic and of their argument. Ultimately, the focus on the major concentration led to a much richer learning experience for students compared to other courses.

- *"It got us out of our comfort zone with presenting and also doing extra research."*
- *"I really like it because it helps me with my persuasion skills and communication skills."*
- *"I liked how they required me to critically think and justify my arguments with support to enhance my argument."*
- *"I was able to ask more questions about my assignments. Although it asked me to answer one question, it also prompted me to do more research and learn more. This enhanced my understanding of many more topics."*
- *"I liked that we had to pull from a bit of sources and to truly have a deep understanding of the topic to answer, it made me feel really engaged to learn and pay attention but also answer wholeheartedly."*
- *"I liked only being given a question and figuring out yourself how to answer it and what evidence to use. Having the freedom to answer the questions however we thought was right."*
- *"It gave us the opportunity to express ourselves about a certain topic related to this class."*

Other critical comments continued to laud the open format of the assignments which allowed students to express themselves freely, the feedback that was provided, and the challenging nature of the assignments. One student mentioned that being able to choose a topic for one assignment would have increased the engagement of the written communication assignments.

- *"There were times when I was so challenged that I noticed I would trail off with the point I was trying to make. Even though I was challenged, I knew I was also learning."*
- *"I would say there was really nothing that I did not like about the assignments. They were well thought-out and graded fairly."*
- *"I have never had any communication assignments like I had in this class. There is nothing I do not like. ^^"*
- *"To find ways of communication requires finding more information which means doing more research. This can be very time-consuming."*
- *"Honestly, not much. I really enjoyed them and they were fun. :) They all were very thought-provoking while still being open enough for our own feelings and thoughts."*

- *"I thought that one of the essays could have been on a topic of the students' choice. Would be more engaging for me."*

To further understand the positive and negative aspects of students' experience with the written communication assignments, A sentiment analysis was conducted with Google Gemini 1.5. The results show that for question 18, answers are almost exclusively positive, and "None of the remaining sentences express a strongly negative or positive sentiment. They are generally neutral descriptions or observations about the assignments." (Google, 2024). Hence, for question 18, "The majority of the sentences express positive sentiment, indicating a favorable experience with the communication assignments and the course." (Google, 2024). These results are not surprising, since question 18 asked "What did you like about the communication assignments?".

For question 19, responses were much more mixed. Given that the question was "What did you not like about the communication assignments?", this is not surprising either. However, the responses are much less negative than expected. Google Gemini states: "Many of the sentiments are based on personal preferences and specific details." (Google, 2024), and "Some sentences express both positive and negative aspects, making the overall sentiment more nuanced." (Google, 2024). Even though question 19 specifically asked what they did not like about the communication assignments, students still had positive feedback.

Effectiveness of Assignments

Table 2
Results of *t*-tests Comparing Ex-ante and Ex-post Scores

Panel A: Unpaired *t*-tests

Variable	n ex-ante	Mean ex-ante	n ex-post	Mean ex-post	Means difference	*p*-value
delivery	45	4.29	43	5.58	1.29	<0.01
organization	45	4.02	43	5.49	1.47	<0.01
content	45	3.73	43	5.30	1.57	<0.01
logical thinking	44	3.61	44	4.00	0.39	0.01
argumentation	44	3.11	44	3.66	0.55	<0.01
convincingness	44	3.30	44	3.66	0.36	0.03

Panel B: Paired *t*-tests

Variable	n ex-ante	Mean ex-ante	n ex-post	Mean ex-post	Means difference	*p*-value
delivery	43	4.33	43	5.58	1.26	<0.01
organization	43	4.05	43	5.49	1.44	<0.01
content	43	3.77	43	5.30	1.53	<0.01
logical thinking	44	3.61	44	4.00	0.39	<0.01
argumentation	44	3.11	44	3.66	0.55	<0.01
convincingness	44	3.30	44	3.66	0.36	<0.01

Note: n = number of participants; p-values are of non-directional t-tests to minimize Type II errors.

Table 2 shows the results of comparing the three dimensions of written communication quality, *delivery*, *organization*, and *content*, as well as the self-rated *logical thinking*, *argumentation*, and *convincingness* skills at the beginning of the semester to the corresponding values at the end of the

semester. In other words, the tests of Table 2 examine the effectiveness of the written communication curricular enhancement and the related assignments and feedback over the course of the semester. In Panel A, the means of all ex-ante survey responses are compared to the means of all ex-post survey responses in means-difference *t*-tests. The results show that the scores for all dimensions of written communication quality, as well as for all three skills have significantly increased over the course of the semester. Thus, the written communication assignments successfully increase written communication skills of students, as well as their self-efficacy.

Completing the course can sensibly be expected to increase students' *content* scores. Hence, the increase in this dimension shows that the course overall was effective in increasing students' knowledge. At the same time, an increase in knowledge is not necessarily reflected in students' writing, so improved *content* scores at the end of the semester also shows an increase in students' improvement in written communication.

Panel B repeats the analyses of Panel A with paired *t*-tests. Paired *t*-tests have greater statistical power than means-difference *t*-tests and thus a lower beta, or a lower probability of a Type II error of failing to reject a false null hypothesis (e.g., Gravetter & Wallnau, 2013). Only observations from students that answered both the ex-ante survey and the ex-post survey, and whose ex-ante response could be matched to their ex-post response enter the analyses. The results confirm the findings from Panel A that the written communication assignments are effective in increasing written communication skills and self-efficacy of students.

Table 3 shows the results of regressing the changes in the three written communication quality measures and the three skills measures on the demographic variables of the students in the sample. Student age was positively related to changes in the organization and quality of content of written communication. Additionally, students with more professional experience demonstrated larger improvements to the quality of delivery of written communication, and to the argumentation skills. These findings are important since they demonstrate the positive impact of the written communication curricular enhancement and the related assignments and feedback on non-traditional students that may be older, or have a longer history of work experience before or during their undergraduate education (e.g., Hittepole, 2019; Wood, 2023).

Information on students' gender was gathered with an open-ended item in the ex-ante survey. Students' strictly identified as either female or male. Hence, the variable *gender* was coded 1 if a student identified as female and 0 otherwise. Table 3 shows that female students had a larger increase in their argumentation skills over the course of the semester, which emphasizes the importance of written communication assignments and feedback in business and especially finance courses to increase the portion of women in financial professions (e.g., Loureiro, Loureiro, & Silva, 2020).

The results in Table 3 also demonstrate that there are significant differences for students' learning based on their race/ethnicity. White/Caucasian students experienced smaller increases in the argumentation skills than students of other races/ethnicities. This finding supports the importance of incorporating written communication assignments into finance curricula from an equity perspective. These assignments help level the playing field and overcome equity gaps between different ethnic/racial groups (e.g., American Psychological Association, Presidential Task Force on Educational Disparities, 2012).

Students who had a business major other than finance experienced larger increases in all dimensions of written communication quality. Thus, the written communication assignments and feedback over the course of the semester elevate business education across sub-disciplines. Furthermore, these results show that the written communication assignments helped students to

think more deeply about the subject matter, hence increasing the understanding and learning of students who are not majors of the field. This finding is also in line with the comments from students presented above.

Table 3
Results of Regression Analyses

Variable	change in delivery	change in organiza-tion	change in content	change in logical thinking	change in argumenta-tion	change in convin-cingness
age	0.04	0.09***	0.10**	>-0.01	0.02	0.02
	(1.14)	(2.77)	(2.34)	(-0.01)	(0.64)	(1.14)
degree year	-0.10	-0.22	-0.35*	-0.13	0.07	-0.04
	(-0.57)	(-1.12)	(-1.75)	(-0.96)	(0.64)	(-0.42)
professional experience in years	0.33**	-0.16	0.21	0.12	0.40***	-0.05
	(2.13)	(-0.82)	(1.13)	(0.66)	(2.98)	(-0.37)
number of times course taken before	0.42	-0.30	-0.05	-0.03	0.31	0.06
	(1.31)	(-0.66)	(-0.09)	(-0.25)	(1.49)	(0.24)
gender	-0.47	-0.36	-0.17	0.34	0.47*	0.16
	(-1.31)	(-1.16)	(-0.33)	(1.22)	(1.80)	(0.71)
Asian/Asian-American	0.12	0.44	0.06	0.43	-0.39	0.29
	(0.24)	(0.88)	(0.12)	(1.08)	(-1.23)	(0.88)
Hispanic	-0.41	0.35	-0.28	0.02	-0.46	-0.02
	(-0.54)	(0.48)	(-0.31)	(0.03)	(-0.77)	(-0.04)
White/ Caucasian	0.24	0.82*	0.53	0.56	-0.67**	-0.13
	(0.59)	(1.71)	(0.98)	(1.31)	(-2.55)	(-0.39)
finance major	0.63	-0.40	0.45	0.43	0.09	-0.20
	(1.14)	(-1.05)	(0.95)	(1.22)	(0.34)	(-0.57)
other business major	1.84***	1.43**	2.43***	0.52	0.86*	-0.31
	(2.75)	(2.55)	(3.63)	(1.29)	(1.97)	(-0.60)
number of observations	42	42	42	43	43	43
adjusted R^2	0.555	0.628	0.557	0.193	0.324	0.131

Note: All models are based on the White (1980) heteroskedasticity robust estimates. Reported estimates are significant at p < 0.10 (*), p < 0.05 (**), and p < 0.01 (***). All variables are dummy variables except for age, degree year, professional experience in years, and number of times course taken before, which were categorical variables. The intercept was not significant, and thus is not included in the models. No students identified as belonging to racial/ethnic groups other than Asian/Asian-American, Hispanic, and White/Caucasian.

Conclusion

This study demonstrates the importance of incorporating written communication assignments and feedback into the curricula of major-specific upper division courses instead of only having a designated written communication course in the degree plan. Implementing written communication assignments into upper division courses enhances students' learning, engagement, written communication skills, and self-efficacy. Students explicitly expressed that the written

communication projects enabled a deeper understanding of topics discussed in class, and motivated them to do additional research and dive deeper into each topic. Results from a pretest-posttest study design also showed that the assignments increased the quality of students' written communication in terms of delivery, organization, and content, as well as students' self-efficacy with regards to their logical thinking, argumentation, and convincingness skills.

The improvements in students' written communication skills and self-efficacy will increase students' employability and career success in a major way. While 73.3% of managers believe that written communication skills are the most desirable soft skills of recent college graduates (Walker, 2023), almost all job postings require written communication skills (Rios et al., 2020), and 90% of employers categorize written communication skills as either "very important" or "important" (Association of American Colleges and Universities, 2021), only 44% of employers rate recent college graduates as "very well prepared" (Association of American Colleges and Universities, 2021). Increased written communication skills thus provides students with a competitive advantage over their peers who have not had specific training on written communication. Additionally, the increased self-efficacy is associated with more sustainable learning and further enhances students' written communication skills upon entry into their first post-graduation full-time job. Students are thus able to more confidently apply their written communication skills, and thus fully capitalize on their education (Bandura, 1982, 1986; Noe, 2020).

Furthermore, the results revealed that incorporating written communication assignments into major-specific upper division courses helped overcome equity gaps and supported non-traditional students, female students, and non-White students. Consequently, all business concentrations should include written communication assignments similar to those presented in this study. These assignments not only increase the quality and relevance of business education as well as students' employability, but also contribute in a major way to bridging equity gaps and thus benefit society overall.

The written communication assignments can easily be adapted to other courses, or other fields, as the specific topic of each written communication assignment can be chosen from the course in question. The process of providing feedback, discussing best practices before and frequent mistakes after can be transferred to any business discipline. In adapting the written communication assignments, each discipline can focus on the most frequent form of written communication used by professionals. For example, marketing students can be asked to perform a market analysis, while accounting students can be asked to formulate an auditor opinion letter. The main obstacle might be initial student confusion or resistance, as in particular more quantitative business disciplines often only include very few written communication assignments and students are as a result unfamiliar with such assignments. At the same time, the absence of written communication assignments in these disciplines provides plenty of opportunities to introduce writing into usually quantitative courses and greatly improve students' employability, especially of non-traditional students, female students, and non-White students.

The scalability of the written communication assignments is limited by the fact that the feedback required to effectively teach written communication skills is highly individual, which might take up a considerable amount of instructor resources. The absence of a control group reduces the power of the results, so it is difficult to definitely disentangle whether an increase in written communication skills was solely due to the written communication assignments. The sample size is with 43 observations large enough to produce reliable results of all statistical tests. However, sample selection bias cannot be ruled out at such a small sample size. A larger sample

size or control group would have allowed for more complex methodology, even though the contributions of the present study already provide important and novel insights.

References

American Psychological Association, Presidential Task Force on Educational Disparities. (2012). Ethnic and racial disparities in education: Psychology's contributions to understanding and reducing disparities. Retrieved from http://www.apa.org/ed/resources/racial-disparities.aspx

Association of American Colleges and Universities. (2021). How college contributes to workforce success [pdf file]. Retrieved from https://dgmg81phhvh63.cloudfront.net/content/user-photos/Research/PDFs/AACUEmployerReport2021.pdf

Bandura, A. (1982). Self-efficacy mechanisms in human behavior. *American Psychologist*, *37*(2), 122-147. doi: 10.1037/0003-066X.37.2.122

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Broad, M. L., & Newstrom, J. W. (1992). *Transfer of training: Action-packed strategies to ensure high payoff from training investments*. New York, NY: Basic Books.

Brower, T. (2024, Feb 12). Yes, the talent shortage is real: What you must know to attract and retain. *Forbes*. Retrieved from https://www.forbes.com/sites/tracybrower/2024/02/12/yes-the-talent-shortage-is-real-what-you-must-know-to-attract-and-retain/

Cox, P. L., Bobrowski, P. E., & Spector, M. (2004). Gateway to Business: An Innovative Approach to Integrating Writing into the First-Year Business Curriculum———. *Journal of Management Education*, *28*(1), 62-87. doi: https://doi.org/10.1177/1052562903252502

Florida International University. (2023). Writing in general education courses. Retrieved from https://wac.fiu.edu/writing-general-education-courses/

Gagne, R. M., & Medsker, K. L. (1996). *The conditions of learning: Training applications*. Belmont, CA: Wadsworth Publishing.

Google. (2024). *Google Gemini 1.5* [Large language model]. https://gemini.google.com/

Gravetter, F. J., & Wallnau, L. B. (2013). *Statistics for the behavioral sciences* (9th ed.). Boston, MA: Cengage Learning.

Higher Ed Dive. (2022, September 19). Demand for strong written communication skills is soaring – why isn't the support?. Retrieved from https://www.highereddive.com/spons/demand-for-strong-written-communication-skills-is-soaring-why-isnt-the-s/631385/

Hittepole, C. (2019). Nontraditional students: Supporting changing student populations [pdf file]. Retrieved from https://naspa.org/images/uploads/main/Hittepole_NASPA_Memo.pdf

Loureiro, M., Loureiro, N., & Silva, R. (2020). Differences of gender in oral and written communication apprehension of university students. *Education Sciences*, *10*(12), 379-398. doi: https://doi.org/10.3390/educsci10120379

Mitchell, R. B. (1988). Integrating the Development of Interpersonal, Listening, Speaking, and Written Communication Skills-Concluding the Business Communication Course with Realism. *The Bulletin of the Association for Business Communication*, *51*(2), 27-29. doi: https://doi.org/10.1177/108056998805100212

Noe, R. A. (2020). *Employee training and development* (8th ed.). New York, NY: McGraw-Hill.

