provides us a further opportunity to discuss the conclusion of the accounting cycle and the updates needed in order for the accounts to be finalized. We summarize the cash transactions and update the cash balance, we update the

Exhibit 8. Completed Performance and Condition Ratios

Performance		
	Original	**Revised**
Profit Margin (NI/Sales)	3.25%	3.36%
Operating Margin (EBIT / Sales)	5.84%	6.08%
TIE (EBIT / Interest)	5.50	5.35
EBITDA Coverage (EBITDA / Interest)	9.09	8.78

Condition		
	Original	**Revised**
Debt Ratio (TL/TA)	73.14%	73.58%
Debt / Equity Ratio (TL/TE)	2.72	2.78
Current Ratio (CA/CL)	1.14	1.15
Quick Ratio (CA - Inv) / CL)	0.956	0.964
Cash Ratio (Cash / CL)	0.540	0.544
Equity Mulitiplier (TA / TE)	3.72	3.78

retained earnings account based on net income and our fixed payout ratio, and wrap up the tutorial by discussing the changes that have occurred from borrowing money and purchasing and operating the fixed asset for one accounting period.

Throughout the exposition, the application makes use of highlight colors to draw attention to changes in each account. At the end of the discussion, the statements are updated, and the original and revised figures are displayed in the ending income statement and balance sheet, and in the summaries of each category of financial ratios.

Exhibit 9. Completed Combined and DuPont Ratios

Performance and Condition		
	Original	**Revised**
ROE (Net Income / Total Equity)	15.37%	16.19%
ROA (Net Income / Total Assets)	4.13%	4.28%
Total Asset Turnover (Sales / TA)	1.27	1.27

Dupont Identify (ROE)		
	Original	**Revised**
Profit Margin (NI/Sales)	3.25%	3.36%
Total Asset Turnover (Sales / TA)	1.27	1.27
Equity Multiplier (TA / TE)	3.72	3.78
Return on Equity	15.37%	16.19%

Our experience with using this application suggests that students appreciate the view of the forest after studying the trees in their year of accounting principles courses. Since the manual processes for closing out an accounting period are essentially hidden with modern accounting packages, it is important to demonstrate that the transactions involved in managerial decisions have an eventual impact on the summaries of performance and condition. This understanding is helpful in developing competence in financial decision making.

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Stock Simulations: Game and Group Design to Reduce Risky Behavior and Enhance Learning

Nancy Lottridge Anderson

Stock simulations have been used at all levels of education to teach about the investment process. For college classes, a 15 week semester means the game will be limited to around 12 weeks. The short-term nature of the game may encourage risky behavior, but the educational component of the simulation may be worth the exposure to risk-taking in order to enhance learning through a hands-on experience. I design a simulation and construct various types of student groups. Through observations and a student questionnaire, I determine that simulation complements a traditional lecture. I also find that the design of the game and the design of student groups may reduce risky behavior and enhance learning.

INTRODUCTION

Hands-on or experiential learning through simulations, including but not limited to stock market simulations, are commonly used at all levels of education. When studying the impact of such simulations, Siegfried and Fels (1979) find a positive impact in seven key areas: cognitive achievement, student attitudes, retention, and the distribution of benefits between high and low-achieving students. Paden (1980) finds that students involved in simulations spent less time studying while performing better on exams. Joseph (1970) finds that the use of a simulation increases student interest in the course material. When surveying students on a particular game, he finds that 75% of students are more interested in the subject and 90% suggest that the simulation should become a permanent part of the curriculum.

Boehlje and Eidman (2001) point out that the effectiveness of simulations as teaching tools depends on the

integration of simulations with other teaching tools and may produce different results, depending on individual students. Prior to incorporating a simulation, the class consisted of classroom lectures, problem solving, and current events related to weekly topics. Students often ask questions about how to incorporate recently learned material in a practical setting. Many did not know how to open a brokerage account or place a trade. After learning about investing, students want to invest on their own but don't know how to proceed.

In addition, I found that many students struggled to understand derivatives and short selling. Although these concepts are covered in class, and students are assigned problems over these topics, students have no real understanding of the mechanics of investing.

As such, I decide to incorporate a stock simulation to supplement existing lectures. I design the simulation as a group activity. The cost of the online simulator is a factor, but group activities for graduate students are important preparation for team activities in a work setting. In designing the groups, I deliberately create a variety of group types to ascertain the optimal configuration. I design single gender, as well as mixed gender groups. Since international students represent a sizable component in our program, I can observe how different grouping strategies may provide ways to integrate these students more effectively.

