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THE VALUATION OF SUSTAINABILITY BY A NEW GENERATION OF INVESTORS

CECELIA GRACE MINNICK
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Reviewed and approved* by the following:

Samuel Bonsall
Associate Professor of Accounting
Honors Advisor and Thesis Supervisor

Suzanne Wright
Associate Teaching Professor
Honors Reader

* Electronic approvals are on file.

ABSTRACT

This thesis explores the importance of environmental sustainability information and the influence this non-financial information has on the decisions of a newer generation of investors. Through this thesis, a study, which used the Penn State Nittany Lion Fund as a proxy for the general population of young investors, revealed that student investors generally take environmental sustainability information into consideration when valuing a stock. The study revealed that student investors are generally positively influenced by highly sustainable practices and negatively influenced by poor sustainable practices. These trends were more prominent when the company was not performing well financially, which implies that student investors care more about sustainability when a company is already struggling financially. These results lay the groundwork for the conclusion that student investors care about environmental sustainability and should, therefore, be given access to accurate and standardized sustainability reports.

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Chapter 1

Introduction

In recent years, consumers and investors alike have become more interested in non-financial information, such as environmental, social, and corporate governance (ESG) factors. We are currently dealing with air quality, pollution, and other environmental issues that are catching the interest of investors. This puts the corporate world of today in a state of disconnect between the financial focus that most for-profit businesses have known for decades and the growing interest in non-financial information.

In order to fully assess the current dilemma, we first need to look back at the history of accounting and how it has evolved. The beginning of accounting and auditing traces back to a time when businesses did not even remotely resemble what they are today. However, the reasons for auditing, both internally and externally, were largely the same: error reduction, reporting accuracy, and fraud prevention (Ramamoorti, 2003). Since then, these fields have evolved to include many laws, regulations, and new practices. In modern times, when people think of auditing, they also think of financial reporting, which is the output product of the auditing process. Financial reporting also faces the challenges of evolving laws, regulations, and practices. Companies are forced to respond to these changes that tend to result from investors looking to receive additional and more accurate information in a timely manner.

In 2002, some of the most notable changes were made to the financial reporting and auditing world through the Sarbanes-Oxley Act, which aimed to mend what had become ineffective auditing of U.S. public companies. At this time, investors and Wall Street

professionals were surveyed and found to have low confidence in the auditing of financial reports. This finding was in line with the decline in stock market indices of large capitalization stocks that was occurring at the same time (Coates & John, 2007). With the stock market being an indication of the health of the country's overall economy, the government stepping in during this time of crisis was inevitable. The result was the passing of the Sarbanes-Oxley Act, which has somewhat changed the landscape of financial reporting today.

In present-day 2020, the trustworthiness of auditing and financial reporting is much less of a concern after strict regulations were put in place. However, there is another parallel between the situation in 2002 and the situation today. In 2002, the complaints of investors about the integrity of companies and the accuracy of their financial reports were sparked by a crisis. Now, we have another crisis in the form of environmental concerns. When investors showed their dissatisfaction in the state of financial reporting in 2002, an act was passed in response. However, even with a shift in investor thinking and the development of non-financial reporting standards and research by organizations such as the Sustainable Accounting Standards Board (SASB) and the Global Reporting Initiative (GRI), reporting on environmental sustainability information has not been mandated.

Through this thesis, I plan to expand on current research and provide new information towards the argument that the value investors place on non-financial information has grown to the point that sustainable reporting should be mandatory.

Chapter 2

A Shift in Thinking

Proving that mandated sustainable reporting will be beneficial and can make a difference involves first and foremost proving that investors care about sustainability. To do this, it is helpful to look at the big picture shift in thinking from generation to generation. Figure 1 shows that 85% of millennials value companies who practice sustainability, in comparison to the 72% and 65% of baby boomers and silent generation, respectively. Overall though, more than half of respondents in all generations feel that environmental practices are important, which shows that sustainable thinking is spreading to all generations.
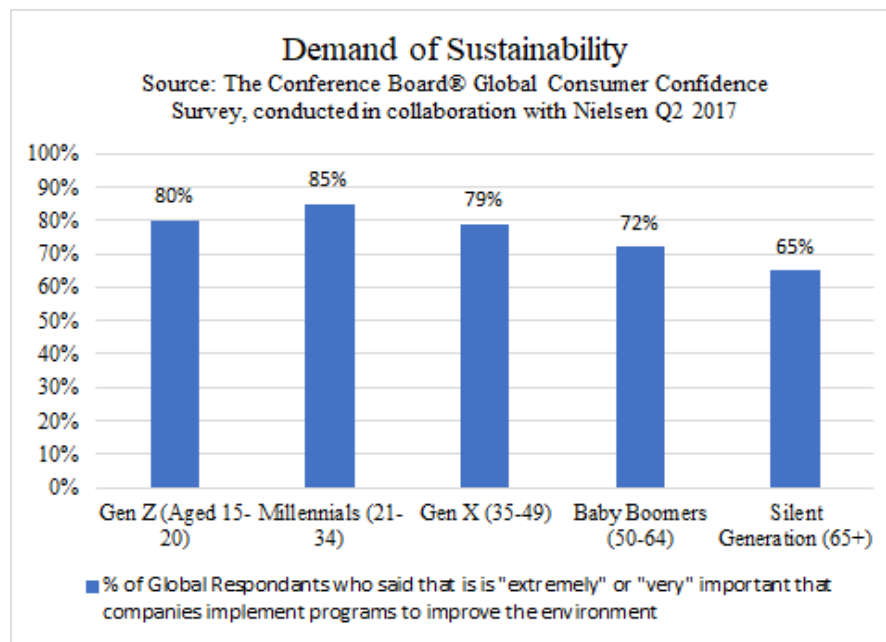

Figure 1. Demand of Sustainability

As the general population is becoming more interested in sustainability, this trend funnels down into industries where these populations are employed. Specifically, in the financial

industry, investors can show their interest in non-financial information by incorporating ESG factors into their decisions.
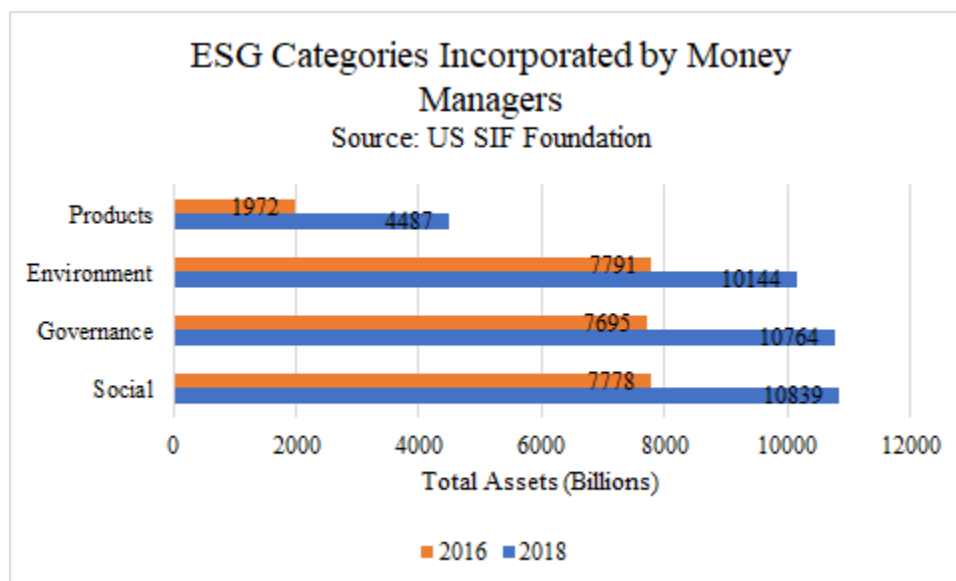
Figure 2. ESG Categories Incorporated by Money Managers

Figure 2 shows the change from 2016 to 2018 in the total assets invested where models incorporated ESG data. In every category, the amount of assets invested grew, and $2.3 trillion more was invested using environmental factors specifically. While the environment category did not experience the highest increase in growth, climate change is the ESG issue that has been found to be the most important to money managers when making investment decisions (US SIF Foundation, 2018). Clearly, investor trends regarding environmental information are following the same trends as the general population.