Poláková, M., Suleimanová, J. H., Madzík, P., Copuš, L., Molnárová, I., & Polednová, J. (2023). Soft skills and their importance in the labour market under the conditions of Industry 5.0. *Heliyon*, *9*(8). doi: https://doi.org/10.1016/j.heliyon.2023.e18670

Renz, F. M., & Vogel, J. U. (2021). Let Students Excel!–Developing Career-Relevant Skills Through Excel-Based Individualized Projects. *Journal of Financial Education*, *47*(2), 19-34.

Rios, J. A., Ling, G., Pugh, R., Becker, D., & Bacall, A. (2020). Identifying critical 21st-century skills for workplace success: A content analysis of job advertisements. *Educational Researcher*, *49*(2), 80-89. doi: https://doi.org/10.3102/0013189X19890600

Sparks, J. R., Song, Y., Brantley, W., & Liu, O. L. (2014). Assessing written communication in higher education: Review and recommendations for next-generation assessment [pdf file]. Retrieved from https://files.eric.ed.gov/fulltext/EJ1109266.pdf

Sutter Fichtner, P. (2000, November 1). *When writing comes across the curriculum to history*. Perspectives on History. Retrieved from https://www.historians.org/research-and-publications/perspectives-on-history/november-2000/when-writing-comes-across-the-curriculum-to-history

Towler, A. J., & Dipboye, R. L. (2001). Effects of trainer expressiveness, organization, and trainee goal orientation on training outcomes. *Journal of Applied Psychology*, *86*(4), 664-673. doi: 10.1037//0021-9010.86.4.664

Tulane University. (2023). Designated writing courses. Retrieved from https://sopa.tulane.edu/degrees-programs/degree-requirements/undergraduate-degree-requirements/designated-writing-courses

Walker, A. (2023, February 20). *10 skills employers look for in college graduates*. LinkedIn. Retrieved from https://www.linkedin.com/pulse/10-skills-employers-look-college-graduates-amelia-walker

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica, 48*(4), 817-838. doi: 10.2307/1912934

Wood, S. (2023, January 20). *A college guide for nontraditional students*. *U.S. News*. Retrieved from https://www.usnews.com/education/best-colleges/articles/a-college-guide-for-nontraditional-students

Appendix 1

Ex-Ante Survey

Participant Number: _____.

1. Should companies maximize profits at all costs, even to the detriment of the environment? In other words, is environmental harm simply a cost of doing business? Write about 200 words or 10 sentences.

_____

_____

_____

_____

_____

_____

2. Are there ethical implications of making drastic changes to payout policy (e.g., switching from paying a dividend to not paying a dividend)? Write about 200 words or 10 sentences.

_____

_____

_____

_____

_____

_____

3. What is your current age? _____

4. Which gender do you most identify with? _____

5. Which ethnicity/ethnicities do you most identify with? _____

6. Which race(s) do you most identify with? _____

7. What is your current major? _____

8. In which year of your degree are you?

first year	second year	third year	fourth year	fifth year	sixth year

9. Do you have any professional experience related to finance? Yes No

10. If yes, how many years of professional experience related to finance do you have? _____

11. How many times have you ever completed this course (or a similar course at another institution) before? _____

12. If you have ever completed this course or a similar course at another institution, which was the delivery format of the course?

online	hybrid	in-person

13. How proficient do you feel in your logical thinking skills?

very proficient	proficient	neutral	not proficient	not proficient at all

14. How proficient do you feel in argumentative skills?

very proficient	proficient	neutral	not proficient	not proficient at all

15. How convincing would you say you are?

very proficient	proficient	neutral	not proficient	not proficient at all

Appendix 2

Ex-Post Survey

Participant Number: _____.

1. Should companies maximize profits at all costs, even to the detriment of the environment? In other words, is environmental harm simply a cost of doing business? Write about 200 words or 10 sentences.

_____

_____

_____

_____

_____

_____

2. Are there ethical implications of making drastic changes to payout policy (e.g., switching from paying a dividend to not paying a dividend)? Write about 200 words or 10 sentences.

_____

_____

_____

_____

_____

_____

_____

13. How proficient do you feel in your logical thinking skills?

very proficient	proficient	neutral	not proficient	not proficient at all

14. How proficient do you feel in argumentative skills?

very proficient	proficient	neutral	not proficient	not proficient at all

15. How convincing would you say you are?

very proficient	proficient	neutral	not proficient	not proficient at all

16. The communication assignments that I completed during this semester were engaging.

strongly agree	agree	neutral	disagree	Strongly disagree

17. The communication assignments that I completed during this semester enhanced my learning in this course.

strongly agree	agree	neutral	disagree	Strongly disagree

18. What did you like about the communication assignments?

19. What did you not like about the communication assignments?

Access to Financial Education in High School and Mortgage Debt

Leobardo Diosdado
Texas A&M University-Corpus Christi

Donald Lacombe
Texas Tech University

Jacob Tenney
University of Charleston

Most states in the United States do not require high schools to provide a financial literacy course. This study analyzes whether there is a relationship between financial education in high school and mortgage debt. The 2015 National Financial Capability data are analyzed using Ordinary Least Squares and Tobit regression models. The results indicate that there is a statistically significant relationship between access to financial education in high school and mortgage debt. Those with access to financial education tend to have mortgages with a lower loan-to-value ratio than those without access to financial education in high school.

Keywords: financial education, mortgage, high school, national financial capability study, debt

Introduction

In 2018, only seventeen states in the United States required high schools to provide students with access to personal finance courses (Council for Economic Education, 2018). However, research suggests that financial education has a significant impact on an individual's behavior regarding the decision to use credit to smooth consumption throughout his or her life. At a minimum, prior research suggests that financial education may result in increased awareness of the choices available for those individuals who choose to use debt (Hartarska, Gonzalez-Vega, & Dobos, 2002; Hartarska and Gonzalez-Vega, 2005, 2006).

One of the many choices regarding the use of debt involves home ownership. Home ownership is a crucial element of wealth in middle-class families. Real estate represents the most significant component of a household's total asset value for those between the 30th and 95th percentile of households (Campbell, 2006). More than half (64.8 percent) of American homeowners made mortgage payments to a lender in 2015 (Bureau, 2015). The amount of debt used to acquire a home can significantly influence an individual's net worth and may impact the ability to reach future financial goals.

This study estimates how access to financial education in high school effects an individual's borrowing behavior. The following research question is analyzed: "Does access to financial education in high school effect the percentage of mortgage debt acquired by an individual when purchasing a home?" The difference in loan-to-value between those who had access to financial education in high school and those who did not is examined via an Ordinary Least Squares model and a Tobit regression model.

Results from both models suggest that those individuals with access to financial education in high school borrow significantly less when purchasing a home. However, only a fraction (slightly more than one-fourth) of the individuals within the sample reported having access to

financial education in high school. The results suggest that those with access to financial education in high school may be less likely to get into a situation where the debt owed on the home is greater than the fair market value of the home.

Review of Literature

Bloom and Ford (1979) hypothesized that it is difficult to evaluate the effect of consumer and financial education on a consumer's behavior. They suggested that behavior is ultimately a reflection of an individual's tastes and preferences. However, an individual's preferences are influenced by a multitude of variables. Bloom and Ford (1979) argued that the size of the sample analyzed, and the limitations of available data would be a significant deterrent. Therefore, researchers have sought to identify a sample of individuals that would satisfy Ford and Bloom's sample size argument and allow them to test their hypothesis. Research began to assess the role of access and exposure to financial education on the individual's preferences and choices (Langrehr, 1979; Kohen & Kipps, 1979; Soper & Bernneke, 1981; Peterson, 1992; Boyce, Danes, Huddleston-Casas, Nakamoto, & Fisher, 1998). High school students became the focal group of their research. The sheer quantity of the high school student population would address Bloom and Ford's sample size dilemma. Subsequent studies have allowed researchers the opportunity to evaluate the individual's behavior and/or choices over time.

Several of the analyses mentioned above regarding the financial behavior of high students find that consumer education and financial education may only have a *short-term* effect on the behavior, knowledge, and attitudes of high school students. Bernheim et al. (2001) find that exposure to financial education in high school can potentially reduce the psychological barriers that impede optimal financial decisions. Lusardi and Mitchell (2014) suggest that access to financial education is more likely to increase exposure and awareness rather than to produce significant behavior changes. Others argue that high school classes in personal finance and money management are not effective at increasing financial literacy (Mandell, 2008). Finally, Ehrlich and Guilbault (2017) found improvements in financial literacy after taking a financial literacy course to be very small for low-income populations.

The quality and frequency of the exposure to financial topics are more likely to make a difference, rather than simply being in an environment with access to financial education. Walstad et al. (2010) found empirical evidence that suggests that only those high schools that offered well-specified and properly implemented financial education programs were more likely to increase a student's financial knowledge. For example, students who had access to, and participated in, personal financial education courses in high school exhibited a lower reliance on non-student debt (Brown et al., 2016).

Business and economics courses are complementary venues to expose students to financial information. Grimes et al. (2010) suggest that individuals who receive a business or economics course in high school are less likely to report being "unbanked". An "unbanked" individual does not use a banking institution in any capacity. Martinez (2016) cautions against assuming that general business and business finance courses can effectively prepare students for personal finance decisions. However, individuals who are exposed to financial education report being more familiar and comfortable with financial transactions (Bernheim et al., 2001). Results from a financial education program offered to high-school students in Brazil suggest that knowledge "trickled up." The high school student's parents experienced significant increases in financial knowledge along with improvement in both savings and spending behaviors (Bruhn et al., 2013).

Prior empirical findings suggest that state mandates that require high school students to receive consumer and/or financial education significantly increase their exposure to financial knowledge (Bernheim et al., 2001). However, amendments to those mandates requiring access

to financial education create ever-changing requirements as the composition of the state government changes. It is important to note that states that chose not to enact consumer education mandates were not statistically different regarding income, retail sales, or individuals completing a high school education (Bloom & Ford, 1979).

Lusardi (2011) conducted a study of Americans' financial capability. The empirical evidence suggests that Americans engage in transactional debt behaviors that result in substantial discretionary expenses. Another study highlights the importance of basic numeracy skills by suggesting that individuals are less likely to default on mortgage payments if they have basic math skills. However, the results suggest that behavior unrelated to the choice of mortgage contract is more likely to influence the probability of default (Gerardi et al., 2013).

Prior research suggests that those individuals who borrow a disproportionate amount of debt when purchasing a home are more likely to set a higher asking price for their home upon sale (Genesove & Mayer, 2001). The individual's aversion to loss can potentially lead to a situation in which the home becomes illiquid. A vast number of mortgagees did not know the terms of their mortgages, or the interest costs associated with their home loans (Lusardi, 2011). As employment opportunities within a region begin to shift, it creates situations where homeowners are less likely to possess the ability to relocate due to the loss of mobility that occurs when one purchases a home. Subsequently, when an area loses a firm that is a significant source of employment in the region, it not only impacts those who are employed at that particular employer but also the individuals who engage in economic transactions with those former employees. Blanchflower and Oswald (2013) suggest that there is a negative correlation between the percentage of homeowners in a region and the long-term unemployment rates within the region. Therefore, individuals who borrow a higher percentage of their home value will most likely sacrifice the liquidity associated with the sale of the home and the mobility associated with renting.

The hypothesis addressed by this paper is that financial literacy education in high school is associated with amounts borrowed to purchase a home. It is anticipated that the loan-to-value ratio for those who were exposed to financial literacy education in high school will be lower than those who had no exposure.

Methodology

Data from the 2015 National Financial Capability Study (NFCS), funded by the FINRA Investor Education Foundation, is analyzed in this study. NFCS's overarching research objective is to establish a benchmark for key indicators of an individual's financial capability. The 2015 NFCS sample was selected from a population of individuals who chose to participate in an online survey conducted between June and October of 2015. The 2015

The NFCS sample consists of 27,654 respondents from all 50 states and the District of Columbia. The sample is intended to be nationally representative when probability weights are applied to the data. This study consists of 7,291 individuals who provided answers to questions in the survey.

The dependent variable in this analysis is the loan-to-value, identified as the percentage of funds borrowed when purchasing a home. The following 2015 NFCS question provided the loan-to-value amount:

"Approximately what percentage of the purchase price was your down payment?"

The estimated loan-to-value percentage ranges from zero to one hundred and is calculated by subtracting the down payment from one hundred to determine the loan-to-value (Lam et al., 2013). The loan-to-value percentages range from zero to a hundred. In this study, the average borrower used 68.73 percent of borrowed funds to purchase his or her current home. This is

compared to statistics gathered by the National Association of Realtors suggesting that in 2019 the average first-time borrower used 93 percent of borrowed funds, and repeat buyers used an average of 84 percent (Lautz, et al., 2020). This is higher than the average amount borrowed in this study. The difference might be because the values in the study are reported values instead of actual values.

The explanatory variable of interest is whether an individual had access to financial education in high school. Slightly more than one-fourth (27.59 percent) of individuals report having access to financial education in high school. Those individuals who reported purchasing a home before the age of eighteen were removed from this analysis. In this sample, on average, respondents reported purchasing their current home at the age of 40.66 years of age.

The additional explanatory variables serve as proxies for preferences. These variables include gender, ethnicity, level of education, and the year of the home purchase. Table 1 outlines the descriptive statistics of the respondents in this study.

Table 1
Descriptive Statistics

	Mean	**(SD)**
Loan-to-Value	0.6873	(0.4432)
Age at the time of home purchase	40.6673	(13.7394)
Access to financial education in high school	0.2759	
Gender		
Male	0.5504	
Female	0.4495	
Ethnicity		
White Non-Hispanic	0.7233	
Black Non-Hispanic	0.0697	
Hispanic (any race)	0.1389	
Asian Non-Hispanic	0.0526	
Other	0.0154	
Level of Education		
Did not complete high school	0.0095	
High School	0.1311	
GED	0.0454	
Some college, no degree	0.2801	
Associate degree	0.2326	
Bachelor's degree	0.1689	
Post-graduate degree		

Source: NFCS 2015 (Number of obs: 7,291)

The dependent variable in this analysis is the loan-to-value (LTV) or percentage of borrowed funds that an individual used to purchase his or her current home; thus, the effect of access to financial education in high school will be estimated via Ordinary Least Squares and Tobit models. The multivariate regression below was estimated via ordinary least squares:

$$LTV_i = \alpha + \beta_1 fehs_i + \beta_2 achp_i + \beta_3 achp^2{}_i + \beta_{ij} DV_{ij} + \beta_{ij} Year_{ij} + \varepsilon$$

where LTV_i is the observed amount of borrowed funds the individual used to purchase the home. The Tobit model addresses the possibility that a predicted loan-to-value estimate may be less than zero or exceed one hundred.