Felton et.al. (2003) find some gender effects in investment decision-making. They find that males take more risk in their investment choices but believe this result may be due to a particular subset of males. They call these "optimistic" males and find unusual risk-taking among this group. Atkinson et.al. (2003) find no such gender difference among professional fund managers. Hamacher (2001) says that "The differences within each gender are actually greater than the differences between the genders" (Hamacher, p. 152).

In looking at the security selections of the individual groups, I watch for the tendency to limit choices based on nationality. Kho et.al. (2009) study home bias among U.S. investors over a ten year time period ending in 2004 and find a decline in this bias for foreign countries as a whole. Nieuwerburch and Veldkamp (2009) find access to information does not have an effect on home bias, but Lai and Xiao (2010) suggest this bias may dissipate as investors gain competence and experience. My question concerning group design is, "How do I create groups that offer the best opportunities for students to learn from each other and increase their knowledge of investing?"

SIMULATION

The online stock simulator, StockTrak, was used for the exercise. StockTrak is a virtual trading platform that allows for the trading of stocks, options, futures, bonds, mutual funds, and currencies. This company has conducted simulations for over twenty years and currently serves about 60,000 students per year. StockTrak accountholders may trade on over 20 global exchanges through this virtual platform. As the professor, I set the parameters of the game for my class by choosing initial account balances, types of securities, available exchanges, and the start and end dates of the game.

No security types were off-limits, but each position was limited to 10% of the entire portfolio. Trading could occur on the following exchanges: U.S., Toronto, Bombay, Hong Kong, Shanghai, Taiwan, and London. The choice of exchanges was related to the composition of the class.

StockTrak offers packages based on the number of weeks in the simulation. One may choose 7 weeks, 10 weeks, 12 weeks, 18 weeks, and 36 weeks. My class lasted 15 weeks, so I chose the 12 week package. This gave me time at the beginning of the semester to prepare students for the simulation and time at the end to conclude the exercise. The 12 week package allowed for 200 trades during the entire exercise. I opted to allow for day trading.

I divided the class into seven groups and assigned students to their groups. Three groups were all male. Two groups were all female, and two groups were mixed in gender. One of the mixed gender groups was all domestic students, and one was a combination of international and domestic students. The single gender groups were either all international or all domestic students.

Each group opened one account, starting with $1 million dollars for trading. Only two student names could be on each account. The cost per account for the 12 week session was $26.95. This nominal fee was paid by each group upon account registration and divided among the members. Students chose who would be listed on the account and who would have trading privileges. In some cases, these roles broke down during the semester.

Guidelines for the simulation are in Exhibit 1. While the exercise lasted 12 weeks, there were interim deadlines for various tasks. These deadlines corresponded to class lectures on each subject. The first task was for students to figure out how to open a brokerage account. They were given time in class to complete an online application. After the lecture on short-selling, they were required to have one short position in the account. An options trade was required after the lecture on options, and a futures contract position was required after a lecture on futures. By week eight, all groups had to be 80% invested and remain so until the end of the simulation.

Each week, we discussed their experiences and addressed problems. When students had problems with a trade or a price, they were required to contact StockTrak directly. I did not intervene but forced them to resolve those issues themselves. Not only did this relieve me of this burden, it was quite instructive for the students. They learned to pay close attention to their accounts and to be proactive when encountering problems.

Students practiced different types of trades by setting up market, limit and stop orders. They researched public companies and looked up stock symbols. Learning about an option or futures contract in class is one thing, but trading in these derivatives and trying to make money in this market brings that lecture to life. It is only when students experience these markets first-hand that they really begin to understand

these securities. Students also learned about the practical side of investing when attempting to place a trade after 3 pm Central Standard Time. Probably the most instructive trade was the short sale. Every group shorted Toyota after an announcement from the company about brake problems.

Each week, results were displayed in class, with groups ranked from highest to lowest in performance. In the interim, students may view current valuations for each group but cannot see individual positions or trades. Group members exchanged contact information, so that they could communicate during the week and conduct trading, as necessary. In addition, I allowed for time at the end of each class for groups to discuss security selections and strategy. At the end of the simulation, the winning group was determined by the highest absolute return. Finally, each group presented a paper at the end of the simulation detailing their experiences.