In response to this shift in interest, numerous organizations have been formed with the goal of advancing the research and resources in the area of non-financial reporting. Non-financial reporting refers to the idea of producing a published report outlining what a company is doing around sustainability of the overall business. Two of the most well-known organizations dedicated to producing sustainable reporting standards are the GRI and the SASB. The GRI,

based out of Amsterdam, was the first organization to develop a set of standards as a guideline

for how companies could communicate their sustainability efforts. Their mission is "to empower

decisions that create social, environmental and economic benefits for everyone" (Global

Reporting Initiative, 2020). SASB is a similar organization; however, they have chosen to create

standards that are tailored to more specific industries. They focus on determining information

material to each industry individually and reporting on only that information. Their mission is

"to establish industry-specific disclosure standards across environmental, social, and governance

topics that facilitate communication between companies and investors about financially material,

decision-useful information" (Sustainable Accounting Standards Board, 2018). Both

organizations claim to complement each other and work together towards a common goal.

   As general population interest in sustainability increases, so too does investor

interest. Now organizations have responded to that call by developing standards to ensure that

investors receive effective communications regarding sustainability information from companies.

The next logical step is for regulations to be put in place to mandate reporting on this

information using a standard format for all companies. The question, though, is whether the

demand for reports utilizing these standards is enough to move regulators to take action.

Chapter 3

Literature Review

The topic of sustainable reporting and investing is relatively new. The first standards being developed in 1997 by the GRI (Global Reporting Initiative, 2020) is evidence of that; however, this topic is growing in popularity as environmental issues become more evident. Therefore, plenty of research already exists in this area, but there are still many unanswered questions. Research conducted by MIT, published in the *Journal of Business Ethics*, and published in *Business Strategy and the Environment* will be used as the basis of this thesis and the groundwork from which this study will expand.

The article published in the MIT Sloan Management Review titled "Investing for a sustainable future: Investors care more about sustainability than many executives believe" attempts to disprove a common misconception about investing and reporting. This source is largely qualitative with a survey report for support. The authors state that it is a common misconception that investors do not care about sustainable practices, which is why most companies make little effort to become more sustainable and, in turn, do not report on their practices (Unruh, Kiron, Kruschwitz, Reeves, Rubel & Zum Felde, 2016). The problem with this study is the format. The research was conducted using a "question and answer" survey format (Unruh et al., 2016). While this survey was able to provide plenty of valuable information, the nature of the survey allows for the claim of bias in the results. The surveyors simply asked investors if they would hypothetically invest in a company with poor sustainable performance. Self-reporting bias is inherently introduced to this study and could have influenced the results to be unrealistic. Therefore, while this source provides valuable back-up for the argument that investors care about sustainability, this thesis will attempt to answer the open questions of: How

do we reverse this misconception, and do young investors truly care about sustainability or do they just say they do?

The article published in the *Journal of Business Ethics* is titled "A further examination of the impact of corporate social responsibility and governance on investment decisions." This study is relevant to the future of our business world because it uses MBA students in 2015 (Cohen, Holder-Webb & Khalil, 2017) as a sample. The conclusion of this study lines up with the hypothesis that the newer generation investors are more likely to invest in companies with strong CSR when presented with information about the company's environmental practices (Cohen et al., 2017). However, some holes can be found in this study. For example, in this study, the sample of investors were presented with only the CSR information of the company and then asked whether they would invest in the stock (Cohen et al., 2017). The argument could be raised that this is unrealistic because if an investor is realistically looking to invest in a company, they would not simply look at their sustainable practices. More likely, they will look primarily at a company's financial performance and use the sustainable practices as a supplement. The conclusions that this study can draw are also limiting because all the investors were asked was whether they would invest or not. Additionally, this study combines the testing of value relevance of both natural and social capital as well as the effect of corporate governance quality (Cohen et al., 2017). Because of this combination of multiple studies, the question of whether investors care about environmental sustainability alone can be clouded. Therefore, this thesis aims to more obviously answer the question of whether the new generation of investors would care about environmental sustainability when presented alongside financial information.

The article published in *Business Strategy and the Environment* is titled "Can sustainable investments outperform traditional benchmarks? Evidence from global stock markets." This

study analyzes performance investments that incorporated ESG factors throughout different regions and countries. The researchers concluded that in some regions, portfolios that used sustainable investment strategies had superior risk-adjusted returns. While the US was not one of the regions that they found this trend to be true for, there were other well-developed regions that did demonstrate the trend (de Souza Cunha, de Oliveira, Orsato, Klotzle, Oliveira & Caiado, 2020). This study is an example of the importance of teaching investors to care about sustainability, since they could experience higher returns as a result. This thesis attempts to build on this study and shed light on whether student investors are aware of the return potential of sustainable investing strategies.

Chapter 4

Methodology

The intended outcome of this study is to determine how valued sustainability is to young investors. To obtain this outcome, this thesis describes a study that tests whether a simple fabricated stock valuation scenario with different levels of sustainable practices would influence student investors' decisions. The details of this study are outlined in this chapter.

Participants

The sample tested was 41 investors, ranging from freshmen to juniors in college, who are members of the Nittany Lion Fund at Penn State University. The Nittany Lion Fund is an undergraduate student-run hedge fund in charge of managing $7 million (The Pennsylvania State University, 2020). This sample was chosen as a representative of the group of people who will soon join the workforce as the new generation of investors. The Fund, as the group is often referred, prides itself on its rigorous program and develops "leaders who have landed careers with investment banks such as Bank of America Merrill Lynch, Goldman Sachs, and JPMorgan Chase" (The Pennsylvania State University, 2020). The students in this organization are on track to become influential in the investing world, making them suitable candidates to participate in this study.

Administration

The students in the Nittany Lion Fund meet for class as part of their organization curriculum. With the permission of the professor of the class, Professor Christoph Hinkelmann, the study was conducted during the fifty-minute class period on Friday, January 24, 2020. The complete study took approximately thirty minutes.

Study Design

Each participant was given one of the four versions of the scenario/data collection sheet as well as an informed consent sheet. The scenario/data collection sheets (Appendices B-E) directed participants to use the scenario provided to give an approximate monetary valuation of that company's stock and record it in the provided area. The informed consent sheet (Appendix A) provided logistics of the experiment, guidelines for ethicality, and the contact information of the researchers. After turning in the scenario/data collection sheet, participants were asked to complete a follow-up survey (Appendix F) to assist in analysis.

To summarize the study, the participants were presented with a scenario that required them to put a valuation on a fabricated upcoming Initial Public Offering (IPO) company in the Energy industry using a relative valuation technique. This sector was chosen for this study because impacts of energy production on the environment are widely debated. Some experts believe that carbon emission reduction goals can feasibly be met by changing energy practices (Clift, 2007). The scenario read, "You have been asked to value an energy company's IPO given the following information. Please use the typical process you would follow for a very simple relative valuation. Keep in mind that some of the information has been omitted or consolidated

for the sake of the study; however, treat all information as if there is supplementary proof to ensure its accuracy and perform the valuation to the best of your ability." The information provided in the scenario included the Price-to-Earnings (PE) ratios of three real companies in the Energy industry and their average Earnings Per Share (EPS) as well as fabricated, forecasted EPS for the IPO.