The Tobit model below is estimated via maximum likelihood and controls for both left (the lower limit) and right (the upper limit) censoring:

$$ltv_i^* = \alpha + \beta_1 fehs_i + \beta_2 achp_i + \beta_3 achp^2{}_i + \beta_{ij} DV_{ij} + \beta_{ij} Year_{ij} + \varepsilon$$
$$ltv_i = ltv_i^* \; if \; 100 > ltv_i^* 0$$
$$ltv_i = 0 \; if \; ltv_i^* \leq 0$$
$$ltv_i = 100 \; if \; ltv_i^* \geq 100$$

where ltv_i^* is the latent variable representing the desired loan-to-value (ltv) ratio. This loan-to-value ratio could be greater than one hundred if the individual wants to acquire more debt than the home's current worth. $fehs_i$ identifies whether the individual had access to financial education in high school. $achp_i$ identifies the individual's age at which the current home purchase occurred. DV_{ij} represents a matrix that contains the individual's demographic variables. The demographic variables include the individual's gender, ethnicity, and level of education. Finally, year variable identifies the year in which the individual purchased the home and serves as a control for the economic conditions at the point in time when the home was purchased.

α, β_1, β_2, β_3, and β_j are the coefficients to be estimated. The β's are the estimated effects of the explanatory variable on the dependent variable while holding the other variables constant. The error term is assumed to be normally distributed.

The expected sign on β_1 is negative because it is hypothesized that those individuals who had access to financial education in high school will borrow less than those who did not have access to financial education in high school. Those individuals who attended a high school that provided financial education were more likely to be exposed to basic financial concepts. Exposure to basic economic and/or financial concepts can ultimately influence an individual's choices (Hiratsuka and Gonzalez- Vega 2002, 2005, and 2006). Brown et al. (2016) suggest that an individual who had access to financial education will borrow less capital.

β_2 and β_3 are the coefficients for age of the individual when the home purchase occurred. These coefficients for age are expected to be negative, due to the unique factors associated with an individual's age. For example, as individuals age salaries tend to increase, and individuals tend to accumulate more assets. This allows individuals to pay down the mortgages on their homes over time. In addition, the longer an individual waits to purchase a home along with the compounding interest associated with saving allows the individual a greater opportunity to allocate a higher portion of his or her prior savings towards the purchase of a home.

The demographic variables included in this study are gender, ethnicity, and level of education. These demographic variables are included to serve as proxies for individual preferences. The signs of these effects cannot be determined as a priori, as they vary across studies. The year variable controls the unique economic factors that were present at the time the home purchase occurred.

Results

Table 2 reports the results from both the OLS and Tobit multivariate regression models. The results show the difference in the percentage of funds that are borrowed to purchase a home between those who had access to financial education in high school and those who did not. All else equal, individuals with access to financial education in high school borrowed 4.07% less from a lender when purchasing a home when compared to those who did not have access to financial education in high school. This lower amount borrowed suggests that access to financial education in high school influences an individual's preferences regarding how much is borrowed when purchasing a home.

The results suggest that younger individuals (between the ages of eighteen and forty-three) are more likely to make a smaller down payment (less than thirty percent of the home's value). Those over the age of forty-three are less likely to depend on borrowed funds to purchase a

home. Additional years allow individuals the opportunity to allocate more of his or her resources towards savings and/or transfer the equity from a previous home purchase.

Table 2
Results from OLS and Tobit regressions showing the effect of access to financial education in high school on mortgage loan-to-value ratios.

Variable	OLS Coefficient	Tobit Coefficient
Loan-to-Value	66.1437***	65.9121***
	(5.741)	(7.4895)
Access to financial education in high school (*ref*: no access to financial education in high school)	-4.079 ***	-4.9113***
	(0.8281)	(1.0967)
Age at the time of current home purchase	0.8619 ***	1.0974 ***
	(0.1712)	(0.2232)
Age at the time of current home purchase^2	-0.0177 ***	-0.0226 ***
	(0.0019)	(0.0025)
Female (*ref:* Male)	2.0274 ***	2.6524 ***
	(0.7243)	(0.9387)
Ethnicity (ref: White non-Hispanic)		
Black non-Hispanic	3.7351 **	4.9952 **
	(1.5569)	(2.0112)
Hispanic (any race)	3.9394 ***	4.8722 ***
	(1.2591)	(1.6278)
Asian non-Hispanic	-1.3923	-2.2411
	(1.8409)	(2.3562)
Other non-Hispanic	3.1825	4.4827
	(2.3619)	(3.0714)
Education (*ref*: less than high school)		
High school	-4.5796	-6.0967
	(4.351)	(5.7024)
GED	-5.5261 **	-7.5624
	(4.6065)	(6.0322)
Some college, no degree	-0.8205	-1.5916
	(4.2726)	(5.5999)
Associate's degree	-1.1105	-2.0154
	(4.3418)	(5.6878)
Bachelor's degree	-2.6999***	-4.7177
	(4.264)	(5.5874)
Postgraduate degree	-3.2856 **	-5.4034
	(4.2877)	(5.6174)
R-squared	0.1095	0.0132
Number of Observations	7291	7291

Source: NFCS 2015 Standard error in parenthesis.
*Statistical significance *<0.10, **<0.05, ***<0.01*

The demographic variables in the multivariate regression equation serve as proxies for tastes and preferences. Prior research about how demographics influence debt usage is mixed. On the one hand, Wang et al., (2011) found little association between demographics and credit card behavior. On the other hand, in a study in Saudi Arabia, where credit card usage has been

on the rise, there is evidence that demographics do influence credit card usage (Adbul-Muhmin & Umar, 2007). This current study also finds evidence that demographic variables influence debt use. For example, females are estimated to borrow an additional 2.02 percentage points at the time of purchasing a home when compared to males.

The results also suggest that an individual's ethnicity affects the percentage of funds that are borrowed when purchasing a home, all else constant. An individual who identified himself or herself as "Black non-Hispanic" is more likely to borrow by an additional 3.73 percentage points when compared to "White non-Hispanic" respondents. An individual who identified himself or herself as "Hispanic (any race)" is more likely to borrow an additional 3.93 percentage points towards purchasing a home when compared to "White non-Hispanic" respondents.

The results for individuals with higher education are mixed. Individuals with a bachelor's degree will borrow 2.69 percentage points less than an individual who did graduate with a high school degree.

The estimated coefficients from the Tobit analysis of the relationship between access to financial education in high school and borrowing are both statistically and economically significant. The results suggest that those with access to financial education in high school borrowed an additional 4.91 percentage points of the purchase price of a home compared to those without access, all else equal. The major difference between the OLS and Tobit model is the lack of statistical significance in the education variable.

Conclusion and Implications

Two multivariate regression equations are estimated to examine the difference in the percentage of funds that are borrowed when purchasing a home between those individuals who had access to financial education in high school versus those who did not. The regression equations in this study included several demographic variables as explanatory variables. Those variables serve as controls for the individuals' tastes and preferences.

The results from both multivariate regressions suggest there is a difference in the amount of debt used by those individuals who had access to financial education in high school and those who did not have access. The estimated difference in the percentage of amounts borrowed in the OLS and Tobit model is both statistically and economically significant. Individuals with access to financial education in high school borrowed 4.07 percent less than those who did not have access to financial education in high school. Therefore, policymakers should evaluate the benefits and costs associated with enacting, changing, or repealing a mandate that requires high school students to have access to a financial education course.

Limitations and Future Research

Due to limitations in the available data, future researchers could analyze the actual dollar amount instead of the percentage of borrowed funds used when purchasing a home. Future research could analyze the actual mortgage rate charged to the borrower because the rate uniquely reflects the risk[s] associated with each specific mortgage transaction. Thus, as longitudinal data becomes available, future studies could examine how financial behavior differs among those who have access to a financial education course in high school.

References

Adbul-Muhmin, A., & Umar, Y. A. (2007). Credit card ownership and usage behaviour in Saudi Arabia: The impact of demographics and attitudes toward debt *Journal of Financial Services Marketing, 12*(3), 219-234.

Bernheim, B. D., Garrett, D. M., & Maki, D. M. (2001). Education and saving: The long-term effects of high school financial curriculum mandates. *Journal of Public Economics, 80*(3), 435-465.

Blanchflower, D. G., & Oswald, A. J. (2013). Does high home ownership impair the labor market? *National Bureau of Economic Research*, No. W19079.

Bloom, P. N., & Ford, G. T. (1979). Evaluation of consumer education programs. *Journal of Consumer Research, 6*(3), 221-279.

Boyce, L., Danes, S. M., Huddleston-Casas, C., Nakamoto, M., & Fisher, A. B. (1998). Evaluation of the NEFE high school financial planning program. *Boulder, CO: National Endowment for Financial Education.*

Brown, M., Grigsby, J., Van Der Klaauw, W., Wen, J., & Zafar, B. (2016). Financial education and the debt behavior of the young. *The Review of Financial Studies, 29*(9), 2490-2522.

Bruhn, M., Leao, L., Legovini, A., & Marchetti, R. (2013). *The impact of high school financial education: Experimental evidence from Brazil.* The World Bank.

Bureau, U.S.C. (2015). *Selected Housing Characteristics*. Retrieved from https://data.census.gov/table?d=ACS+5-Year+Estimates+Data+Profiles&tid=ACSDP5Y2015.DP04

Campbell, J. Y. (2006). Household finance. *The Journal of Finance,61*(4), 1553-1604.

Council for Economic Education. (2018). *Survey of the States: Economic and personal finance education in our Nation's schools.* New York.

Ehrlich, M., & Guilbault, M. (2017). What Colleges can do to Enhance Financial Literacy of Students. *Journal of Financial Education, 43*(2), 262-272.

Genesove, D., & Mayer, C. (2001). Loss aversion and seller behavior: Evidence from the housing market. *The Quarterly Journal of Economics, 116*(4), 1233-1260.

Gerardi, K., Goette, L., & Meier, S. (2013). Numerical ability predicts mortgage default. *Proceedings of the National Academy of Sciences, 110*(29), 11267-11271.

Grimes, P. W., Rogers, K. E., & Campbell, R. (2010). High school economic education and access to financial services. *Journal of Consumer Affairs, 44*(2), 317-335.

Hartarska, V., & Gonzalez-Vega, C. (2005). Credit counseling and mortgage termination by low-income households. *The Journal of Real Estate Finance and Economics, 30*(3), 227-243.

Hartarska, V., & Gonzalez-Vega, C. (2006). What affects new and established firms' expansion? Evidence from small firms in Russia. *Small Business Economics, 27*(2-3), 195-206.

Hartarska, V., Gonzalez-Vega, C., & Dobos, D. (2002). Credit counseling and the incidence of default on housing loans by low-income households. *Unpublished manuscript*.

Kohen, A. I., & Kipps, P. H. (1979). Factors determining student retention of economic knowledge after completing the principles-of-microeconomics course. *The Journal of Economic Education, 10*(2), 38-48.

Lam, K., Dunsky, R. M., & Kelly, A. (2013). Impacts of down payment underwriting standards on loan performance--evidence from the GSEs and FHA portfolios. *Federal Housing*

Finance Agency Working Paper, 13-3.

Langrehr, F. W. (1979). Consumer education: Does it change students' competencies and attitudes? *Journal of Consumer Affairs, 13*(1), 41-53.

Lautz, J., Dunn, M., Snowden, B., Christopherson, M., & Holmes, S. (2020). *2020 Profile of Home Buyers and Sellers.* National Association of Realtors.
Lusardi, A. (2011). Americans' financial capability. *National Bureau of Economic Research, No. 217103*.
Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature, 52*(1), 5-44.
Mandell, L. (2008). Financial literacy of high school students. In *Handbook of Consumer Finance Research* (pp. 163-183). New York: Springer.
Martinez, V. (2016). Financial Literacy Among Our Students: Assessing and Improving Their Knowledge. *Journal of Financial Education, 42*(3-4), 291-303.
Peterson, N. A. (1992). The high school economics course and its impact on economic knowledge. *The Journal of Economic Education, 23*(1), 5-16.
Soper, J. C., & Bernneke, J. S. (1981). The test of economic literacy and an evaluation of the DEEP system. *The Journal of Economic Education, 12*(2), 1-14.
Walstad, W. B., Rebeck, K., & MacDonald, R. A. (2010). The effects of financial education on the financial knowledge of high school students. *Journal of Consumer Affairs, 44*(2), 336-357.
Wang, L., Lu, W., & Malhotra, N. K. (2011). Demographics, attitude, and personality and credit card features correlate with credit card debt: A view from China. *Journal of Economic Psychology, 32*(1), 179-193.

The Economics of Payday Lending

John D. Martin
Baylor University

Arthur J. Keown
Virginia Tech

This paper examines the costs of public policy issues associated with, and reasons for and against regulation of payday loans. A payday loan is a short-term (usually two to four week) source of liquidity used by low- to moderate-income consumers, with interest (typically 15 to 20 percent of the amount borrowed) and principal due within a period of 10 days to two weeks. As a result of large interest payment over a short period of time, these, these loans typically carry an annual percentage rate of more than 500%. Moreover, if the effects of compound interest are incorporated in the analysis, where the loans are rolled over without any payment of interest, the annual percentage yield can easily exceed 10,000 percent.

As a result of the high interest rates and the tragic personal tails associated with payday loans, there has been a public outcry over the lending practices of payday lenders. In their defense, payday lenders have argued that, first; the borrowers using payday loans are very risky clients who may default on the loan obligation. Second, payday lending entails very high operating expenses. Both these considerations call for an adjustment to the computation of the cost of credit. Specifically, the expected cost of credit must reflect the probability of default on the loan as well as the anticipated recovery by the lender in the event of default. In addition, to assess lender loan profitability, we need to incorporate consideration for the operating expenses incurred by the lender. Incorporation of consideration for these factors dramatically reduces the expected rate of return to the lender.

Payday lending practices are subject to both federal and state regulation. However, the stories of human tragedies have created pressure from the public to further restrict payday lending. A fundamental argument favoring added regulation relates to the notion that payday lenders are abusing their clients with draconian fees and expenses that leave the borrower worse off at the expense of returns to the lender. While stories of high costs of financing abound, however, there is little evidence available that payday lenders are earning abnormally high profits.

Keywords: payday loans, payday lending payday policy

Acknowledgements

We would like to express our sincere thanks to Mark Flannery for providing comments on an earlier draft of the paper. Any remaining errors, of course, remain with the author team.

Introduction

Payday lending is one of the most controversial topics in consumer finance, although they charge triple digit interest rates, millions of American households have taken out these loans every year. Here are some interesting facts about payday lending:[1]

In the U.S. 12 million households borrow approximately $50 billion a year using payday loans.

The typical borrower owes payday lenders for five months out of the year and ends up paying $800 for a $300 loan.

Borrowers with six or more loans each year make up over half of all payday revenues in California.

Payday lenders tend to aggregate in areas with higher poverty rates.

All this has resulted in an increased level of scrutiny for payday lenders resulting in numerous calls for action to control them (Skiba and Tobacman 2009, Martin, 2010), The Federal agency charged with making sure that banks, lenders, and other financial companies treat consumers fairly [2] refers to these loans as "debt traps" and has new proposed regulations designed to limit some of the more egregious lending practices.[3] Payday lenders argue that the risks associated with payday lending warrant high rates of interest and that they provide credit options to consumers that commercial banks and other financial institutions do not provide.[4]

The typical payday loan is for less than $500, has a maturity of two weeks, is secured by the borrower's post-dated check or debit authorization, and carries a compound annual rate of interest that can easily exceed 10,000 percent.[5] If you imagined the terms of illegal loan sharking you may not envision rates this high, and these loans are legal in 35 states!