Students added to their knowledge base in investing, but they also learned more about the group process. Some groups functioned well, but others did not. The presentation at the end of the experience was important to the process. Students had to justify their investment choices and had to face their results. Doing so in front of their classmates was part of the learning experience.

SURVEY RESULTS

To measure effectiveness and perception of the simulation, I administered a survey. Exhibit 2 lists the questions in the Student Survey. To alleviate stress within groups, students completed a Peer Review. See Exhibit 3. I adjusted scores based on my observations and these Peer Reveiws.

I asked students about the overall benefit of the simulation. On a scale from one to ten, the students gave an average rank of 7.5 to the stock market game. The students rated simulation as helpful in this class. Eleven students, more than sixty percent of the class, had no previous experience investing. Of those with experience, six out of the seven had experience with stock investing, and only two had experience with options. Students' perception of the hands-on experience was positive. My observations confirmed this.

All groups engaged in short-term trading. Each account was allowed a total of 200 trades during the 12 week period. The winning group had 200 trades and reached this limit a few days before the end of the simulation. Average number of trades per group was 71. In most cases, students underestimated the number of trades and did not confirm this by checking the group account. No single group pursued a buy and hold strategy for the entire simulation, but some groups held individual issues for the entire 12 weeks.

Approximately two-thirds of the class pursued a strategy that was more aggressive than conservative. One of the questions on the questionnaire at the end of the semester concerned aggressive versus conservative investment. In my observations, I noted one group with an extremely risky profile. This group regularly traded in naked options. I had expected to see some tens (most aggressive investing) on this question but did not. Apparently, this group's members did not perceive their strategy to be as risky as I did. Interestingly, when asked if they would invest the same if this had been their personal money, about seventy percent said they would not.

Four of the seven groups were comprised of all international students. Two of these were all male, and two were all female. One international student was on a team with two U.S. students. Three female Nepali students were in one group together. Nepal lacks a well-defined financial market, and these students had a steeper learning curve. At the end of the simulation, the group members told me that they would have performed better if they had an American member in their group.

International students, as a whole, appeared to have a greater appreciation for investment opportunities outside the United States. In the group with a mix of American and international, the American students credited their international colleague with the international stock picks, recognizing the importance of her knowledge of other countries and cultures in the simulation.

In addition to accessing foreign exchanges, students could purchase ADRs. Groups with international students tended to buy individual stocks such as Baidu, China Mobile, Guangshen Railway, Sohu, Toyota Motors, New Oriental Education Technology, Home Inns, and Gushan Environmental. The two groups with only U.S. students tended to use exchange traded funds for their exposure to international markets, buying The Malaysia Fund, The South Korea Fund, and The Brazil Fund. Only one group with all U.S. students purchased an individual stock of a foreign country. That stock was Toyota Motors.

Three groups were comprised of all males, and two groups were comprised of all females. The groups that had problems with a domineering member were all male, and the groups that had problems with miscommunication were all male. These groups were also comprised of all international students. I noted no such problems within the all male group of U.S. students.

In observing the closing positions for each group, I note that the all male groups tended to hold larger positions in each security. While the simulation required trading in derivatives during the course of the twelve weeks, most groups simply fulfilled this requirement by trading once, then quickly unwinding that position. The two all male groups comprised of international students continued to trade derivatives in their portfolio beyond what was required.

The two groups with a mixture of male and female members placed in third and fourth for this simulation. While the third place team did not have the highest raw return, they had the highest risk-adjusted return, as measured by Sharpe's ratio. The ending positions for each displayed a more diverse security selection than the single gender groups. In addition, presentations at the end of the class by the mixed teams were, by far, the most polished and cohesive. My observation was that these mixed groups performed better as a group and produced above average results.

CONCLUSIONS

To supplement existing course materials, I incorporate a simulation for a graduate class and design student groups to determine an optimal investment team. During the activity, I observe student performance and behavior. In addition, students complete a questionnaire at the end of the simulation to measure perceptual benefits.

Students engaged in short-term trading throughout the process. The average trades per group was 70, with one group maximizing the allotted 200 trades. Some groups engaged in naked option writing, and diversification did not appear to be a consideration in security selection. The design of the game could be altered to limit the number of trades per account. StockTrak also allows the administrator to limit day trading on accounts. While short-term stock simulations encourage risky behavior, adjusting these design elements could reduce risk-taking. Per the survey results, students appear to recognize the difference in investor behavior in a simulation versus a real portfolio situation. They indicate they would be more conservative if they were investing their own money.