Undisclosed to participants at the time, the real companies used to represent comparable companies to the IPO were Exxon Mobil Corporation (XOM), Royal Dutch Shell PLC (RDS-A), and Chevron Corporation (CVX). According to Yahoo Finance, as of January 18, 2020, the PE ratios for Exxon, Shell, and Chevron were 19.98 (Yahoo Finance, 2020b), 11.66 (Yahoo Finance, 2020c), and 16.58 (Yahoo Finance, 2020a) respectively. The average was therefore 16.07. While these companies are not realistically comparable for a relative valuation, participants were blind as to what these companies were and, as such, could treat them as comparable.

The information that was provided was enough to perform a simple relative valuation using the average PE ratio. A relative valuation is a method to value a company by comparing it to similar companies (Sahun, 2008). To do this, the market values must be standardized, and one method of standardization is using the PE ratio. Using the PE ratio for a relative valuation is one of the most common methods (Sahun, 2008) and is also very simple, which means it is less likely to confuse participants. The formula for the PE ratio is the "Market Price per Share" divided by "Earnings per Share" (Damodaran, 2002). When given the forecasted EPS of an IPO, the method provides that the EPS would be multiplied by the average PE ratio of comparable companies to solve for the price of the IPO (Sahun, 2008). An outline of the method can be referenced below:

$$P_I = E_I \times \left(\frac{P}{E}\right)_A$$

Where,

P_I = Price of IPO

E_I = Earnings per share of IPO

$\left(\frac{P}{E}\right)_A$ = Average PE ratio of comparable companies

Had they been given just the financial information, most participants would have only performed that simple calculation to solve for the price of the IPO. However, in addition to the financial information provided, the scenario also provided fabricated sustainability information. In order to keep the variables controlled for the study, the sustainability information was presented as a rating. The scenario read, "This rating is out of 100 points and values the level of environmentally sustainable performance. For example, a rating of 50/100 means that the company is engaging in average sustainable practices with regards to the environment according to its sustainability report. The rating is performed by an expert on sustainable practices for the energy industry." Each comparable company in the scenario was given a fabricated sustainability rating. The sustainability ratings for Exxon, Shell, and Chevron were 49, 45, and 56 respectively. The average was therefore 50/100, representing an industry with average sustainability practices. Participants were also given a sustainability rating for the IPO. The basis of the study was to see how participants incorporated the sustainability ratings into their calculation of the price of the IPO, if at all.

The participants were also provided with the average EPS for those three companies, which at the time was $5.14 (Yahoo Finance, 2020a; Yahoo Finance, 2020b; Yahoo Finance, 2020c). The purpose behind providing this number was to give more of a benchmark of how

much value to put on the sustainability information, if any, since no other information about the companies or industry was provided. The disclosure in the scenario related to this value read, "assume the number of shares outstanding is relatively constant between the IPO and the companies so any change in Earnings Per Share is due to a change in earnings." This was to assure participants that the variations in Earnings per Share was not a result of variations in shares outstanding and was, instead, a result of financial return.

While each participant was given the same general information, there were four different versions randomly assigned that varied in both EPS and sustainability rating for the IPO. The four groups are described below:

Table 1. Descriptions of Versions

Version	Appendix	EPS	Sustainability Rating
A	B	Higher than average	Higher than average
B	C	Higher than average	Lower than average
C	D	Lower than average	Lower than average
D	E	Lower than average	Higher than average

The versions with the higher than average EPS (A and B) had a forecasted EPS of $6.14. The versions with the lower than average EPS (C and D) had a forecasted EPA of $4.14. The versions with the higher than average sustainability rating (A and D) had a rating of 98/100. This rating represented outstanding sustainable practices relative to the industry. The versions with the lower than average sustainability rating (B and C) had a rating of 2/100. This rating represented poor sustainable practices relative to the industry.

Random assignment was performed by passing out one Version A, one Version B, one Version C, one Version D, and repeating until all participants had a scenario/data collection sheet. This method was used to mitigate the risk of cheating since the seats were in close proximity. Due to the uneven number of students in the class, eleven participants had Version A, while the rest of the versions were completed by ten participants each. The scenario/data collection sheets were labelled A1-A11, B1-B10, C1-C10, and D1-D10 because the Internal Review Board at Penn State deemed this study as exempt, so no records of identification of the participants could be retained. This code on each scenario/data collection sheet was written on each participants' follow-up survey sheet so that they could be matched.

The follow-up survey consisted of four questions and a disclosure statement. The disclosure statement explained that the purpose of the study was to determine the amount of value student investors place on sustainability information. The first three questions were designed to provide insight into the decisions and calculations made by the participants. The last question was designed to determine how much experience in investing for the Nittany Lion Fund each participant has had.

Chapter 5

Results

The mean valuation result of each version of the scenario was compared to the mean valuation response of the version that varies in sustainability rating. Therefore, Versions A and B were compared, and Versions C and D were compared. The mean valuation result for each version was derived by taking an average of the valuation responses from that version. A higher mean represents a higher valuation on the stock, while a lower mean represents a lower valuation on the stock.

The mean valuation result of each version of the scenario was compared to the mean valuation response of the version that varies only in sustainability rating to determine if investors treat sustainability as added value to the IPO's stock. This comparison was performed using a one-tailed t-test for means of two samples. The confidence level used was 95%, which means that the critical t-value for each version was calculated using an alpha of 0.05. The null hypothesis assumes that there will be no difference between the version with a higher sustainability rating and the version with a lower sustainability rating. The alternative hypothesis assumes that the version with the lower sustainability rating will have a lower average valuation. If the critical t-value was found to be less than the calculated t-statistic, the null hypothesis was rejected, and there was found to be a significant difference between the valuation of IPO's with better sustainable practices versus worse sustainable practices.

The significance test was repeated after cleaning the data to include only more experienced investors. For the purposes of this study, more experienced investors were defined

as investors who have been in the Nittany Lion Fund for three or more semesters. The purposes and interpretations of this test remained constant but were repeated on the smaller data set to discover any other possible trends.

Finally, the results of the follow-up survey (Appendix F) were analyzed to gain insight into the reasoning behind students' valuations. These results were also used as supplementary information for the significance tests when presented using various data visualization techniques.

Limitations of Study

It is important to note that this study includes some methodological limitations. These limitations could influence the results of this study for a reason other than the intended design. For this reason, the results of this study are not interpreted as causation, but rather correlation.

One such limitation is the lack of sample size. The Nittany Lion Fund is intended to be a representative sample of student investors who will be entering the workforce in the next few years. However, this is a sample of 41 students that is being extrapolated to a population of millions of people. In addition, the student investors in The Nittany Lion Fund represent students who are from Penn State University, and the results may not be accurately extended to all universities.

Self-reporting bias is also unavoidably present in this study, as it is with many others. The participant's actions and decisions during this study may not be reflective of how they would realistically act if they thought they should answer a certain way just for the study.

The study design attempted to mitigate this bias by creating a scenario rather than asking survey

formatted questions.

The study design also limits the ability to treat the results as realistic because of

its simplistic nature. The student investors are taught very complex models that take in countless

variables to value a stock. In this study, the variables had to remain controlled and, in turn,

minimal. This may have contributed to the sustainability information standing out more than it

would have if an investor was performing a valuation in the natural environment. This also may

have contributed to an inability to place an accurate monetary value on the sustainability rating.