This brings us to a central point of an ongoing policy debate about the current state of the payday lending market. Is the high cost of payday lending justified by the risks of lending to a very high-risk borrower pool or does it reflect predatory lending practices designed to take advantage of uninformed individuals?

Historically, regulation of payday lending has fallen to the states. However, the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act created the Consumer Financial Protection Bureau (CFPB) which provided broad authority for this federal agency to regulate consumer financial markets including payday lending. On March 26, 2015 the CFPB announced it was considering rules that would end what they referred to as payday lending traps which are viewed as a form of predatory lending.[6] A lending trap is designed to snare the borrower into an endless sequence of high cost loans. Although payday loans are technically

---

[1] Hayley Peterson, 6 Outrageous Facts that Show How Payday Lenders Screw Consumers" Business Insider, (October 25, 2013) http://www.businessinsider.com/outrageous-facts-about-payday-loans-2013-10. Accessed August 17, 2016.

[2] The Consumer Financial Protection Bureau (CFPB) was created by the Dodd-Frank Wall Street Reform and Consumer Protection Act signed in July 2010. The CFPB consolidated most of the Federal consumer financial protection authority into one place.

[3] http://money.cnn.com/2015/03/26/investing/payday-lenders-cfpb-proposal-stocks-fall/.

[4] The payday lender trade group is known as the Community Financial Services Association of America (CFSA). The CFSA was established in 1999 as the national organization for small dollar, short-term lending or payday advances.

[5] The cost referred to here is the Annual Percentage Yield or APY which takes into account the effects of compound interest. Most studies of the cost of payday loans report the Annual Percentage Rate or APR which dramatically understates the true cost of financing as it fails to account for the effects of compounding. For example, the APR for a typical payday loan is 400-600%. However, the APY for these same loans ranges from 4,029% to 22,020%.

[6] On June 2, 2016 the CFPB proposed a rule designed to end payday debt traps by requiring lenders to take steps to make sure that consumers have the ability to repay their loans. The rules would apply to payday loans, auto title loans, deposit advance products, and certain high-cost installment ant open-end loans.

short term in nature (typically two weeks), lenders know that their borrowers are unlikely to be able to come up with the repayment of principal and fees in one pay period. When this happens the borrower makes another payment of interest and fees to the lender and the loan rolls over until the next pay period. Thus, the typical loan takes five months to be repaid by which time the amount of the loan has been recovered multiple times and the annualized rate of interest is triple digits.

The objective of this brief tutorial is to describe the little understood world of payday lending. Specifically, we explain the nature of payday lending, reveal the true cost of payday loans from the borrowers perspective and contrast this with the expected return the lender anticipates given the very high default rates on this type of loan, provide context regarding the significance of payday loans as a source of financing for individuals, and describe the public policy issues surrounding their use.

The Workings of Payday Loans

A payday loan is a short-term (usually two to four week) source of liquidity used by low-to moderate-income consumers. They are flat fee loans that involve paying interest of 15 percent to 20 percent of the loan amount (online loans cost as much as 25 percent) for the length of the pay period. For example, a two-week loan with a principal amount of $500 that carries a 20 percent interest rate would require the borrower to repay the loan principal plus $100 in two weeks. Underwriting practice in the industry requires that the borrower provide identification, a recent bank statement, a recent pay stub, and a personal check that is post-dated to coincide with the maturity of the loan.[7]

Given the very high cost of payday loans it is difficult to imagine why someone would ever take out a payday loan in the first place, much less carry multiple loans simultaneously. However, if borrowers are rational then it must be the case that a payday loan appears to be the best available alternative. To illustrate consider the following example. Suppose you are a week from your next payday and you have a bill that is due which is larger than your bank account balance. If you either do not have a credit card or it is maxed out, then you might turn to a payday loan that costs you $40 for two weeks rather than writing a check with insufficient funds and paying the $30 non-sufficient funds fee plus the $20 charge for a returned check.

So, if payday lending provides a temporary source of financing to get over a brief financial rough patch, these loans may actually help borrowers avoid financial distress. There is a great deal of evidence from survey research that describes payday loan behavior.

The PEW Charitable Trusts funded a study of payday lending practices and consumer behavior. The key findings regarding who borrows, where they borrow and why are summarized in Exhibit 1. These findings indicate that the dollar amount of a payday loans is less than $400. In addition, payday lenders are less affluent than the general population: (i) 20 percent of borrowers earn less than $25,000 a year (only 1 percent earn more than $100,000 a year) and only 6 percent are full time employees. Moreover, the majority of payday loans are used to finance ordinary household expenses (69 percent) and the loans are typically outstanding for five months. Thus the typical two-week payday loan is renewed multiple times (resulting in additional interest and penalty payments). When asked what they would do without the availability of payday loans the majority of borrowers indicated they would cut back on expenses and perhaps delay payments on their outstanding bills. Finally, when asked what they would do if storefront payday lenders were eliminated in their state only 5 percent indicated they would resort to online payday lenders.

[7] Caskey (2005) provides a more detailed description of payday lending practices.

Exhibit 1
Pew Charitable Trust Survey of Payday Loan Use

Who uses payday loans?	• Twelve million American adults use payday loans annually with the average loan amount equal to $375 per year and total interest paid equal to $520. • 5.5 percent of all adult Americans have used a payday loan. • 12 percent of African Americans have used a payday loan compared to 4 percent of white and 6 percent of Hispanic Americans. • 20 percent of payday borrowers earn less than $25k per year while only 1 percent earn more than $100k. • 27 percent of payday borrowers are either part-time employed, unemployed, or disabled compared to 6 percent who are full time employed.
Why do borrowers use payday loans?	• 69 percent of borrowers use payday loans to cover ordinary living expenses. • 16 percent of loans are taken out for unexpected emergency expenses. • 8 percent borrow for "something special" such as gifts. • The average borrower is indebted about five months of the year.
What would borrowers do without payday loans?	• 81 percent of borrowers say they would cut back on expenses. • 62 percent said they would delay paying bills. • 57 percent indicated they would sell or pawn personal possessions. • 44 percent said they would get a loan from a bank/credit union. • 37 percent indicated they would use a credit card.
Does the regulation of payday lending affect its use?	• In states that restrict storefront payday lending, 95 of 100 would-be borrowers elect not to use payday loans leaving 5 who borrow online or elsewhere. • Restrictive payday loan laws lead to 393 fewer storefront borrowers per 10,000 people.

Source: Excerpted from The PEW Charitable Trusts, 2012, Payday Lending in America: Who borrows, where they borrow, and why, (Philadelphia, PA).

There are two ways that are typically used to compute the cost of credit for a payday loan. The first is the annual percentage rate or APR which is the metric required by the Truth in Lending Act (TILA) of 1968.[8] The second is the annual percentage yield or APY which takes into account the effects of compound interest. Since payday loans are very short term in nature, annualizing the interest rates charged per loan period produces very high rates of interest.

The APR can be estimated by multiplying the per loan period interest rate (e.g., 20 percent) by the number of loan periods in a year (e.g., 26 two-week loan periods). Thus, for the $500 loan example used above the per loan period rate is 20 percent and the number of two-week loan periods in a year is 26 such that the APR is 520 percent. Equivalently we can total the interest paid in a year and divide this total by the loan principal, i.e.,

$$APR = \frac{Total\ interest\ paid\ over\ one\ year}{Loan\ (principal)\ amount} \qquad (1)$$

[8] The APR is a measure of the cost of credit, expressed as a nominal yearly rate. It relates the amount and timing of value received by the consumer to the amount and timing of payments made. The disclosure of the APR is central to the uniform credit cost disclosure envisioned by the TILA.

Using the $500 loan that requires 20 percent interest for a two-week period, we compute the APR as follows:[9]

$$APR = \frac{\left(\frac{52\ weeks\ in\ one\ year}{2\ week\ loan\ period}\right) \times (\$500\ loan\ amount \times .20)}{\$500}$$

$$= 5.20 \text{ or } 520\%$$

The APR is typically reported when discussing the cost of credit from payday loans, however, the APR calculation severely understates the actual cost of payday loans as it does not account for the effects of compounding. For example, if the borrower takes out a two-week loan on which they will be charged $20 for each $100 borrowed, at the end of two weeks the borrower will owe $120. If we want to incorporate consideration for the effects of compound interest, we must compute the annual percentage yield or APY.

The annual compound rate of interest represented by the e$500 loan example cash flows takes into account the effect of compound interest and is equal to 11,498 percent. A simple application of the compound dollar value of $500 for a period of two weeks (14/365ths of a year) that requires a 20% interest payment illustrates the point, i.e.

$$\$\mathbf{500}(\mathbf{1} + \boldsymbol{APY})^{\mathbf{14/365}} = \$\mathbf{600}$$

Where APY is the annual percentage yield which is the compound annual rate of interest. Solving for APY we get 11,498 percent. The computation of the APY is typically done as follows:

$$\boldsymbol{APY} = \left(\mathbf{1} + \frac{\boldsymbol{Nominal\ annual\ rate\ of\ interest\ (APR)}}{\boldsymbol{Compounding\ periods\ per\ year\ (m)}}\right)^{\boldsymbol{Compounding\ periods\ per\ year\ (m)}} - 1 \qquad (2)$$

Using our $500 loan again, we convert the 521 percent APR[10] into its equivalent APY and we get a much higher estimate of the cost of credit, i.e.

$$\boldsymbol{APY} = \left(\mathbf{1} + \frac{\mathbf{5.2143}}{\mathbf{14/365}}\right)^{\mathbf{14/365}} - \mathbf{1} = 114.98 \text{ or } 11{,}498\%$$

Thus, the APY for the $500 payday loan calling for 20 percent interest every two weeks is a whopping 11,498 percent.[11] The effects of compounding are huge in this example since the compounding period (2 weeks) is so very short. The APY is astronomically high because the two week rate of 20 percent is compounded every two weeks or 26 times per year.

Payday loans are often very risky loans that result in very high default rates. As a consequence no payday lender would anticipate realizing the computed APY on every loan they make as some borrowers would be expected to default. Instead, the expected APY must reflect both the terms of the loan and the probability of default and the associated loss to the lender.

Flannery and Samolyk (2005) report that roughly two-thirds of their sample of payday loans end up in default. Moreover, since the dollar amount of each loan is typically small, $300 to $500, the operating cost per loan and costs incurred in trying to collect delinquent loans may be quite substantial. Both these factors must be considered when trying to evaluate the payday lender's expected APY.

---

[9]Technically, the number of 14-day loan periods in a 365 year is 26.0714 such that the APR is 521.43 percent.

[10] Note that for purposes of our yield calculation we calculate the APR using a 14-day period out of a 365-day year. The net result is an APR of 521% (not the 520% computed using weeks to measure the loan term).

[11] The APY is actually much higher than this since the first interest payment is typically paid in advance at the time the loan is made such that the APR is 650% which corresponds to an APY of 33,042%!

Taking into account the likelihood of loan default, the expected (or probability weighted) rate of return to the payday lender measured by the loans APY can be estimated as follows:

$$E(APY) = \left[\begin{pmatrix}\textbf{Probability}\\ \textbf{of Default}\end{pmatrix} \times \begin{pmatrix}\textbf{Recovery}\\ \textbf{Rate}\end{pmatrix} \times \begin{pmatrix}\textbf{Calculated}\\ \textbf{APY}\end{pmatrix}\right] + \left[\left(1 - \begin{matrix}\textbf{Probability}\\ \textbf{of Default}\end{matrix}\right) \times \begin{pmatrix}\textbf{Calculated}\\ \textbf{APY}\end{pmatrix}\right] \quad (3)$$

The Recovery Rate is the percentage of the interest and principal owed by the borrower that the payday lender anticipates they will recover when a loan defaults, and the Calculated APY is found using equation (2) above. We are not aware of any evidence regarding the recovery rate for defaulted payday loans so for illustrative purposes we will assume the worst case where the recovery rate on loans that default is zero.

Exhibit 1 illustrates the computation of the expected APYs for payday loans that default at the end of the first pay period (in two weeks), two pay periods, and so forth up to 12 pay periods. The differences in expected APYs is driven by the fact that the borrower makes (and the lender receives) the required interest payment every two weeks until the loan is defaults. Throughout the analysis we assume that there is a 66.6 percent probability that the loan will default and this probability remains constant whether the loan has been outstanding only one pay period or twelve. In all cases the interest payment is made until the period in which the loan is defaulted and the recovery from defaulted loan is assumed to be zero such that the cash flow received by the lender in the period in which a loan defaults is zero.

The APY for a defaulted loan is computed as the annual compound rate of return produced by the cash flow stream received by the payday lender. For example, in the column headed by "6" the borrower makes five $20 interest payments before defaulting at the end of the sixth pay period (i.e., twelve weeks after the loan was made). Note that the loan is assumed to have been renewed each pay period by paying the interest owed on the loan for that period. The compound annual rate of return to the payday lender is then computed using the five $20 interest payments which are the cash inflows to the lender and the $100 cash outflow. The compound annual rate of return in this instance is 0 percent. However, for loans that remain current in their interest payments for longer periods of time, say nine pay periods, the payday lender earns a positive APY of 891 percent. Remember that the payday lender is receiving 20 percent of the principal amount of the loan every two weeks so the compound annual rate of return increases rapidly once the initial amount of the loan is recovered by the lender.

The expected APY calculations found in Exhibit 2 do not incorporate consideration for the operating costs incurred by the payday lender. Consequently, these expected APYs *overstate* the net return to the payday lender.

Exhibit 3 provides estimates of the expected APYs earned by the payday lender for the same loan durations found in Exhibit 2. However, these APYs incorporate consideration for the average costs of doing business as reported in Flannery and Samolyk (2005). Specifically, the average loan is $250, and the payday lender incurs total store operating expenses per loan that vary depending on the age of the store. For stores that were less than one-year-old the cost is $144.44 per loan while the cost per loan is only $36.10 for stores that are one to four years old, and $25.10 for stores that are more than four years old.