Ultimately, students perceived the simulation as beneficial to their understanding of the concepts in investing. From my observations, I could see that a hands-on simulation in conjunction with core lectures improved student knowledge and experience. Executing trades helped them understand the benefits of different trading strategies. Trading in derivatives markets through the simulation deepened their understanding of this type of security. Placing a short sale in an account resulted in an "aha" moment for many of my students. When students understood the mechanics of investing, I found they better understood the concepts we explored in class.

Lectures are still critical to the process. Preparatory lectures gave them enough information to venture into various types of securities and trading. Post lectures helped students process their activities and allowed me to fill in knowledge gaps. In other words, the simulation became a type of learning loop.

The mixed gender and mixed cultural groups produced above average results and performed better in the presentation. A mixed gender group may be the best approach in a simulation, and a mixed gender, mixed cultural group may be the best approach within an investment team. International students chose individual issues of companies with which they were familiar. They bought what they knew. U.S. students bought individual issues of U.S. companies and relied on exchange-traded funds for exposure to international markets. Different perspectives may assist students in learning about global investment options, and different genders may lead to a smoother process.

Despite the short-term nature of the simulation, students became educated about the investment process. In addition, I learned how to better use this tool in a classroom setting. Changing the design of the game may reduce risky behavior. Using a risk-adjusted measure of return will reduce risky behavior and encourage a more thoughtful process. Assigning particular investor profiles will encourage students to focus on a more conservative strategy. Placing students in a diverse group should help with the group process and the investment outcome and should expose them to a global perspective and reduce home bias.

The hands-on experience gained from a stock simulation outweighs the pitfalls. Instructors can modify the simulation to discourage risky behavior as much as possible but must understand that risky behavior cannot be completely eliminated. Designing mixed groups should improve the experience and the outcome. We might take comfort in knowing that students will probably be more conservative when it comes time to invest their own money. The opportunity to trade all types of securities and then experience the reward or disappointment of those choices is invaluable.

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Exhibit 1. Instructions given to graduate students on StockTrak stock market simulation game.

Overview:

You will be assigned to investment teams. By January 18, 2010, you will receive an e-mail with the team designations. An additional e-mail will be forwarded to you with links and instructions on setting up an account. Each team will have one account. The cost for the account is $26.95 and will be split evenly among the team members. You should be prepared to pay this when opening the account.

The simulation will run for 12 weeks. Class time will be allowed on January 25th for teams to meet and begin the process of opening an account. Only 2 student names will be allowed per account, even though the entire team may be 3 or 4 students.

Each account is funded with a $1 million dollar endowment. Your goal is to maximize the fund's investment. You may use any investment option available within the simulation: stocks, mutual funds, exchange traded funds, bonds, options, futures contracts, short-selling. There is more than one exchange for trading set up for this simulation.

There is a charge for each trade. You may trade online or by calling and placing broker-assisted trades. Broker-assisted trades are more expensive. It is the students' job to determine all costs associated with investing.

Although some class time will be allowed for team meetings, students should expect to spend time outside of class researching, discussing, decision-making, and trading. Each team will track their portfolios week-by-week. Weekly performance should be calculated. All trades during the week should be documented. The professor will be able to view all accounts and account activity and will use investment choices to assign case studies. The team should keep notes on each investment choice.

At the end of the class, each team will present their portfolio. Performance for the full 12-week period should be calculated using a time-weighted, geometrically-linked return. All trading costs incurred during the time period should be documented. A team paper will be turned in to the professor. In addition to the above, it must contain justification for each investment decision.

The grade for the simulation will NOT be based on the performance of the portfolio. Instead, the grade will be determined by the investment decision-making process. Can each trade be justified? Did the team apply sound financial theory? What about the overall risk of the portfolio during the 12-week period?

Below is a list of trading rules:

1. By January 25, 2010, your team should have registered for an account and be familiar with the website.
2. By January 29, the team should have placed at least one trade in the account. The first trade should be for a long position.
3. By February 5, the team should have at least one short position.
4. By February 5, the team should have at least one position in an options contract.
5. By February 12, the team should have at least one position in a futures contract.
6. By March 12, the team should have at least 80% of its assets "at risk " (i.e. invested in something other than cash). This condition must be met throughout the remainder of the trading period. Therefore, proceeds from security sales must be reinvested immediately.
7. All transactions must be well-motivated and may not be arbitrary. If positions cannot be justified to the professor, the team must liquidate.
8. The fund may not engage in insider trading or any illegal or unethical trading. The team must adhere to limits and rules set by Stock Trak.
9. Any trading errors are the responsibility of the team, not the broker. The team must resolve all conflicts or errors with the broker.
10. Please note that, because this is a simulation, there is a 20 minute lag in security pricing.