Influence of Sustainability Information

This section discusses the results of comparing the two sets of versions that have the

same EPS value but different sustainability ratings. The purpose of this comparison was to

discover how the valuation responses were affected by a high or low sustainability rating. The

information between Versions A and B was the same except for the sustainability rating. The

same pattern followed with Versions C and D, so these pairs were compared to each other.

Figure 3 shows the mean responses of all the students who had each version. Version A, which

had good financials and a high sustainability rating, had the highest mean response of $107.68,

while Version C, which had bad financials and a low sustainability rating, had the lowest mean

of $45.72. These means show that, before any significance tests, students were positively

influenced by a high sustainability rating and negatively influenced by a low sustainability
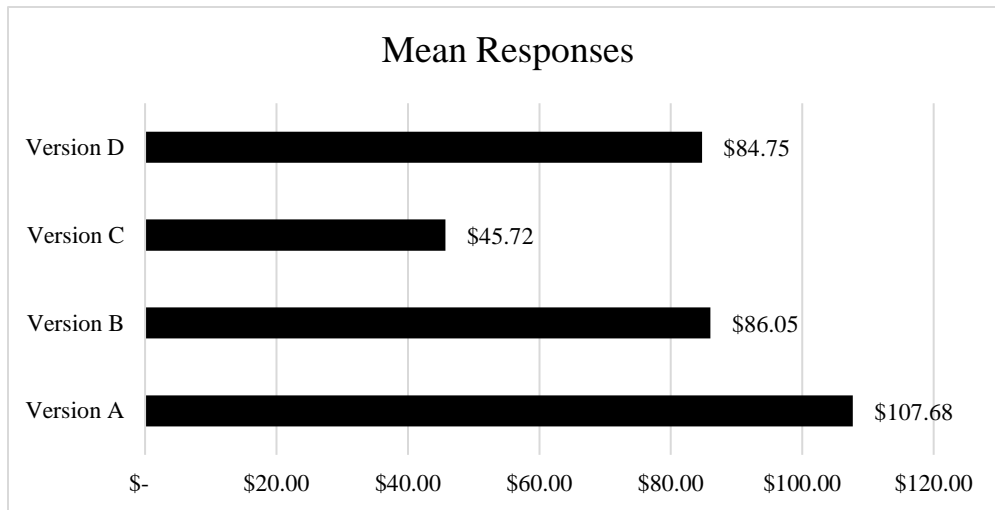
rating.

Mean Responses

Version	Value
Version D	$84.75
Version C	$45.72
Version B	$86.05
Version A	$107.68

$- $20.00 $40.00 $60.00 $80.00 $100.00 $120.00

Figure 3. Mean Responses by Version

Figure 4 shows the same mean responses as Figure 3, but they are presented as a comparison of the paired versions. Again, before any significance tests, students rated the version in the pair with a higher sustainability rating higher on average. The visual also suggests that with a larger difference between Versions C and D in comparison to the difference between Versions A and B, students cared more about the sustainability information when the IPO had poor financial performance.
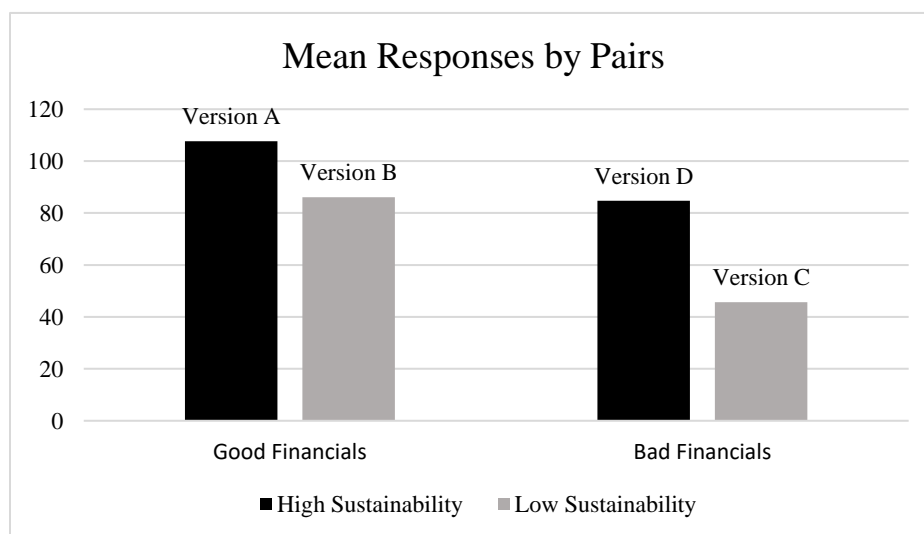
Mean Responses by Pairs

120
100
80
60
40
20
0

Version A
Version B
Version D
Version C

Good Financials   Bad Financials

■ High Sustainability   ■ Low Sustainability

Figure 4. Mean Responses by Pairs

The one-tailed t-tests for means of two samples were performed using a null and
alternative hypothesis. The null hypothesis for each version is that the difference in means of
each version would be zero, implying that the sustainability information did not affect either
valuation. The alternative hypothesis is that the mean for the version with a higher sustainability
rating will be greater than the mean for the version with a lower sustainability rating. The null
and alternative hypotheses for each version are outlined in Table 4.

Table 2. Hypotheses for Test When Comparing Means

Comparison	Null Hypothesis	Alternative Hypothesis
Versions A and B	$\mu_A - \mu_B = 0$	$\mu_A > \mu_B$
Versions C and D	$\mu_C - \mu_D = 0$	$\mu_D > \mu_C$

These hypotheses were tested using a one-tailed t-test for means at a 0.05 significance
level. The results are described in Table 5. The critical t value was compared to the calculated t
statistic to find the significance of the findings.

Table 3. Significance Tests When Comparing Means

Comparison	Critical T value	T Stat	Significant?
Versions A and B	1.7341	1.3169	No
Versions C and D	1.7341	3.1027	Yes

The results of this comparison of the mean value of one version in a pair to the mean
value of the other version seem to suggest that students were positively influenced by a high
sustainability rating and negatively influenced by a low sustainability rating. However, the
results were only significant for the comparison of Versions C and D. These were the versions

that performed below average financially. Therefore, we can predict with 95% confidence that

students with Version C valued the IPO lower than the students with Version D because of the

lower sustainability rating. In other words, we can predict with 95% confidence that students

with Version D valued the IPO higher than the students with Version C because of the higher

sustainability rating.

Influence of Sustainability on Experienced Investors

This section discussed the results of the tests after the less experienced investors were

eliminated from the data sets. The remaining results included investors who have been in the

Nittany Lion Fund for three or more semesters, including the current semester and any summer

semesters. Thirteen responses were eliminated by this consolidation. The purpose of analyzing

the data of only more experienced investors was to determine if students value sustainability

information differently as they learn more throughout their college careers.