Exhibit 2. Computation of Expected APY for Payday Loans that Default at the End of One to Twelve Loan Periods (14 days)

	Loan duration until default measured in pay periods of two weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
Week	Cash flows received by the payday lender											
7/13/2016	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)	$ (250.00)
7/27/2016	$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
8/10/2016		$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
8/24/2016			$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
9/7/2016				$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
9/21/2016					$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
10/5/2016						$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
10/19/2016							$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
11/2/2016								$ -	$ 50.00	$ 50.00	$ 50.00	$ 50.00
11/16/2016									$ -	$ 50.00	$ 50.00	$ 50.00
11/30/2016										$ -	$ 50.00	$ 50.00
12/14/2016											$ -	$ 50.00
12/28/2016												$ -
1/11/2017												
APY if loan is in default	-100%	-100%	-100%	-100%	-90%	0%	301%	891%	1738%	2746%	3810%	4851%
Probability of default	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%	66.6%
APY if loan is not in default	11498%	11498%	11498%	11498%	11498%	11498%	11498%	11498%	11498%	11498%	11498%	11498%
Probability of No Default	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%	33.4%
Expected APY	3774%	3774%	3774%	3774%	3780%	3840%	4041%	4434%	4998%	5669%	6378%	7071%

Legend:

Loan amount	$ 100.00	
Interest rate	20%	biweekly
loan period	14	days
APR	521.43%	
APY	11498%	
Default Risk Factors		
Pb of default	66%	
Recovery rate	0%	

Exhibit 3. Computation of Payday Lender's Expected APY after Operating Expenses

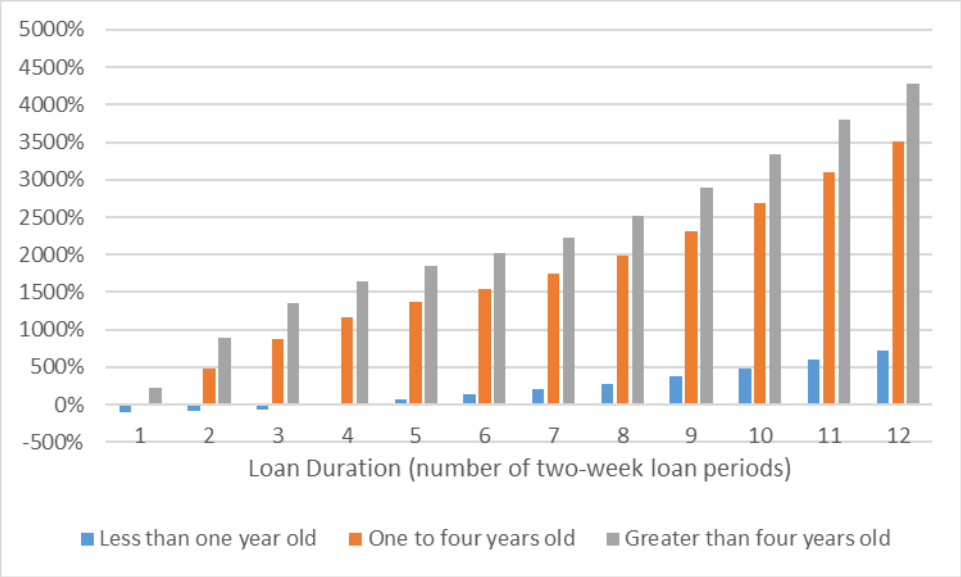
The expenses reflected in these calculations are from Flannery and Samolyk (2005) and correspond to payday lending stores that are one to four years old. Stores that are less than one-year-old incur much higher operating expenses per loan and those that are older than four years have lower operating costs.

	Loan duration until default measured in pay periods of two weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
Week	Cash flows received by the payday lender											
7/13/2016	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)	$ (286.00)
7/27/2016	$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
8/10/2016		$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
8/24/2016			$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
9/7/2016				$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
9/21/2016					$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
10/5/2016						$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
10/19/2016							$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 50.00
11/2/2016								$ (7.00)	$ 50.00	$ 50.00	$ 50.00	$ 50.00
11/16/2016									$ (7.00)	$ 50.00	$ 50.00	$ 50.00
11/30/2016										$ (7.00)	$ 50.00	$ 50.00
12/14/2016											$ (7.00)	$ 50.00
12/28/2016												$ (7.00)
1/11/2017												
APY if loan is in default	-100.00%	-100.00%	-100.00%	-99.99%	-98.37%	-76.16%	20.33%	244.64%	608.07%	1081.16%	1617.52%	2173.14%
Probability of default	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
APY if loan is not in default	248%	1621%	2820%	3689%	4318%	4783%	5134%	5404%	5617%	5785%	5921%	6031%
Probability of No Default	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Expected APY (after expenses)	16%	475%	875%	1166%	1377%	1547%	1728%	1968%	2281%	2652%	3055%	3462%

Legend:

Loan amount	$ 250.00	
Operating costs per $100 loan	$ 36.00	
Interest rate	20%	bi-weekly
loan period	14	days
Estimated Rates of Return		
APR	521.43%	
APY	11498%	
Default Risk Factors		
Pb of default	66.6%	
Recovery rate	0%	
Recovery expenses/loan	$ 7.00	

Exhibit 4. Expected APY after Total Operating Expenses by Age of Payday Lending Store



	Loan duration until default measured in pay periods of two weeks											
Store Age	1	2	3	4	5	6	7	8	9	10	11	12
Less than one year old	-100%	-94%	-62%	-6%	61%	129%	200%	279%	371%	477%	595%	720%
One to four years old	15%	472%	872%	1162%	1374%	1548%	1740%	1992%	2315%	2693%	3098%	3503%
Greater than four years old	220%	896%	1350%	1645%	1848%	2017%	2221%	2509%	2888%	3334%	3809%	4282%

Legend:

	Total Operating
Store Age	Expenses per Loan
Less than one year old	$ 144.44
One to four years old	36.10
Greater than four years old	25.10

The expected APYs found in Exhibit 3 reflect the operating expenses per loan for stores that are one to four years old. The APYs are dramatically lower than the corresponding APYs found in Exhibit 2 which did not reflect the cost of doing business as a payday lender. However, even so, the expected APY's are always positive and rise dramatically for loans that are not repaid for multiple pay periods.

Exhibit 4 contains expected APYs for the three different store ages reported in Flannery and Samolyk (2005). The expected APY for each loan duration (measured as the number of two-week loan periods until default) differs across the three classes of store ages. The average total operating cost per loan is highest for the stores that are less than one year of age and consequently the expected APYs are uniformly the lowest for these newest stores. For this newest class of payday loan offices, payday loans are expected to earn negative APYs for all loan durations less than five (i.e., ten week). However, the expected APY after all operating expenses rises over 720 percent for loans that only default after 12 loan periods (24 weeks).

All of our analysis of net or after-operating cost APYs suggests that payday lending can be a very profitable business. Moreover, our results are biased against the payday lender in that we assume zero recovery from loans that default. There are two key factors that drive the very high expected APYs (after operating costs). The first is the fact that the rate of interest charged on these loans is extremely high. The second is that these loans are typically not repaid at the end of the first loan period but are extended for multiple loan periods. The average loan is not repaid for five months which means the borrower pays interest (plus any fees) every two weeks for 20 weeks before repaying the principal. In our analysis we have accounted for the full operating costs for each loan when the initial loan is made so each time the loan is extended the payday lender realizes the full interest (plus any fees) without incurring additional operating costs.

The dependence of lender profitability on the extension of loans for many months gives rise to regulator concerns that borrowers may be trapped into paying exorbitant rates of interest.

Public Policy Issues

Given the expense of the loans provided by payday lenders, and accusations of deceptive and misleading business practices, many public policy activists suggest that they be banned outright. In fact, 15 states do not allow payday lending and another nine restrict lending practices severely.[12] Moreover, in 2007 the federal government effectively banned payday lending to military service personnel by setting a usury ceiling for such loans at an annual percentage rate of 36 percent.[13]

A primary public policy concern that arises out of payday lending is something called *the debt trap*.[14] That is, payday borrowers typically are unable to repay their loan in one pay period so they end up extending it for multiple pay periods by paying only the interest on the loan when it comes due. By doing this the borrower extends the loan term for one more pay period without reducing the principal. Thus, a short-term payday loan becomes a longer term loan. Since the interest is a

[12] For a detailed description of state payday loan regulation see the report of the Pew Charitable Trust titled State Payday Loan Regulation and Usage Rates, January 14, 2014.

[13] Although an APR of 36 percent may sound high (this corresponds to a compound annual rate of interest or annual percentage yield of 43 percent), this ceiling is substantially lower than the 400-600 percent APRs typically associated with payday loans.

[14] The federal regulatory authority, Consumer Financial Protection Bureau, proposed new regulations in 2016 designed to end payday lending traps by requiring lenders to take steps to make sure consumers have the ability to repay their loans. http://www.npr.org/sections/thetwo-way/2016/06/02/480329986/new-rules-to-ban-payday-lending-debt-traps (accessed August 5, 2016).

fixed percentage of the loan amount, the borrower can end up paying more in finance charges than the principal amount of the loan. In fact, the typical payday loan is not repaid for five months resulting in the borrower paying interest that often exceeds the principal amount of the loan. For example, a Colorado report published in 2008 stated that by the time the loan was repaid, the average borrower had paid over $570 in total finance charges for a $350 loan.

There is evidence that payday borrowers regularly find themselves trapped in successive loans. The Consumer Financial Protection Bureau (CFPB), the federal agency that oversees payday lenders, reported that "Within a month, almost 70 percent of payday borrowers take out a second payday loan. And one in five new borrowers ends up taking out at least ten or more loans in succession. With each new loan, the consumer pays more fees and interest on the same debt."[15] In a rare opportunity to look into the lending experiences of two payday lenders, Flannery and Samolyk (2005) report that roughly 46 percent of all loans are either renewals of existing loans or "rollovers", (i.e., new loans that follow immediately upon the payment of an existing loan).[16] In addition, Chen (2021) finds a relationship between property crimes in states not allowing payday lending

One argument that is often made in favor of payday loans and against increased regulation of this financing source is that they provide a borrower who is caught in a cash bind a lender of last resort to help them avoid financial distress. However, to the contrary, Melzer (2016) found that availability to payday loans does not decrease but actually increases the likelihood of difficulty paying bills and delaying needed healthcare.

Payday loans are subject to both federal and state regulation. In fact, in some states payday lending is prohibited outright.

At the federal level there are a number of acts that have been passed which are designed to restrict payday lender practices. There are a number of consumer finance laws and regulations currently apply to payday loans. These include the following:[17]

Truth in Lending Act (TILA) and its implementing regulation, Regulation Z

This act requires that lenders disclose loan terms including the annual percentage rate. In addition, Regulation Z requires lenders to provide advertising disclosures, credit borrower payments correctly, process credit balances properly.

The Electronic Fund Transfer act and its implementing regulation, Regulation F

This act protects consumers that engage in electronic fund transfers. For example, with rare exceptions, Regulation E prohibits lenders from requiring, as a condition of loan approval, a customer's authorization for loan payment through a recurring electronic funds transfer.

The Fair Debt Collection Practices Act

This act governs (i) collection activities conducted by third party collection agencies, (ii) lenders collecting their own debt using an assumed name; and (iii) any collection agency that acquires the debt if the collector acquired the debt when it was already in default.

[15] Silberman (2016).

[16] A study done by the California Department of Corporations (Applied Management and Planning group, 2007) reported that only 16% of payday borrowers take out just one payday loan.

[17] These acts are described in the Consumer Finance Protection Board publication on examination procedures for small-dollar lending (http://files.consumerfinance.gov/f/201309_cfpb_payday_manual_revisions.pdf).

The Fair Credit Reporting Act

This act and its regulations require that the data furnished to consumer reporting agencies be accurate. The act also prohibits the use of consumer reports for impermissible purposes and restricts the sharing of information between affiliated companies.

The Graham-Leach-Bliley Act

This act prevents financial institutions from impermissibly sharing consumer nonpublic personal information with third parties and requires that they disclose their privacy policies.

The Equal Credit Opportunity Act and its implementing regulation, Regulation B

This act prohibits discrimination against any borrower

- on the basis of race, color, religion, national origin, sex or marital status, or age;
- because all or part of the applicant's income is derived from public assistance; or
- because the applicant has exercised in good faith any right under the Consumer Credit Protection Act.

Military Lending Act

This act provides protections that apply to consumer credit regulations issued by the Department of Defense which includes closed-end payday loans of $2,000 or less with terms of 91 days or fewer that include creditors' access to consumer deposit accounts. This legislation also applies to vehicle title loans and tax refund anticipation loans.

In addition to the various acts noted above, the Consumer Financial Protection Board or CFPB was created by the congress in 2010 with the specific mandate of protecting consumers from unfair, deceptive, or abusive practices. Of specific concern to the CFPB is the notion of a debt trap that borrowers can fall into when they cannot afford to repay the loan within a single pay period. In 2016 the CFPB proposed new rules for payday lenders aimed at eliminating debt traps. Specifically, the proposal is a "full-payment test." Specifically, lenders would be required to make an upfront determination of a potential borrower's ability to repay the loan. Specifically, the full-payment test requires lenders to determine whether the borrower will have enough income to afford the loan, meet the consumer's major financial obligations, and still pay basic living expenses including food and utilities. To accomplish this lenders would be required to verify the amount of income the borrower receives and perform a credit check to verify the amount of the borrower's outstanding loans. In addition to the new qualification requirement, the proposal made it difficult for lenders to push distressed borrowers into re-borrowing or refinancing the same debt.

The degree to which payday lending practices are regulated varies dramatically from state to state. The Pew Charitable Trust surveyed state payday regulation and usage rates[18] and reported that 15 states restrict payday lending such that there are no storefront payday lenders, another 9 states have payday storefronts but maintain restrictions on their lending practices (e.g., lower limits on fees, lower loan usage, or longer repayment periods), and 27 states are classified as permissive (allowing single-repayment loans with annual percentage rates of 391 percent or higher).

Throughout history all but a few states have used usury laws to cap interest rates on loans to consumers. However, over the last two decades these rules have been relaxed in a number of

[18] See http://www.pewtrusts.org/en/multimedia/data-visualizations/2014/state-payday-loan-regulation-and-usage-rates for a state-by-state summary of payday lending.

states. For example, the Consumer Federation of America[19] reports that thirty-two states now have safe harbor legislation that has been enacted such that payday lenders are permitted to make loans based on checks written on consumers' bank accounts that carry triple digit interest rates, or no rate cap at all.[20]

Should government step in to restrict the availability of very high cost lending in the form of payday loans? Federal statutes focus on leveling the playing field by requiring that payday lenders at least tell the borrower what they are getting into and restrain the ability of lenders to further take advantage of borrowers by sharing their information with others. At the state level the legislation runs the gamut from legislation that allows payday lenders to operate freely with little additional regulation all the way to states that ban these lenders outright. Consumers are allowed to engage in credit card finance, auto loan finance, home mortgages and a host of other types of financing, so why the interest in regulating payday lenders?

One perspective on the issue of regulation relates to whether payday lending rates are justified given the riskiness of the pool of potential borrowers. If payday lenders are extracting exorbitant profits out of their operations because of the rates they charge which are not warranted by the riskiness of their borrower pool, then their operations should reflect these profits.

One way to address this issue is to look at the firm level profitability of publicly held payday lenders for which we have access to publicly available financial statements. Huckstep (2007) analyzed the financial performance of all publicly traded companies whose primary or secondary line of business was originating payday loans. The study concludes, contrary to popular opinion, that payday lending firms do not always make extraordinary profits, and when compared to many well-known lending institutions, the payday lenders did not fare well.

It is worth noting, however, that many payday lenders are privately owned and their financials are not readily available for analysis. The industry includes a number of payday lenders who own one or a very small number of stores. These firms may be either more or less profitable than the public firms.

Regulation is an evolving process. The regulatory authority enacts guidelines designed to restrict the ability of lenders to engage in egregious lending practices. In response lenders adapt their practices to meet the letter of the law and sidestep what they consider to be unwarranted restrictions on their businesses. Two specific examples come to mind with regard to payday lending. The first relates to the creation of online payday lenders who locate outside the purview of the regulatory body on Indian reservations, and the second is the creation of an alternative loan product know as an installment loan. Moreover, Fonseca (2022) found that government efforts to control debt collections and protect consumers from predatory practices may lower repayment, reduce access to mainstream credit and increases payday borrowing.

A recent addition to the payday lending business are the online lenders and more specifically, online lenders that are often located on Indian reservations in an effort to avoid state and federal statutes restricting lending practices.

---

[19] The Consumer Federation of America (CFA) is a non-profit organization founded in 1968 to advance consumer interests through research, education and advocacy.