The objective of this exercise is to learn the mechanics of investing and to apply lessons from class. In your pursuit of good investment ideas, be wise, but not TOO careful. Look for healthy debate within the teams. This usually makes for good decisions. Have fun with the process! When all is said and done, you'll be glad to have this opportunity to do this with "play" money.

Exhibit 2. Survey given to graduate students on StockTrak stock market simulation game.

1. Have you ever invested in a security before this simulation?
2. If yes, what types of securities have you purchased before this simulation?
3. How many orders did you place during the simulation?
4. What percentage of your orders were market orders?
5. What percentage of your orders were limit orders?
6. What percentage of your orders were stop loss orders?
7. On a scale of one to ten, with one being the most conservative and ten being the most aggressive, rate the investment philosophy/strategy of the group.
8. On a scale of one to ten rate your personal investment philosophy/strategy.
9. The professor offered a point reward and a prize for the best performing portfolio. Did this cause you to be more aggressive in your selections?
10. At the beginning of the simulation, the professor indicated there would be a penalty for the poorest performing portfolio. When this penalty was removed, did you change your investment style/strategy? If so, did you become more aggressive?
11. Did being part of a group affect your investment choices? How?

12. Would you invest in the same way if this was your account and your money? What would be different?
13. Did you invest in exchanges other than the US?
14. If so, in which exchanges, besides the US, did you buy securities?
15. Are you an international student?
16. Are you a natural born US citizen?
17. If not, what is your nationality?
18. On a scale of one to ten, with one being the least and ten the most, rate how this simulation aided in your knowledge of investments.
19. On a scale of one to ten, with one being the least and ten the most, rate how this simulation aided in your knowledge of derivatives.
20. Case studies were assigned based on activity in group portfolios. On a scale of one to ten, with one being the least and ten the most, rate how the case studies aided in the simulation.
21. If this were an individual exercise, with each person investing their own portfolio, would the cost of the simulation be a problem?
22. Is there anything you would change about the simulation?

Exhibit 3. Peer Review given to graduate students on StockTrak stock market simulation game.

List all members in your group (include yourself). Complete a peer review sheet for each member other than yourself.

Member to be reviewed
_____
_____

1. On a scale of one to ten, rate the member's contribution to the exercise.
2. What percentage of the security selections were the idea of this member?
3. Did this member obstruct the simulation in any way? Explain.
4. Did the member do any of the trading in the account?
5. Did the member "take over" the simulation, ignoring the input of other members?
6. If the overall grade for your group was an "A," what grade would you award the member

Empirical Finance in R: An Introduction

Omid Sabbaghi

This article provides an introduction to the R statistical programming language with teaching applications in finance. R is a statistical software environment for data analysis and graphics. Specific applications presented in this study include the calculation of descriptive statistics for financial returns of 2 stocks and the S&P 500 Index. The R language is useful in today's finance classrooms because of its open-source coding environment, ease of learning, and high number of financial data analysis packages contributed by users worldwide.

INTRODUCTION

Empirical finance has attracted much attention in recent years. Modeling financial data and the empirical implementation of financial econometric models provide unique insights in regards to the behavior of securities and financial instruments trading in today's global markets. Research in finance continues to evolve rapidly and new results appear regularly. Importantly, financial time series is an empirical discipline and forms the foundation for making inference. The importance of econometric methods in finance has increased in recent years because of the increase in systematic data collection. That is, our financial markets provide a data-rich environment for the finance student. Thus, modeling financial returns requires knowledge of a programming language that is easy to use.

To date, there has been an absence of research focusing on alternative financial technology applications, thus providing the motivation for the present study. In today's finance classrooms, fewer than 1% of AACSB-accredited business schools offer a dedicated course in financial technology applications (Payne and Tanner 2011). Financial technology courses in business schools' finance curriculum are becoming increasingly important since increases in the availability of financial data and technology have increased the speed at which trades and investment decisions take place. Importantly, business graduates exhibiting a higher competency in technology applications will have a significant comparative advantage in career placement and future success (Truitt forthcoming).