Figure 5 shows the adjusted means of each version after elimination of less experienced

investors. The means follow the same trends as the full data set. Version A, which had good

financials and a high sustainability rating, had the highest mean response of $119.76, while

Version C, which had bad financials and a low sustainability rating, had the lowest mean of

$51.10. These means show that, before any significance tests, students were positively

influenced by a high sustainability rating and negatively influenced by a low sustainability
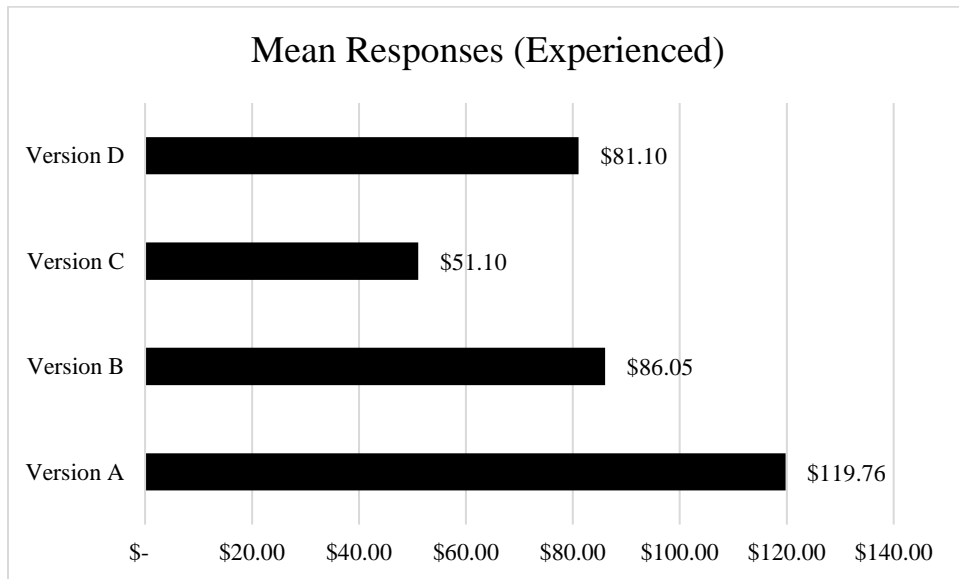
rating.

Mean Responses (Experienced)

Version	Value
Version D	$81.10
Version C	$51.10
Version B	$86.05
Version A	$119.76

(x-axis: $- $20.00 $40.00 $60.00 $80.00 $100.00 $120.00 $140.00)

Figure 5. Mean Responses by Version for Experienced Investors

The comparison of the means for each version in a pair was performed for the consolidated data set. Figure 6 outlines the recalculated means in the format that helps to visualize the difference in the pairs, Versions A and B versus Versions C and D. Again, the recalculated means show the same trends as the full data set and, before any significance tests, students rated the version in the pair with a higher sustainability rating higher on average.
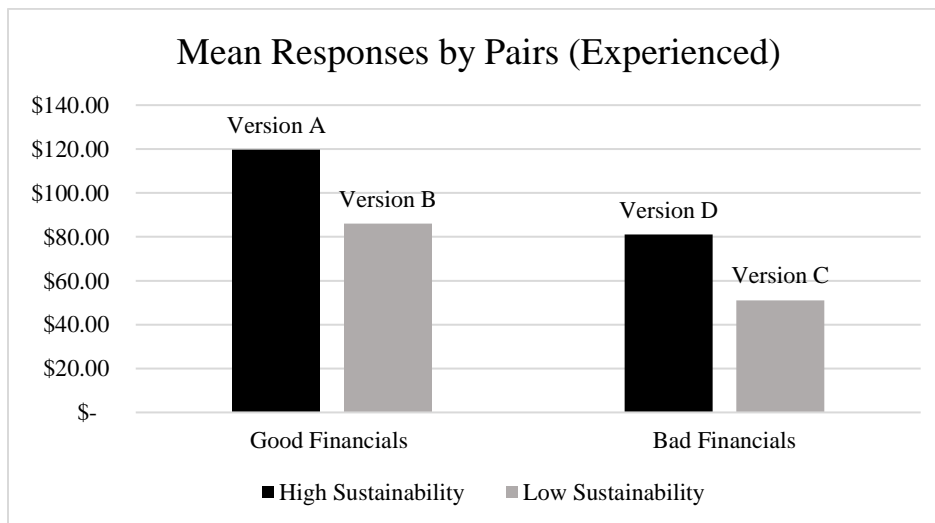
Mean Responses by Pairs (Experienced)

(Bar chart — Good Financials: Version A (High Sustainability), Version B (Low Sustainability); Bad Financials: Version D (High Sustainability), Version C (Low Sustainability). Y-axis: $- $20.00 $40.00 $60.00 $80.00 $100.00 $120.00 $140.00)

Legend: ■ High Sustainability   ■ Low Sustainability

Figure 6. Mean Responses by Pairs for Experienced Investors

The hypotheses outlined in Table 2 are the same as those tested with the consolidated data set. These hypotheses were tested using a one-tailed t-test for means at a 95% confidence level. The results are described in Table 7. The critical t value was compared to the calculated t statistic to find the significance of the findings.

Table 4. Significance Tests When Comparing Means (Experienced)

Comparison	Critical T value	T Stat	Significant?
Versions A and B	1.8946	2.0227	Yes
Versions C and D	1.8595	1.5685	No

The results of this comparison of the mean value of one version in a pair to the mean value of the other version seem to suggest that experienced investors were positively influenced by a high sustainability rating and negatively influenced by a low sustainability rating. However, the results were only significant for the comparison of Versions A and B, which is the opposite of the results from the full data set. These were the versions that performed above average financially. Therefore, we can predict with 95% confidence that students with Version B valued the IPO lower than the students with Version A because of the lower sustainability rating. In other words, we can predict with 95% confidence that students with Version A valued the IPO higher than the students with Version B because of the higher sustainability rating.

Follow-Up Survey Results

This section analyzes the results of the follow-up survey (Appendix F), which was intended to give the students a chance to explain their decision-making process. First, the

responses to Question #2 of the follow-up survey are analyzed to discover how many students

intended to take sustainability into consideration when valuing the IPO. Question #2 reads, "Did

you consider the sustainability information provided? Why or why not?" For the purpose of this

analysis, the responses were shortened to "Yes" or "No." Figure 7 shows the results of this

question for Version A, Figure 8 shows the results of this question for Version B, Figure 9 shows

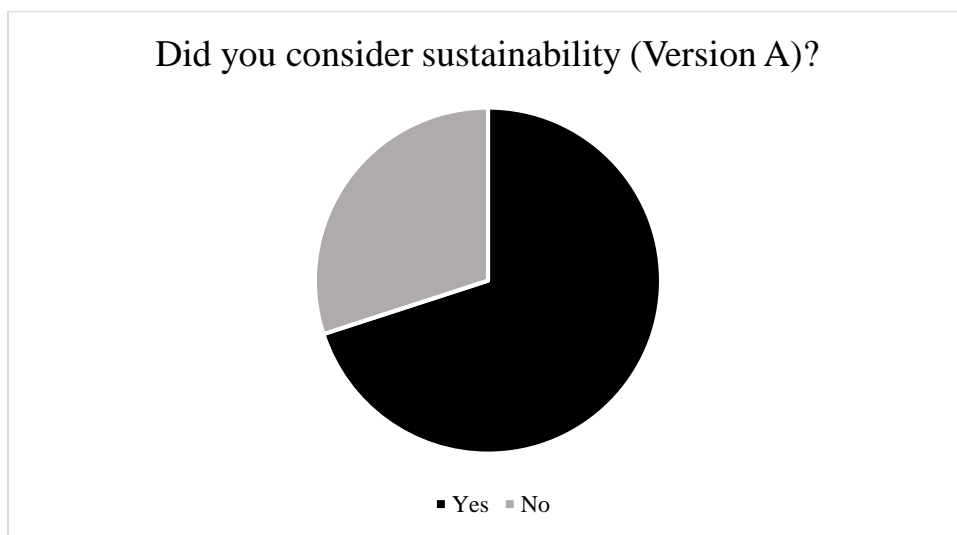the results for Version C, and Figure 10 shows the results for Version D.