[20] These states include: Alabama, Alaska, California, Delaware, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming. Reported on the Consumer Federation of America's website (http://www.paydayloaninfo.org/state-information accessed July 27, 2016).

Recent efforts by the CFPB to reign in payday lenders it feels are engaging in predatory lending practices has led the payday lenders to turn to installment lending. The difference in an installment loan and the typical payday loan relates to the fact that installment loans can be repaid multiple pay periods and for this reason they typically carry larger loan balances.

Summary

A payday loan is a short-term (usually two to four week) source of liquidity used by low- to moderate-income consumers. The loan typically calls for the repayment of interest (typically 15-20 percent of the loan amount) plus principal at the end of the borrower's next pay period. Given the short duration of the loan and the flat interest charge, these loans typically carry an annual percentage rate of more than 500%. Moreover, if the effects of compound interest are incorporated in the analysis, the annual percentage yield can easily exceed 10,000 percent.

The extremely high rates of interest on payday loans have resulted in public outcry over the lending practices of payday lenders. Payday lenders have offered defenses in support of the high cost of payday loans. First, the borrowers that use payday loans are very risky clients who may default on the loan obligation. Second, payday lending entails very high operating expenses. Both these considerations call for an adjustment to the computation of the cost of credit. Specifically, the expected cost of credit must reflect the probability of default on the loan as well as the anticipated recovery by the lender in the event of default. In addition, to assess lender loan profitability, we need to incorporate consideration for the operating expenses incurred by the lender. Incorporation of consideration for these factors dramatically reduces the expected rate of return to the lender.

The lender's profitability from making a payday loan increases with the number of loan renewals the borrower uses. Even though payday loans are ostensibly one pay period in length, most borrowers do not have the financial resources to repay the loan when due and extend the loan by paying interest and penalties. As a consequence borrowers typically take a half a year to finally repay the loan. This means that the borrower pays the high rate of interest multiple times which has the effect of dramatically increasing the cost of the loan and the profits of the lender. This situation is referred to as a "debt trap" by the regulatory authorities and has given rise to growing pressure to restrict the lending practices of payday lenders.

Payday lending practices are subject to both federal and state regulation. Even so, the practices of traditional payday lenders and their online counterparts has created pressure from the public to further restrict payday lending. A fundamental argument favoring added regulation relates to the notion that payday lenders are abusing their clients with draconian fees and expenses that leave the borrower worse off at the expense of returns to the lender. Stories of high costs of financing abound, however, there is little if any evidence that payday lenders are earning abnormally high profits.

References

John P. Caskey, 2005, Fringe banking and the rise of Payday Lending, Credit Markets for the Poor, Ed. Patrick Bolton and Howard Rosenthal, New York: Russell Sage Foundation.

Chen Shen, September 7, 2021, The Impact of Payday Lending on Crimes. Available at SSRN: https://ssrn.com/abstract=3831654 or http://dx.doi.org/10.2139/ssrn.3831654

Mark Flannary and Katherine Samolyk, 2005, Payday Lending: Do the costs justify the price: 9 (FDIC Center for Financial Research, Working Paper No. 2005-09.

Julia Fonseca, 2022, Less Mainstream Credit, More Payday Borrowing? Evidence from Debt Collection Restrictions, Journal of Finance, Forthcoming, Available at SSRN: https://ssrn.com/abstract=4057436

Aaron Huckstep, 2007, Payday Lending: Do Outrageous Prices Necessarily Mean Outrageous Profits, Fordham Journal of Corporate & Financial Law, Volume 12, Issue 1.

Nathalie Martin, 2010, 1,000% Interest—Good while supplies last: A study of payday loan practices and solutions, 52 Arizona Law Review 563, 564 n. 1.

Brian Melzer, 2011, The real costs of credit access: Evidence from the Payday Lending Market, Quarterly Journal of Economics 126, 517-55.

David Silberman, We've Proposed a Rule to Protect Consumers from Payday Debt Traps, Policy & Compliance, Consumer Financial Protection Bureau, June 2, 2016.

Paige Marta Skiba and Jeremy Tobacman, Do Payday Loans Cause Bankruptcy? (November 9, 2009). Vanderbilt Law and Economics Research Paper No. 11-13. Available at SSRN: https://ssrn.com/abstract=1266215 or http://dx.doi.org/10.2139/ssrn.1266215

Hellcat or Sedan: Can we really retire early? Implications of the 2022 IRS rule changes to 72(t) distributions

Christine McClatchey
University of Northern Colorado

Joseph J. French
Asian Institute of Technology

Case Synopsis

The inspiration for this case came from the 2022 IRS updates regarding changes in the rules to avoid the 10% penalty for withdrawal from qualified retirement accounts prior to age 59½. Exceptions to the 10% penalty had been in place for many years to include college expenses, a first-time home purchase, medical expenses, and other specific conditions allowed by the IRS. But what if a person simply wanted to retire early and did not qualify under one of these special circumstances? Penalty-free distributions prior to age 59½ that were not tied to a qualifying event were termed a series of substantially equal period payments. Recent rule changes have raised the interest rate used for computing some allowable withdrawals that has resulted in a significantly increased distribution in the current low interest rate environment. In this case, students took on the role of a future financial planner (Paul) to explain how and why recent rule changes altered the distribution calculation that could potentially allow their clients to retire early. Students were asked to present updated SEPP payments under the new rules. A final recommendation, to include the qualitative benefits and concerns of an early retirement, had to accompany their quantitative findings.

Keywords: Retirement planning, 72(t), SEPP, Penalty-free distribution, Case Study

Introduction

"Over 47 million Americans voluntarily quit their jobs in 2021 — an unprecedented exit from the workforce (US Bureau of Labor). This is now being called the Great Resignation," read Juan on his computer screen as his left eye twitched from lack of sleep.

"Do I have any appointments tomorrow?" Juan asked his intern Paul.

"Of course," Paul responded with a chuckle and continued, "seems like another couple looking to exit the labor force early."

"What is their story?" queried Juan slightly distracted by a Twitter feed on increasing core inflation.

"Their names are Christine and Shane, and they are both in their early 50s. Christine is in the IT industry, and Shane voluntarily left work a few years ago," responded Paul as he read their electronic files. "Let's see, it appears like they own their home, vehicles, and have no credit card debt. Also, they have three rental properties with very low mortgage balances."

"Thanks Paul."

"Our notes indicate that last year Christine expressed a desire to retire early but did not qualify for any of the usual IRS exceptions for early withdrawal that would enable her to tap their retirement savings early without incurring a 10% penalty," chimed an enthusiastic Paul.

Juan responded, "Got you. I suppose the penalty-free distributions prior to 59½ that are not tied to a specific event or circumstance (SEPP) are insufficient to maintain the couple's standard of living, eh?" Adding a slight Canadian accent at the "eh" which drew a smile from Paul who was Canadian.

"That is correct. You also discussed with the couple the option of selling one of their rental properties to help bridge their income gap to age 59½ but the sale would trigger a hefty tax liability and eliminate future rental income," Paul responded confidently, "and given property values in 2021, they were uneasy that the proceeds from the sale of a rental property, coupled with their non-retirement savings and annual SEPP distributions, would provide enough income to support their desired lifestyle until Christine turned 59½."

"Understandable, I recall that retirement would also mean Christine would lose her employer's healthcare benefits, so monthly health insurance premiums and out-of-pocket medical expenses would be a significant added expense," Juan added.

"Seems like we have some work to do *El Jefe* given the changes in SEPP calculations that went into effect at the beginning of this year." Paul used the Spanish word for "boss" to amuse Juan who was Panamanian.

"Indeed, Shane and Christine have done the right thing over the years, but the bulk of their wealth is invested in Christine's 401(k). While the value of her retirement account is significant, they were uncomfortable with the decision to retire under the 2021 SEPP calculations. Seems we need to see how things have changed under the new 2022 SEPP calculations," Juan replied wisely.

"Shall we grab a coffee, Paul?"

Allowable IRS Early Retirement Withdrawals

After an enjoyable coffee at Morning Joe's (a local coffee house), Juan and Paul began their review of Christine and Shane's situation.

The inexperienced Paul began the afternoon meeting stating that "this is the first time I have encountered a situation like this with one of our clients. Can you remind me of some of the details?"

"Of course," the greying Juan responded, "The IRS has long allowed no-penalty early withdrawals from qualified retirement accounts prior to age 59½ for specific expenses, oftentimes called a 72(t) exception (qualified retirement plans eligible for 72(t) include the 401(k), 403(b), 457(b), Thrift Savings Plans (TSPs) and IRAs). If a 72(t) distribution is initiated under an employer plan, the individual must stop working for that employer. Allowable expenses are disability expenses, required minimum distributions from an inherited IRA, medical expenses that exceed 7.5% of adjusted gross income, health insurance premiums by unemployed individuals, qualified higher education expenses, down payment for qualified first-time home buyers, individuals called to active duty, and defraying birth or adoption costs."

"Claro," Paul nodded his head.

"While these circumstances certainly help individuals or families falling into one of these narrowly defined categories, clients like Christine and Shane who simply want to retire before age 59½ for personal reasons can only avoid the 10% early withdrawal penalty via the SEPP exclusion (Washington, 2022)," Juan added for context.

SEPP Distribution Rules: Pre- January 2022

"Can you catch me up on the pair's situation last year?" asked Paul.

"Sure, SEPP distributions have been in place since 1986. Once initiated, withdrawals must be made at least annually for the *longer* of 5 years or until the taxpayer turns 59½ (a rule not changed in 2022). In 2021, Christine was 53, which meant SEPP withdrawals for the couple would be required until 59½ or for 7 years. If the couple postponed her retirement for 2 years, the calendar would align the 5-year requirement and Christine's age requirement, resulting in required withdrawals for just 5 years," mumbled Juan who was still buzzing from the double expresso.

"SEPP disbursements are considered taxable income in the year they are received. Importantly, if SEPP disbursements are altered during the withdrawal period, the 10% penalty and interest are retroactively applied to the first distribution. A limited number of exceptions, including death or disability of the account owner or a one-time shift from the amortization or annuitization methods to the required minimum distribution method, can avoid the retroactive penalty," Juan finished his thought (see Revenue Rule 2002-62 §2.03 for a complete list of exceptions and the IRS one-time allowance to switch from either of the two fixed methods to the RMD method).

Paul rubbed his head and asked, "Can you provide me some more details on how distributions are calculated?"

"Distribution amounts must be calculated using one of three IRS safe-harbor methods: (a) required minimum distribution (RMD), (b) fixed amortization, or (c) fixed annuitization (see Frankel, 2017) as an example under prior rules. Under each method, the amount that must be withdrawn depends on the account balance and a life expectancy calculation based on the owner's life, or the joint life expectancy of the owner and their designated beneficiary. Calculations under the fixed amortization and fixed annuitization methods additionally require an 'acceptable' interest rate be identified." Juan's response included sending Paul the information contained in Table 1.

Table 1
Allowable SEPP Calculation Methods

		RMD	Fixed Amortization	Fixed Annuitization
Life expectancy	Uniform	Yes	Yes	No
	Single	Yes	Yes	No
	Joint & last survivor	Yes	Yes	No
	Mortality table	No	No	Yes
Applicable interest rate		No	Yes	Yes
Will the payment change during distribution period?		Yes	No	No
Is a change to another method allowed?		No	Can change to RMD after one year	Can change to RMD after one year

After giving Paul a few minutes to review the information, Juan continued: "As you may have guessed, the three methods produce significantly different payment amounts. Christine and Shane's goal is early retirement without altering their standard of living in the next five years, hence their goal is to choose a method that produced a large SEPP. However, we might work with other clients who want to minimize SEPP distributions, perhaps to meet an immediate one-time need, but leave a larger account balance for their long-term retirement goals. We should be well-versed as to how recent rule changes impact each of the three calculations."

Life expectancy

"Juan as you know, I will be taking the Certified Financial Planner (CFP) exam in a few months, do you mind spending a little time refreshing my memory on each aspect that is relevant to the calculations."

"So long as you keep working for us after you pass," grinned Juan. "The RMD and fixed amortization methods allow the account holder to choose from three options: Single is the option that all account holders can use regardless of marital status or selected beneficiary. Single produces the *shortest* life expectancy. Uniform is an option that all account holders can use regardless of marital status or selected beneficiary. Uniform estimates a joint survivorship but does not use the beneficiary's age to determine life expectancy. Uniform produces the *longest* life expectancy. Joint and last survivor is the third option that cross-references the account owner's age with that of the account's oldest designated beneficiary. The joint and last survivor calculation depends on the ages of the account holder and oldest beneficiary.

"The annuitization method does not provide a choice among tables, rather life expectancy is determined from mortality tables prescribed by regulations to pay out an IRA account as if it were an annuity, as set forth in Appendix B of Revenue Rule 2002-62. The annuitization method produces a similar annual distribution to the amortization method, assuming the single-life table is used. Regardless of method chosen, the calculated life expectancy tables are inversely related to allowable distributions" Juan said catching his breath.

Interest Rate

"Thanks, *El Jefe*, and what are the rules with regards to interest rates used by the amortization and annuitization methods?"

"The account owner must choose an interest rate less than 120% of the federal midterm rate for either of the two months immediately prior to the first distribution, as determined in accordance with IRC §1274(d). While the rule places a ceiling on the interest rate, it does not impose a minimum, so a 0% interest rate is acceptable," Juan said. "Here are the relevant rates dating back to 2002."

Figure 1
120% of Annual Federal Mid-term Rate

Source: https://www.irs.gov/applicable-federal-rates

Juan took a minute to refill his water bottle and then continued, "The federal mid-term 120% interest rate is directly related to allowable SEPP penalty-free distribution calculations: a lower rate produces a lower distribution. With a few exceptions, this interest rate has been below 3% since 2010. At last year's meeting with the couple, the rate was 0.62% for January 2021 and 0.58% in December 2020, severely constraining their allowable distributions. New rules would significantly increase their SEPP withdrawals under both fixed methods."

Account balance

Paul sighed and considered the information Juan presented him. Paul was eager to please his boss as there was an opening for another financial planner at their firm which Paul hoped to obtain after he passed his CFP exam. He hoped his next question would demonstrate to Juan his financial savvy.

"How do retirement account balances factor into the advice we give to our clients?"

Juan considered Paul's question while he read a text message from the corporate office about the potential of a significant increase in the interest rate in the coming months and then responded: "The account balance for a SEPP calculation must be based on the entire balance of the account earmarked for the distribution. If the account balance is too large, which is not the case for Christine and Shane (but perhaps could be important for other clients), I would recommend splitting it prior to the transaction to the desired amount. IRS rules do allow including more than one account balance in the initial calculation, so some clients may need to be counseled to combine multiple qualified accounts into one beforehand if necessary to meet their goals."

"Furthermore," Juan continued after taking a bite of the empanada his visiting aunt made him last night, "the IRS does allow some leeway as to the date on which the account value is determined if it is reasonable. For example, I first discussed the SEPP distribution with Christine and Shane in February 2021 and at that time her account balance was approximately $1.8 million. If financial markets had recently been volatile, and the balance had been $500,000 higher or lower during the

prior six-month period, these conditions could provide a substantial range of values for her SEPP calculation."

Annual SEPP-RMD

"Sorry for not sharing my Aunt Lia's empanadas. I will bring you some tomorrow."