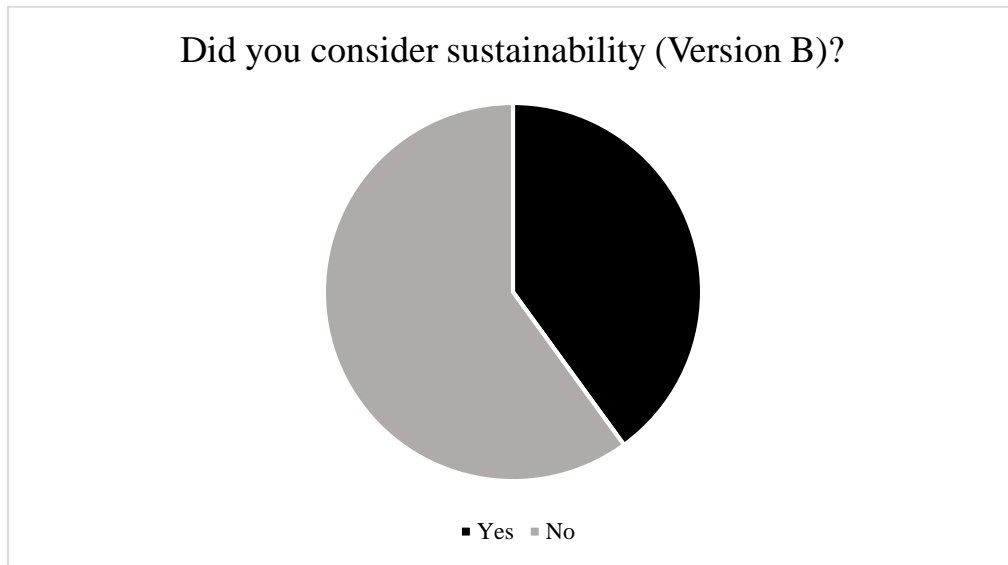**Figure 7. Responses to Question #2 Version A**

Did you consider sustainability (Version B)?

■ Yes ■ No

Figure 8. Responses to Question #2 Version B

Did you consider sustainability (Version C)?

■ Yes ■ No
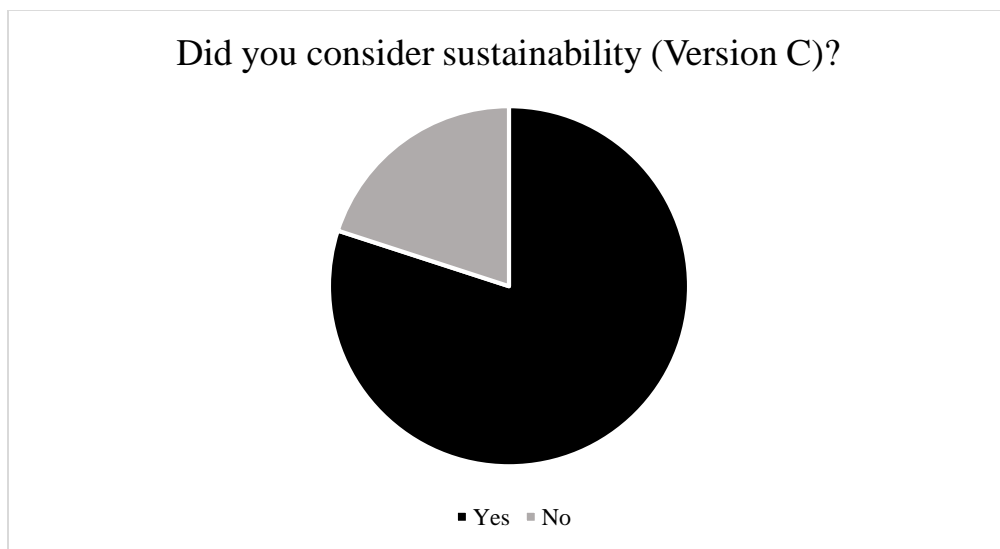
Figure 9. Responses to Question #2 Version C

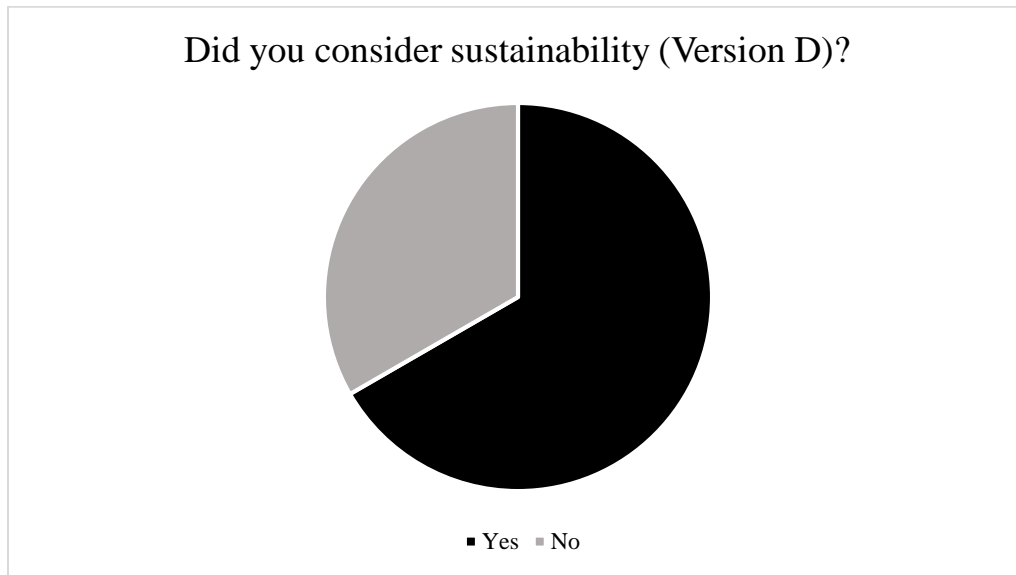Did you consider sustainability (Version D)?

■ Yes   ■ No

Figure 10. Responses to Question #2 Version D

With the exception of Version B, the majority of students in each version replied that they did take the sustainability rating into consideration when valuing the IPO. Figure 11 shows the total of all the participant's responses to Question #2. Overall, 64% of participants reported that they considered the sustainability information, while 36% reported that they did not.
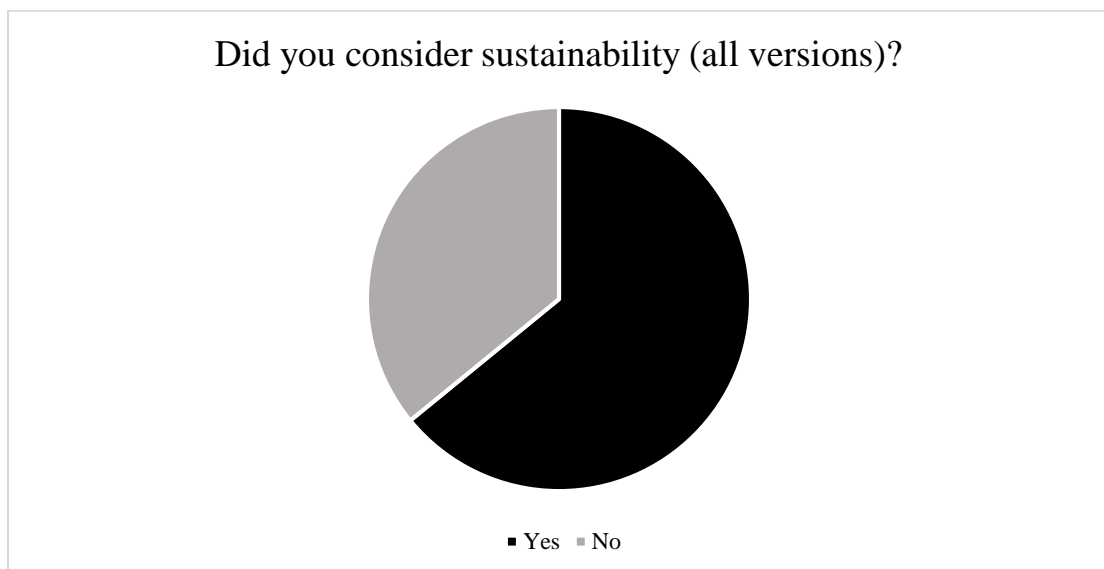

Did you consider sustainability (all versions)?

■ Yes   ■ No

Figure 11. Responses to Question #2 All Versions

Next, the participants' responses to Question #2 were compared to the actual results of the study. The purpose of this comparison was to back-up the assumption that the variations in responses are due to the differences in sustainability ratings. On average, participants who said they took sustainability into consideration valued the IPO higher for versions with a high sustainability rating (Versions A and D). On the other hand, participants who said they took sustainability into consideration valued the IPO lower for versions with a low sustainability rating (Versions B and C). Figure 12 demonstrates this trend in the data.
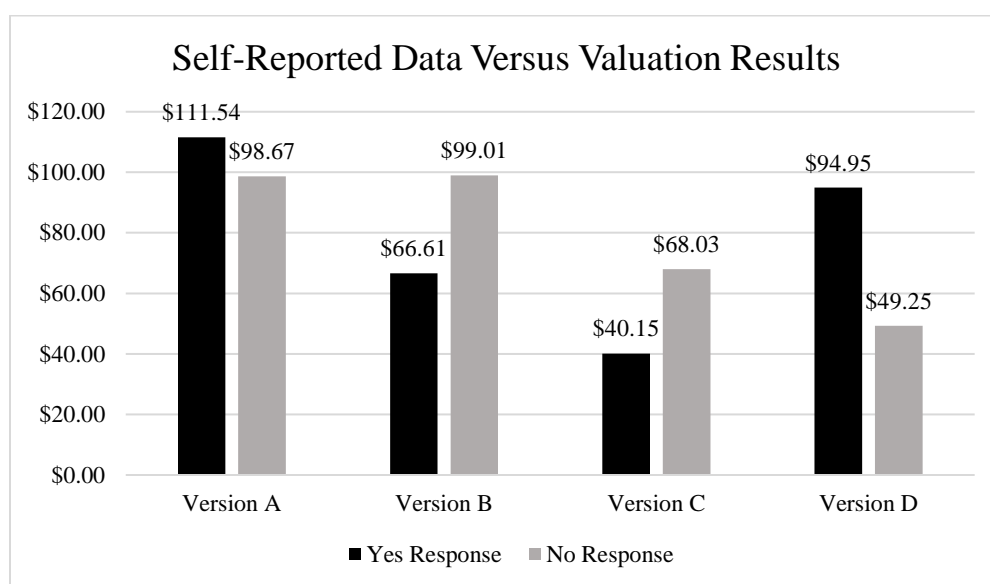

Figure 12. Self-Reported Data Versus Valuation Results

Chapter 6

Conclusions

The goal of this study was to determine how student investors view environmental sustainability and whether they consider it in their decision when putting a monetary value on a stock. Through a fabricated scenario and a follow-up survey, the study collected information on the type of information investors in the Nittany Lion Fund consider when valuing an IPO. The results of the study provide a basis for several conclusions about students' values of environmental sustainability to be made.

The study results indicate that a majority of students made their valuation using both the financial information and the sustainability rating. This conclusion is based off both the self-reported results in the follow-up survey and the results of the study. The follow-up survey revealed that 64% of participants claimed to take the sustainability rating into consideration. The results of comparing the mean valuation of a version with high sustainability with the mean valuation of a version with low sustainability and the same financial information reveal the same conclusion that student investors are positively influenced by high sustainability and negatively influenced by low sustainability. The results of this test are only significant for the versions with lower than average financial performance. This suggests that student investors care more about environmental sustainability when the company is not producing very attractive financial results rather than if a company is performing very well.

The results of the study when consolidated to include only experienced investors are not as conclusive regarding significance, although the results do demonstrate the same general

trends. For the comparison of means in the pairs of versions, the results are significant when the means of the versions with good financial information were compared. This is the opposite result of the test when performed across the entire data set. This implies that students with more experience are taught to care about environmental sustainability even if a company is already performing well financially. It is important to note though that the reason for the difference in significance when the test was performed only on more experienced investors may be correlated with the smaller sample size.

This study came about as a response to the many unanswered questions in the field of sustainable reporting. The results may help to uncover some of the unknown trends of student investors who, upon entering their careers, will be the real beneficiaries of the transparency that accurate sustainability reporting provides. When developing the standards for these reports, their opinions and preferences are the ones we should be seeking out. Since the results lay the groundwork for the conclusion that student investors care about environmental sustainability, they should, therefore, be given access to accurate and standardized reports that detail this type of non-financial information. While this study lays a foundation for proving that student investors care about environmental sustainability, it can be expanded upon by creating a more realistic fabricated scenario that will test what variables the participants take into consideration.

Appendix A

Consent Guidance for Exempt Research

<u>Consent for Exempt Research</u>
The Pennsylvania State University

Title of Project: *Cecelia Minnick's Honors Thesis*

Principal Investigator: *Cecelia Minnick*

Telephone Number: ███████████

Faculty Advisor: *Sam Bonsall*

Faculty Advisor Telephone Number: ███████████

You are being invited to volunteer to participate in a research study. This summary explains information about this research.

- The purpose of this study is to provide data for an honors thesis
- Subjects will be provided with a directions sheet and a set of financials. They will be asked to use the materials to value the stock.
- As part of the research, we may mislead you or we may not tell you everything about the purpose of the research or research procedures. At the conclusion of the study, we will provide you with further information.
- No records identifying the subject will be maintained.
- Information collected in this project may be shared with other researchers, but we will not share any information that could identify you.

If you have questions, complaints, or concerns about the research, you should contact Cecelia Minnick at ███████████ or Professor Sam Bonsall. If you have questions regarding your rights as a research subject or concerns regarding your privacy, you may contact the Office for Research Protections at 814-865-1775.

Your participation is voluntary, and you may decide to stop at any time. You do not have to answer any questions that you do not want to answer.

Your participation implies your voluntary consent to participate in the research.

Appendix B

Version A Data Collection Sheet

Form _____

Dear Participant,

You have been asked to value an energy company's IPO given the following information. Please use the typical process you would follow for a very simple relative valuation. Keep in mind that some of the information has been omitted or consolidated for the sake of the study; however, treat all information as if there is supplementary proof to ensure its accuracy and perform the valuation to the best of your ability. After completing and turning your valuation in to the researcher, you will be asked to complete a short follow-up survey.

The IPO you are asked to price is forecasted to produce Earnings Per Share of $6.14. This forecast was made before the sustainability report was rated*. After bringing in an expert, it was determined that this company is rated 98/100 for environmental sustainability, which is very high in relation to the rest of its industry. The following are 3 comparable energy companies to the IPO, which have average Earnings Per Share of $5.14 (assume the number of shares outstanding is relatively constant between the IPO and the companies so any change in Earnings Per Share is due to a change in earnings):

	PE Ratio	Sustainability Report Rating*
Company 1	19.98	49
Company 2	11.66	45
Company 3	16.58	56

* This rating is out of 100 points and values the level of environmentally sustainable performance. For example, a rating of 50/100 means that the company is engaging in average sustainable practices with regards to the environment according to its sustainability report. The rating is performed by an expert on sustainable practices for the energy industry.