"That would be great, they look legit!" responded Paul and continued, "Can you also brief me on the methods to calculate SEPP?"

"Certainly. There are three methods, so make sure and take notes as this will be useful for your CFP exam and with future clients," Juan stated.

"First, the RMD method typically yields the lowest possible withdrawal of the three methods. If the RMD method is selected, it cannot be changed to another method without triggering the retroactive 10% penalty and interest. RMD payments are calculated by dividing the account balance by the number of years the IRS expects someone of that age to live, using the chosen life expectancy table (i.e., single, joint, uniform). The resulting amount is the figure that must be withdrawn in year one. Unlike the next two methods, annual payments are not affected by a "selected" interest rate, rather distributions depend on IRS-published RMD tables. In subsequent years, annual distributions are recalculated using new life expectancy factors from the chosen table (i.e., single, uniform, or joint and last survivor) and the account's current value, which depends on the account's return," Juan finished.

"I think I understand, under the RMD method annual required distributions will change every year," Paul said.

Annual SEPP - Fixed Amortization Method

"Correct," Juan chirped back, nodded, and continued, "Under the second method called fixed amortization, payments are calculated by amortizing the account balance over the selected life expectancy at a rate not to exceed 120% of the applicable federal midterm rate in the most recent two months. Payments under this method remain flat over the distribution period, though the individual can switch to the RMD method after the first year."

"Is there a penalty if one switches from the fixed amortization method to RMD?" Paul astutely queried.

"Under current rules no penalty would be imposed," Juan answered back.

Annual SEPP - Fixed Annuitization Method

"The final way annual SEPP distributions can be calculated is the fixed annuitization method. Under this method payments are calculated by dividing the account balance by an annuity factor that equals the present value of a $1 per year annuity beginning at the account owner's age and extending through their life expectancy and is determined by the mortality table prescribed by regulations to pay out the IRA account as if it were an annuity. The applicable interest rate cannot exceed 120% of the applicable federal midterm rate in the most recent two months. Payments under this method remain flat over the distribution period, though one can switch to the RMD method after the first year without penalty," Juan finished his thought as he paused for the last bite of Aunt Lia's empanada.

Christine and Shane: February 2021

"Thanks for the review, Juan. Would you have a few moments to walk me through Christine and Shane's situation in 2021, so I can understand what has changed under the new regulations?"

"Good idea. Let's see," Juan pauses as he opens the couple's file on his computer. "There it is," Juan states triumphantly.

"In our February 2021 meeting, Christine was 53 and Shane was 51. Shane was the sole beneficiary of her retirement account. Christine's 401(k) balance was $1.8 million. The maximum allowable interest rate for the couple at the time was 0.62% (used by both fixed methods). The couple's stated goal was to maximize early retirement distributions, so the single life expectancy table was their best option. I have summarized this information in a spreadsheet," Juan said showing Paul the information contained in Table 2.

Table 2
Christine & Shane's 2021 Allowable Distributions

		Distribution Method		
Rate Table Used	**Factor**	**Amortization[1]**	**Annuitization[1]**	**RMD[2,3]**
Single Life	31.4	$63,263	n/a	$57,325
Joint Life	38.5	$52,699	n/a	$46,753
Uniform Life	43.6	$47,243	n/a	$41,284
Mortality Table	28.8	n/a	$62,506	n/a
Maximum Initial Distribution		$63,263	$62,506	$57,325

Source: https://www.bankrate.com/retirement/72-t-distribution-calculator/
[1] Under the amortization and annuitization methods annual distributions remain flat.
[2] Under the RMD method annual distributions would be recalculated annually.
[3] Used BankRate website on 6/8/2022, but BankRate at that time was still using old life expectancy tables.

Paul carefully looked at the spreadsheet to understand the calculations of each distribution method. Equations 1-3 detail Christine and Shane's 2021 distribution calculations under each method (Burilovich and Burilovich (2008) provide an excellent example that details calculations under prior life expectancy tables and other rules).

(a) Single life fixed amortization
PV = $1,800,000
N = 31.4
I = 0.62%
CPT PMT = $63,263 (1)

(b) Single life fixed annuitization
$1,800,000 / 28.78 = $62,500 (2)

(c) Required minimum distribution
$1,800,000 / 31.4 = $57,325 (3)

After a few minutes passed, Paul excused himself to greet a client for another senior financial advisor and then returned to Juan's office. "Everything is clear so far, thanks for sharing the calculations with me."

"No worries," Juan said obviously enjoying his teaching role. "As you can see, given the couple's ample retirement assets, their focus was to pursue a path that would maximize annual distributions as they were not worried about outliving their retirement savings and other income sources. Furthermore, they determined that $90,000 - $100,000 annually would allow them to maintain their current lifestyle, cover additional health insurance premiums, pay out-of-pocket medical costs, and have a safety net for any unexpected expenses. At the time, the largest allowable distribution was $63,263 using the single life, fixed amortization method (Table 2). Therefore in 2021, the couple decided against early retirement. Also remember, the distribution method (RMD, annuitization, amortization) used to calculate annual withdrawals is up to the account holder, but it must be continued, at least annually, for the longer of 5 years or until age 59 ½ to avoid the 10% penalty, excepting certain limited circumstances (Revenue Rule 2002-62 §2.03)," finished Juan.

Changes to Allowable 72(t) Withdrawals: January 2022

Paul sipped green tea as he processed the information provided.

"A lot changed at the beginning of 2022," Juan states keeping his momentum, "but what did not change is that SEPP penalty-free distributions must be calculated using one of three formulas provided by the IRS and must be taken annually for the longer of 5 years or until the taxpayer turns 59½. What did change were two important inputs used to calculate annual distributions [see Revenue Rule 2022-6; Groom Law Group (2022); Dobbis (2022)]."

Updates to life expectancy tables

"What changed and how will this impact our couple's decision to retire?" the ambitious Paul asked.

"Well, in January 2022, the IRS issued new life expectancy tables for RMDs and 72(t) payments. New life expectancy tables *may* be used for 72(t) payments starting in 2022 but *must* be used for payment schedules starting in 2023. Updated tables reflect increasing life expectancies; thus allowable distributions are reduced. While unfavorable for Christine and Shane, the change appears to have only a minor impact in their case. According to my calculations, the couple's maximum distribution for last year, holding all else equal, would have declined from $63,263 to $59,831, a reduction of $3,432 annually. This would not have changed Christine's decision to retire early," Juan said while he ran his fingers through his goatee.

The introduction of a 5% "floor" interest rate to the 120% federal mid-term rate.

"It's going to be a boring meeting with the couple tomorrow then, eh?" Paul responded and continued with a smile, "or are you just going to talk about Christine's Dodge Chargers and her ¼ mile time?"

"Ha-ha," Juan laughed and continued, "Paul you might lose Christine as our client if you ask her about her Charger."

"I don't understand," Paul responded with a furrowed brough.

"She drives a Challenger Hellcat with 2-doors, not a 4-door Charger sedan." Juan chuckled knowing that Paul knew nothing about cars and then said, amused by his own joke. "I guess one strategy for early retirement might be for the couple to sell their Hellcats and buy a sedan."

Paul laughed and shook his head a bit embarrassed as Juan continued: "Don't worry we hopefully won't have to tell Christine to sell her beloved Hellcats, luckily for you. The updated life expectancy tables reduced SEPP distributions, but the rule change to the allowable interest rate

used by the fixed amortization and fixed annuitization calculations presented a game-changing opportunity for the couple. Prior rules required that both methods use an interest rate equal to 120% of the federal mid-term rate for either of the two months immediately preceding the month in which the distribution begins. In January 2022 the IRS released Revenue Rule 2022-6 stating that 72(t) payments starting in 2022 or later can use an interest rate as high as 5%, effectively establishing a new minimum interest rate. The notice does not allow individuals to alter the interest rate for a 72(t) payment schedule already in place. The 120% federal midterm rate was 1.57% in January 2022 and 1.52% in December 2021. While a higher federal midterm rate would further the couple's goal, the 5% allowable interest rate significantly increased allowable withdrawals," Juan informed Paul.

Christine and Shane: Post-February 2022

"How will this rule change impact the couple's decision to retire?" Paul asked.

"Well, I have not completed all the calculations yet, but the couple has shared some updated financial information. They have a small $125,000 (non-retirement) trading account and another $70,000 in a money market deposit account at their credit union. Shane's IRA balance was just over $100K. Christine's parents passed away years ago leaving her a beneficiary IRA with about $230K. I have updated their information as you can see here on my screen," Juan stated while he showed Paul the information contained in Table 3.

Table 3
Financial Data and Rental Property Valuations (February 2022)

Cash / liquid assets	$70,000
Trading account	$125,000
Shane IRA	$100,000
Christine Beneficiary IRA	$230,000
Christine 401(k)	$2,120,000
Rental Property (1)	$500,000 ($90,000 loan balance)
Rental Property (2)	$450,000 (paid off)
Rental Property (3)	$400,000 ($80,000 loan balance)
Personal Home	$600,000 (paid off)

"Christine's 401(k) would be used for their SEPP calculation and as you can see Paul, the account increased over 17% since our meeting last year due to additional contributions and healthy stock market returns. The balance is currently $2.12 million. Additionally, home values have risen considerably since February 2021 that has increased the couple's equity in all three rental properties as well as equity in their personal home. However, Christine and Shane do not want to sell any of the other properties to fund their early retirement goal and are hesitant to rely on any other liquid assets they had other than to meet emergencies."

Juan's phone buzzed and he stepped out of the office for an extended period. Upon returning, he appeared visibly happy. "Que Tal El Jefe?" asked Paul proud of the Spanish he learned from Duo Lingua.

"My Aunt Lia's novel was published, and she wants to celebrate tonight," Juan said proudly, "Do you think you can run the new numbers for Christine and Shane for tomorrow's meeting?"

"Certainly, I can run the updated numbers, what else do I need to know?"

"Well, this year, Christine and Shane are 54 and 52, respectively. The 120% federal mid-term rate was 1.57% in January 2022 and 1.52% in December 2021. Remember their goal is to

maximize annual distributions, so use the newly allowed 5% interest rate for fixed-method calculations to determine their maximum annual distribution. I feel it is important to let them know their distributions under each method. Also, for all calculations, use her current 401(k) balance of $2.12 million. Remember they are hesitant to sell a rental property to meet any shortfalls, so focus solely on updated, allowable SEPP distributions, and ignore their other assets, although this could be an important discussion with other clients. Make sure to calculate allowable distributions under each method," Juan completed his thought.

"Any other questions?" Juan asked

"Not at the moment."

"I will be in early to go over your numbers and discuss other variables that might impact their retirement decision; hopefully Aunt Lia and I do not have too much seco this evening," Juan responded laughing slightly.

"I have everything covered, no worries," Paul responded and continued, "tell your Auntie congratulations on her novel. What is it about?"

"It is a story of a family's struggle during the Noriega years," Juan disclosed ironically.

References

Anderson, Tracey A. (2013). Planning to Avoid the Premature Distribution Penalty: The Benefits and Disadvantages of IRC Section 72(t), *The CPA Journal*, pp. 52-57.

Burilovich and Burilovich. (2008). Substantially Equal Periodic Payments from an IRA. *The Tax Adviser*. Accessed June 2022, https://www.thetaxadviser.com/issues/2008/oct/substantiallyequalperiodicpaymentsfromanira.html

Dobbis, Brian. (2022). A New IRS Rule Makes Early IRS Withdrawal More Attractive, Lord Abbett. Accessed June 2022, https://www.lordabbett.com/en-us/financial-advisor/insights/retirement-planning/a-new-irs-rule-makes-early-ira-withdrawal-more-attractive.html,

Frankel, Matthew. (2017). Use Your Retirement Savings Early with Substantially Equally Periodic Payments. The Motley Fool. Accessed June 2022, https://www.fool.com/retirement/2017/05/19/use-your-retirement-savings-early-with-substiantial.aspx.

Groom Law Group. (2022). IRS Updates Safe Harbor Methods for "Substantially Equal Periodic Payment" Exception. Groom Law Group. Accessed June 2022, https://www.groom.com/resources/irs-updates-safe-harbor-methods-for-substantially-equal-periodic-payment-exception/

Internal Revenue Code, 26 U.S.C. §72(t).

Internal Revenue Code, 26 U.S.C. §1274.

Internal Revenue Service, Revenue Rule 2002-62 (modifies and supersedes modify the provisions of Q&A-12 of Notice 89-25, 1989-1 C.B. 662). Annuities; Certain Proceeds of Endowment and Life Insurance Contracts. https://www.irs.gov/pub/irs-drop/rr-02-62.pdf.

Internal Revenue Service, Notice 2022-6. January 2022 (modifies and supersedes Rev. Rule 2002-62 and Notice 2004-15). Determination of Substantially Equal Periodic Payments. https://www.irs.gov/pub/irs-drop/n-22-06.pdf.

Washington, Kemberley. (2022). Guide to Rule 72(t) and Substantially Equally Periodic Payments (SEPPs). *Forbes Advisor*. Accessed June 2022, https://www.forbes.com/advisor/retirement/rule-72t-early-withdrawals-sepps/

A case study on net-short debt investing via credit default swaps

Danielle Bragale
James Madison University

Carl F. Larsson
James Madison University

This case presents students with the opportunity to analyze the ethical and economic implications of net-short debt investing via credit default swaps (CDS). The case leads students through a fictional story about a hedge fund analyst who comes across a potential net-short investing opportunity. We present students with basic facts and financial figures, and students must then make an "invest" or "do not invest" decision based on an ethical and economic analysis of the investment. We supplement the case study article for students with a teaching note for instructors.

Keywords: Net-short debt activism, distressed debt investing, credit default swaps (CDS), ethical reasoning

Introduction

Holly sips her coffee and wearily eyes the daunting pile of bond indentures on her desk. It is 8:00am on a brisk October morning in 2014. She has spent the last few weeks combing through legal documents and fine print that few will ever read. The pile of documents does not seem to be getting any smaller, but she's hopeful her hard work might eventually yield a favorable investment opportunity for her firm.

As a credit analyst at Opportunistica Capital, a multi-billion dollar hedge fund, Holly is in search of a profitable investment opportunity for her firm. She will deliver her idea in the form of an investment pitch at the investment committee meeting next week. On top of earning a return for the fund's investors, she also hopes that a good pitch could help her case in being promoted to associate later this year.

With a specialty in distressed debt and activist investing, Holly has been actively monitoring developments in credit default swap (CDS) markets. A CDS contract can act as an insurance policy on underlying bonds, or it can be used to speculate on bond defaults.

She picks up the next bond indenture and reads, *TurmaByte 7.5% Bonds due 2019*. The pile of bond indentures on her desk does not appear to be getting any smaller. Holly sighs*, please let this be the one.*

As with all bonds she reviews, Holly first conducts some basic background research on the issuer's company profile. She pulls up some background information for TurmaByte on her side-by-side terminal screens, clicks open her pen and legal pad, and begins to read. TurmaByte is a tech company based out of California. *Dime a dozen,* she thinks, *is there anything special going on?* She notices that TurmaByte appears to be financially distressed, and may be vulnerable to bankruptcy. She continues to read.