Valuation of company's stock: $_____

Appendix C

Version B Data Collection Sheet

Form _____

Dear Participant,

You have been asked to value an energy company's IPO given the following information. Please use the typical process you would follow for a very simple relative valuation. Keep in mind that some of the information has been omitted or consolidated for the sake of the study; however, treat all information as if there is supplementary proof to ensure its accuracy and perform the valuation to the best of your ability. After completing and turning your valuation in to the researcher, you will be asked to complete a short follow-up survey.

The IPO you are asked to price is forecasted to produce Earnings Per Share of $6.14. This forecast was made before the sustainability report was rated*. After bringing in an expert, it was determined that this company is rated 2/100 for environmental sustainability, which is very low in relation to the rest of its industry. The following are 3 comparable energy companies to the IPO, which have average Earnings Per Share of $5.14 (assume the number of shares outstanding is relatively constant between the IPO and the companies so any change in Earnings Per Share is due to a change in earnings):

	PE Ratio	Sustainability Report Rating*
Company 1	19.98	49
Company 2	11.66	45
Company 3	16.58	56

* This rating is out of 100 points and values the level of environmentally sustainable performance. For example, a rating of 50/100 means that the company is engaging in average sustainable practices with regards to the environment according to its sustainability report. The rating is performed by an expert on sustainable practices for the energy industry.

Valuation of company's stock: $_____

Appendix D

Version C Data Collection Sheet

Form _____

Dear Participant,

You have been asked to value an energy company's IPO given the following information. Please use the typical process you would follow for a very simple relative valuation. Keep in mind that some of the information has been omitted or consolidated for the sake of the study; however, treat all information as if there is supplementary proof to ensure its accuracy and perform the valuation to the best of your ability. After completing and turning your valuation in to the researcher, you will be asked to complete a short follow-up survey.

The IPO you are asked to price is forecasted to produce Earnings Per Share of $4.14. This forecast was made before the sustainability report was rated*. After bringing in an expert, it was determined that this company is rated 2/100 for environmental sustainability, which is very low in relation to the rest of its industry. The following are 3 comparable energy companies to the IPO, which have average Earnings Per Share of $5.14 (assume the number of shares outstanding is relatively constant between the IPO and the companies so any change in Earnings Per Share is due to a change in earnings):

	PE Ratio	Sustainability Report Rating*
Company 1	19.98	49
Company 2	11.66	45
Company 3	16.58	56

*This rating is out of 100 points and values the level of environmentally sustainable performance. For example, a rating of 50/100 means that the company is engaging in average sustainable practices with regards to the environment according to its sustainability report. The rating is performed by an expert on sustainable practices for the energy industry.

Valuation of company's stock: $_____

Appendix E

Version D Data Collection Sheet

Form _____

Dear Participant,

You have been asked to value an energy company's IPO given the following information. Please use the typical process you would follow for a very simple relative valuation. Keep in mind that some of the information has been omitted or consolidated for the sake of the study; however, treat all information as if there is supplementary proof to ensure its accuracy and perform the valuation to the best of your ability. After completing and turning your valuation in to the researcher, you will be asked to complete a short follow-up survey.

The IPO you are asked to price is forecasted to produce Earnings Per Share of $4.14. This forecast was made before the sustainability report was rated*. After bringing in an expert, it was determined that this company is rated 98/100 for environmental sustainability, which is very high in relation to the rest of its industry. The following are 3 comparable energy companies to the IPO, which have average Earnings Per Share of $5.14 (assume the number of shares outstanding is relatively constant between the IPO and the companies so any change in Earnings Per Share is due to a change in earnings):

	PE Ratio	Sustainability Report Rating*
Company 1	19.98	49
Company 2	11.66	45
Company 3	16.58	56

* This rating is out of 100 points and values the level of environmentally sustainable performance. For example, a rating of 50/100 means that the company is engaging in average sustainable practices with regards to the environment according to its sustainability report. The rating is performed by an expert on sustainable practices for the energy industry.

Valuation of company's stock: $_____

Appendix F

Follow-Up Survey

Dear Participant,

Thank you for participating in this research study. For disclosure purposes, the purpose of this study was to determine the amount of value student investors place on sustainability information. As a follow-up to the valuation you completed, please provide responses to the following questions.

1. Please list and rank the factors you took into consideration when making your valuation (1- this factor had the most influence).

2. Did you consider the sustainability information provided? Why or why not?

3. If you answered yes to the question above, please explain how you incorporated the sustainability information into your calculation.

4. How many semesters have you been in The Fund (include this semester and count any summers as a semester)?

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ACADEMIC VITA
CECELIA MINNICK
ceceminnick@gmail.com

EDUCATION

The Pennsylvania State University | Schreyer Honors College University Park, PA
Smeal College of Business | Bachelor of Science in Accounting Graduation: May 2020
Minors in Information Systems Management and Legal Environment of Business

WORK & RELATED EXPERIENCE

Baker Tilly Lancaster, PA
Campus Ambassador *Aug 2019 – May 2020*
- Assist recruiters with networking events, such as career fairs, information sessions, and welcome receptions
- Network with business students to offer them a fellow student's perspective on a career with Baker Tilly while representing the firm and trying to recruit qualified candidates
- Convey innovative ideas for more effective recruiting at Penn State during bi-weekly calls with campus recruiters

Audit Intern *June 2019 – July 2019*
- Gained hands-on experience in the audit field to enhance my technical, analytical, and professional skills
- Developed and presented a pitch of a new accounting service or industry for Baker Tilly to invest in with a team of two other interns
- Received and accepted return offer as incoming audit associate in the Lancaster office for the fall of 2020

Summer Spotlight Program *June 12 – 13, 2018*
- Participated in a case competition with other attendees and was awarded first place by Baker Tilly professionals
- Networked with professionals to learn about the work public accountants do across various service lines
- Received and accepted return offer as incoming audit intern in the York office for the summer of 2019

Smeal College of Business University Park, PA
Teaching Assistant | Responsibility, Sustainability, and Ethics of Business *Jan 6, 2019 – May 2020*
- Manage a leadership, ethics, and sustainability class of 300 students to eliminate disruptions and create an environment that is conducive to learning
- Communicate further explanation of concepts and projects with students during office hours to position them for success and grade various papers and projects

National Football League Nashville, TN
NFL Draft Sustainability Ambassador *April 25-27, 2019*
- Engaged with event attendees regarding sustainability and encouraged them to recycle as part of the NFL Green Team's initiative
- Improved and further developed the waste disposal program by giving suggestions based on my experience

LEADERSHIP EXPERIENCE & ORGANIZATIONS

Penn State University Smeal Student Mentors University Park, PA
Mentor *March 2018 – May 2020*
- Selected from a group of applicants to represent Smeal College of Business by providing guidance to first year students consisting of academic advice as well as general information regarding adapting to Penn State life
- Organize events to help mentees get to know each other and to welcome them into the Penn State community

The Accounting Society University Park, PA
Active Member *Aug 2017 – May 2018*
- Gained knowledge and understanding of a career in accounting
- Developed career objectives by attending service and professional events such as networking receptions and corporate partner information sessions

HONORS, AWARDS, & SKILLS

- **Honors:** Schreyer Honors College, National Honor Society
- **Awards:** Pennsylvania Institute of Certified Public Accountants Merit Scholarship Award, Schreyer Honors College Academic Excellence Scholarship, Patrick and Stefanie Durbin Honors Scholarship, Dean's List 7/7
- **Skills:** Microsoft Suite, Google Suite, RapidMiner Studio, Tableau Software