Once she feels like she understands the company's financial background, Holly then dives into the terms of the bond. Holly's mentor, Justin, had impressed on her how important it is to review the terms on fixed income investments. Unlike standardized equity contracts, bond terms can vary widely thus making or breaking an investment (secured vs. unsecured, maturity dates, floating vs. fixed, junior vs. senior, etc.). It is possible for two bonds from the same issuer to have vastly different risk-return profiles.

Holly leafs through her hard-copy version of the SEC official bond indenture, which represents the contract between the bondholders (the lenders) and the issuer (the borrower). Holly reads the indenture aloud, and stumbles upon a covenant about EBITDA requirements. A bond covenant is a legally binding provision that restricts bond issuers from certain actions that could adversely affect the value of the bondholders' claims. Violating a covenant can trigger a technical default on the bonds (see Smith & Warner (1979) for a comprehensive analysis of bond covenants).

This could be my ticket to a promotion! Holly starts to get excited as she reads a financial covenant stipulating that TurmaByte must maintain a minimum EBITDA level for the entire duration of the bonds. She notices that the company's EBITDA has remained very close to the required minimum of the financial covenants over the past few quarters, despite a crash in revenues over the same period. *How is this possible? Are there some accounting gimmicks at play?* Holly wonders, before investigating further.

Then it strikes her – *this company is artificially inflating its EBITDA to meet the bond covenants!* On its own, this may not matter to the creditors as long as they are confident in the issuer's ability to make its principal and interest payments on time and in full. In fact, creditors are sometimes even willing to renegotiate covenants to improve the likelihood of being paid back while also avoiding a technical default for the issuer – a win-win for all involved. As Holly reads, however, she quickly realizes that TurmaByte has not made any attempts to renegotiate the covenants with its creditors. Holly concludes that TurmaByte is in violation of the financial covenants.

Creditors *could* call a technical default on the debt, and yet they have not. *Why would they though?* Holly thinks to herself. *A forced default, in this case, would call TurmaByte's $1.5 billion in bonds to be due immediately. It would not be in the bondholders' best interest considering TurmaByte probably did not have the liquidity to pay accelerated interest and principal. Even if the bondholders were aware of the covenant violation, they might rather "kick the can down the road" and hope that things get better for the company by the maturity date in five years.*

The gears turn in Holly's head as she realizes the opportunity that this covenant might provide. Opportunistica could (1) purchase a majority stake in these bonds and then simultaneously (2) insure them with a greater amount of CDS contracts*…a net-short CDS position on TurmaByte's bonds.* The majority stake in the bonds would give Opportunistica the authority to call a technical default due to TurmaByte's violation of its bond covenants. That would trigger a windfall payoff on the fund's CDS position that would far exceed any losses realized on its bond. TurmaByte might fight against the technical default in court, but if everything went smoothly then Opportunistica would come out on top.

This clearly wasn't a textbook strategy. Holly would have to carefully consider the potential risks and rewards of this net-short investment idea.

Exploring the investment opportunity

For her pitch to the investment committee, Holly's thesis must be bulletproof. The investment committee will thoroughly vet her idea through several rounds of meetings before committing its

limited partner's capital to invest. This is money from Opportunistica's clients, which include high net worth individuals, pension funds, and endowments, among others. Opportunistica has a fiduciary duty to these clients to manage their money responsibly. It must act in its clients' best interest by pursuing profitable investments.

Holly therefore needs to be confident that her net-short investment thesis can produce a high return, while mitigating any significant risks. In her analysis, Holly must consider TurmaByte's bankruptcy potential and assess the company's health from both quantitative and qualitative perspectives.

Does Holly have a unique insight on TurmaByte's debt? Holly thinks back to the words of her undergraduate finance professor, who taught her that the key to fundamental investing is to (1) evaluate the intrinsic value of the investment, ignoring price, and then (2) consider the price of the investment relative to its intrinsic value. As a hedge fund analyst, Holly isn't looking for fairly priced assets. She wants to find an investment that will generate an *abnormal return*, above-and-beyond the fair compensation for the amount of risk taken on.

First, Holly must be confident that a net-short position has a high intrinsic value. In Holly's fundamental approach to investing, she conceptualizes the intrinsic value of an investment as the net-present-value (NPV) of its future cash flows discounted at a rate that reflects the risk of those cashflows. The future cash flows are driven by payoffs on the long CDS contracts, which in turn are dependent on the recovery rate on TurmaByte's bonds given default. It does not matter if the default is triggered by a technical violation of the bond covenants (e.g., the minimum EBITDA requirement), or via financial distress causing an inability to make principal and interest payments as promised.

While the CDS payoffs would be the same in either case, Holly must also consider the *price* of the CDS contracts. She knows that everyone in the high-yield debt investing world has access to the same financials and ratio analysis software. It would be easy for other hedge funds to pick up on a company's impending default by running screening algorithms on leverage ratios, liquidity ratios, and Altman Z-Scores (Altman, 2000), among other relevant metrics. Assuming CDS markets are relatively efficient (though sometimes illiquid), buying demand from those hedge funds could quickly push up the price of CDS contracts on a financially distressed company to the point where a net-short strategy would no longer yield a favorable return-on-investment.

Holly reasons that the best-case-scenario for the strategy would be that she has found something material in the bond indenture regarding TurmaByte's financial distress that nobody else is aware of just yet. In this case, the intrinsic value of the CDS contracts should be higher than the market price. Even if TurmaByte is showing signs of financial distress, her strategy could still generate an abnormal return *as long as her assessment of the probability of default on the bonds is higher than that of the marginal CDS investor.*

As part of her due-diligence, Holly conducts a thorough analysis of TurmaByte's financials. She looks at its financial trends both through time and against various comparable companies. She conjectures that other investors may not notice that the EBITDA figures are artificially inflated, absent a thorough accounting review. They will, however, likely notice the rapidly declining revenues. *Maybe the marginal investor is rating TurmaByte's financial health as a 4/10 based on the inflated EBITDA, when it's actually closer to a 2/10*, she thinks. *These CDS contracts will be expensive, but we could still get them for less than what I think the premium should be.*

Decision tree analysis of expected returns to the net-short investment

Holly sets forth in analyzing the economics of her net-short activist debt investment idea. She will need to consider the up-front costs of the bonds and CDS contacts, in addition to the various paths the future payoffs could take.

Pricing a majority stake in the bonds

After conducting her routine due-diligence on TurmaByte, Holly next dives into some back-of-the-envelope calculations on the potential outcomes of a net-short investment in TurmaByte's debt. To force TurmaByte into technical default, Opportunistica must gain voting rights by purchasing a majority stake in the bond issue, defined in the indenture for this bond as 30% of total principal outstanding. It would need to purchase these bonds on the open market over the course of several weeks, so as not to make any waves. The specific bond issue in question has a total principal amount outstanding of $1.5 billion. When calculating the cost basis of purchasing the majority stake, Holly expects to pay an average price of 90 (i.e., $900 for a $1,000 par value bond) over the next few weeks. Using this information, Holly quickly calculates the expected cost to realize a 30% ownership stake.

Estimating the cost of the CDS position

To complete the net-short position, the fund will also need to purchase CDS insurance on a notional amount *in excess of* the principal amount of its majority stake in the TurmaByte bonds. For example, Holly could purchase CDS covering $2 of notional value for every $1 in bond principal. Buying more will amplify potential gains, but also increase the upfront costs of the investment.

To establish the long CDS position, Holly's firm would have to pay an upfront cost plus a quarterly premium on the first day of March, June, September and December. Holly figures the upfront costs will come out to around 35% of the total notional face value insured, with a premium rate of 0.25% per quarter (i.e., 1% per year) of the total notional amount insured. The quarterly premium is paid until either (1) the CDS mature worthless, or (2) the underlying bonds default and trigger payoff on the CDS contracts.

Building a decision tree to model possible CDS and bond payoffs

Holly thinks, *Wow, there's a huge range of potential outcomes for this investment…maybe I should make a decision tree!* Holly first considers two main outcomes for how the investment could turn out. She then thinks about the probability of each scenario, in addition to considering how minor variations in events could affect the investment's ultimate payoffs.

<u>Scenario 1: Net-short success.</u>

Holly must consider the investment from all perspectives. If Opportunistica sues TurmaByte for violating its debt covenants, and Opportunistica wins, then TurmaByte will be forced into a default on its debt. This default will trigger a payoff on Opportunistica's long CDS position in an amount equal to the face value of the bond minus its recovery rate in default, multiplied by the number of bonds that it insured using CDS. The debt (principal plus accrued interest) will be immediately due to creditors. If TurmaByte is unable to make the full, accelerated payments of principal and interest–which is likely–then it will declare bankruptcy. Opportunistica will likely recoup some of the bond's principal amount in bankruptcy court. Holly's experience with similar

transactions leads her to expect that the bonds recovery rate in default will be around 39.5% (see Cantor & Varma (2004) for statistics on bond recovery rates).

Scenarios 2 and 3: net-short failure.

If the court finds TurmaByte not guilty of breaching its EBITDA covenant, then Opportunistica will receive neither an accelerated payment on its bonds, nor a payout from its CDS contracts. In this case, Opportunistica will simply continue to collect coupon payments from the bonds. It will receive the face value of principal at maturity in 2019. The CDS contracts will expire worthless. *That would be some expensive CDS insurance for a non-event*, Holly thinks. Another potential "failure" scenario could result from a group of investors (such as the CDS sellers) banding together to help prevent TurmaByte from defaulting or declaring bankruptcy. *How much cash would they be willing to advance to TurmaByte to avoid losses on their short CDS positions?* Even if Opportunistica won its lawsuit to force an accelerated payment on the bonds, there would remain a chance that other investors would foil the plan by providing the full amount of liquidity needed to pay off the accelerated bonds in full.

Timing considerations

Holly considers the time horizon of her investment. Most likely, Opportunistica will send TurmaByte a notice of default, and the company will refuse to pay. Opportunistica will file a lawsuit against TurmaByte, and the court case could last months, if not years. *I'll assume two years as a "most likely" scenario*, thinks Holly. The exact timeline however remains unknown.

Holly thinks a five-year CDS would allow adequate time for the default to occur, but she also understands that longer maturity CDS contracts will cost more to establish. In discounting her cash flows, Holly uses a 1.6% risk free rate that is approximately in line with the current 5-year Treasury. Holly gathers this key information into Appendix A.

Legal fees

This investment strategy will only succeed with a significant investment in legal representation. Holly notes that TurmaByte has likely been in violation of the covenants for quite some time now. Would she have a legal case to force technical default? *We should be fine…we hire the best attorneys money can buy. It will, however, come at a cost.* For example, one research study found the range of corporate legal fees across 20 cases conducted in 2008 to be $134,237 to $2,993,567 per case, with an average of $621,880 per case (Lawyers for Civil Justice et al., 2010). For now, Holly makes a "back-of-the-envelope" calculation that legal fees will come in around $1,000,000.

Legal, ethical, and reputational considerations

This is legal, right? And ethical? I mean TurmaByte did violate a bond covenant. I'm also pretty sure other funds have done something like this in the past, Holly thinks. Holly also wonders how this investment could affect other parties, either directly or indirectly. What implications would a default and bankruptcy have for TurmaByte's bondholders, shareholders, and other stakeholders (e.g., employees, customers, contractors, and suppliers)? As an aspiring Chartered Financial Analyst (CFA), Holly figures it would also be worth checking her thesis against the CFA Institute's Code of Ethics (CFA Institute, 2014).

Holly could also evaluate her proposed strategy against duty- and outcome-based ethical frameworks. Duty-based ethics is the ethical philosophy that every person has certain duties to

uphold to other humans and the planet (Miller, 2016). Outcome-based ethics is the ethical philosophy that focuses on the impact of a decision on society or key stakeholders (Miller, 2016). For example, utilitarianism is an outcome-based approach to ethical reasoning in which an action is evaluated in terms of its consequences for those whom it will affect. An action is considered good if it will result in the greatest good for the greatest number of people (Miller, 2016). On top of applying the ethical frameworks, Holly also considers her moral values – what is my intuition here? Can I make this investment in good conscience?

Finally, Holly considers how her net-short investment thesis could affect the reputation and public-relations of her firm. How will the newspaper headlines read once this goes public? Would it somehow affect her firm's fiduciary relationship to its clients? Will the fund's clients support this investment?

Final Decision

Holly's promotion is so close she can feel it. She wonders how the team will take the pitch. An investment like this is a major decision that would involve numerous moving parts, a huge capital commitment, potential ethical dilemmas, and an uncertain time horizon. Is this a sound investment idea? Should Holly pitch a net-short investment in TurmaByte at Monday's investment committee meeting?

Appendix A

Key Information (as of 12/1/2014) for TurmaByte 7 1/2 Bonds Due December 1, 2019

Face Value of Total Bonds Outstanding	$1,500,000,000
% of Bonds Required for Majority Stake	30%
Bond Price on December 1, 2014	90.00
Bond Coupon	7.50
CDS Upfront Payment (% of Total Notional)	35%
Effective Annual Risk Free Rate of Return	1.60%
CDS Quarterly Premium (% of Total Notional)	0.25%
Expected Recovery Rate on Bonds Given Default	39.5%
Estimated Legal Expenses (Lawyers for Civil Justice et al., 2010)	$1,000,000

Miscellaneous assumptions

1. Opportunistica will choose whether to make an investment on November 1, 2014
2. If investing, assume for simplicity that all bonds and CDS are purchased on December 1 2014
3. Opportunistica will send a notice of default and file a lawsuit in December 2014; all legal outcomes will be realized on December 1 2016
4. Opportunistica will use 5-year CDS to insure a greater total notional amount than the face value of bonds purchased
5. Coupon Payments are made semiannually on December 1 and June 1
6. Quarterly CDS Payments are made on March 1, June 1, Sept 1, Dec 1
7. Coupon Payments are invested at the risk-free rate and CDS Quarterly Premiums are discounted by the risk-free rate; the discount rate is approximately in line with the 5-year Treasury rate (retrieved from FRED, Federal Reserve Bank of St. Louis).
8. The average bond price paid to acquire the bonds on December 1, 2014 is 90.00
9. Holly expects a recovery rate on the bonds of 39.5% in default (Cantor & Varma, 2004)

References

Altman, E. I. (2000). Predicting financial distress of companies: Revisiting the Z-Score and Zeta® models. Retrieved from http://pages.stern.nyu.edu/~ealtman/Zscores.pdf

Cantor, R., & Varma, P. (2004). Determinants of recovery rates on defaulted bonds and loans for North American corporate issuers: 1983-2003. *Journal of Fixed Income*, December.

CFA Institute. (2014). Code of Ethics and Standards of Professional Conduct. Retrieved from https://www.cfainstitute.org/-/media/documents/code/code-ethics-standards/code-of-ethics-standards-professional-conduct.ashx

Board of Governors of the Federal Reserve System (US), Market Yield on U.S. Treasury Securities at 5-Year Constant Maturity, Quoted on an Investment Basis [DGS5], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/DGS5.

Lawyers for Civil Justice, Civil Justice Reform Group, & U.S. Chamber Institute for Legal Reform. (2010, May 10). Litigation cost survey of major companies. Presented at Duke Law School 2010 Civil Litigation Conference. Retrieved from https://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf.

Miller, L. R. (2016). *Essentials of the legal environment today*. Cengage Learning.

Smith Jr, C. W., & Warner, J. B. (1979). On financial contracting: An analysis of bond covenants. *Journal of Financial Economics*, 7(2), 117-161.