

Research Article

Evaluation of Learning Outcomes from Participation in a Student-Managed Commodity Investment Fund

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Abstract

Students in agricultural and applied economics are expected to develop skills and knowledge allowing them to perform tasks in agribusinesses and related industries. Skills range from technical abilities in the discipline to soft skills, such as communication ability or leadership performance, which may be more broadly applicable. We present results of a survey of undergraduates and graduate students participating in a student-managed commodity investment fund. The fund provides an experiential learning opportunity for undergraduate students and allows them to learn about commodity markets (futures, options, and other derivatives) while simultaneously improving technical, communication, and leadership skills. Students consider soft skills to be an important factor determining their participation and improve both soft and hard skills through participation.

1 Introduction

Experiential learning is an increasingly prevalent method of teaching in agricultural economics as well as other disciplines. Experiential learning is a process—or philosophy—of learning where learners take experiences and transform them into knowledge. As noted by Kolb and Kolb (2005), experiential learning is not simply an experience provided to the learner, but a process by which the student experiences, reflects, thinks, and acts to gain new knowledge. Each of these concepts (experiencing, reflecting, thinking, and acting) is equally important in the philosophy of experiential learning and supports understanding and retention of material introduced through this approach. The appeal of experiential learning has continued to grow since being conceptualized by Kolb (2014). The importance of experiential learning as a core component of higher education and a supplement to classroom teaching is now widely recognized (Bransford, Brown, and Cocking 2000).

Many of the earliest formalized experiential learning opportunities in agricultural economics involved the use of games or computer simulations to recreate a real-world experience (Koontz et al. 1995b). More advanced experiential opportunities are now available to students including opportunities that marry all three missions of the land grant university (Curtis and Mahon 2010). These opportunities enhance student acquisition of the disciplinary and soft skills required of the well-rounded agricultural and applied economics graduate. Increasing numbers of agricultural graduates are employed outside the traditional agriculture sector (Artz, Kimle, and Orazem 2014). For instance, demand for graduates with a solid understanding of finance and agriculture has only grown with the development of new commodity-based investment instruments. Commercial and financial firms are an important source of employment for students with experience in risk management, commodities, and financial derivatives.

Risk management, commodities, and derivatives education are some of the most common areas of experiential learning in agricultural economics (Spencer and van Eynde 1986; Koontz et al. 1995a; Dolan and Stevens 2006; Dolan and Stevens 2010; Riley 2019). Often, course concepts are illustrated in a game format or through the use of a simulated portfolio (Trapp 1989; Koontz et al. 1995a). A natural

progression from investment and hedging simulators toward a more realistic environment is an investment fund. Unlike typical university courses or investing games, the student-managed investment fund (SMIF) provides students with real money that is invested according to rules set by the organization (Lawrence 1990). In this sense, a student-managed investment fund closely mimics the operations of an investment firm and provides an experiential learning activity that requires students to use and develop knowledge of commodity markets while improving the soft skills demanded by industry. Peng, Dukes, and Bremer (2009) indicate that the majority of SMIFs invest in equities. Even though investing in commodity markets is very different from investing in stocks in both approach and investment horizon, a recent study by Isengildina-Massa and Ramsey (2019) demonstrates that the SMIF provides an excellent model for incorporating experiential learning in agricultural and more general commodity price analysis programs. Student-managed commodity investment funds provide an environment for students to engage in all four stages of Kolb's (2007) experiential learning cycle as they participate in fund activities throughout the course of the semester.

In spite of widely recognized benefits for students, there has been little evaluation of student experiences and outcomes from participation in student-managed investment funds. One exception is Clinebell and Murphy (2016), who surveyed alumni of a student-managed investment fund and found evidence that participation in the fund improved student knowledge and soft skills. Alumni overwhelmingly reported that participation in the fund increased communication, writing, and presentation skills. Moreover, they reported that participation in the experiential learning opportunity increased their knowledge of investing concepts more than learning without the experiential component. Sixty-three percent of respondents to the survey were influenced in their choice of career by participation in the fund. In other studies, students have reported strong preferences for experiential learning over more passive approaches (Hawtrey 2007).

The goal of this study is to assess learning outcomes of students participating in a student-managed commodity investment fund. It builds directly on earlier work by Isengildina-Massa and Ramsey (2019), which describes the fund creation, procedural details of fund operation, and the costs and benefits of operating such funds. This article advances their earlier research by specifically examining student assessment of the benefits of fund participation. Outcomes are measured through self-assessed improvement in several areas related to this experiential learning program. We first review important factors determining student participation. Second, students consider a number of knowledge criteria and skills and rate their confidence in being able to perform related tasks. They also rate perceived improvement in task performance resulting from participation in the fund. We find that soft skills are important factors determining student participation and improve with participation. Possible improvements to fund operation to enhance soft and technical skill sets are also discussed.

2 Learning Outcomes, Student-Managed Commodity Investment Fund, and Outcome Survey

Our survey was designed to capture key learning outcomes associated with participation in a student-managed commodity investment fund described in more detail by Isengildina-Massa and Ramsey (2019), as well as student motivations for joining this fund. The key learning outcomes are specific areas of knowledge or skills that students can be expected to obtain due to their participation. The survey divided these outcomes into technical and soft skills. The outcomes identified in the survey are expected outcomes based on the structure and operation of the fund as detailed below.

The fund is composed of undergraduate and graduate students at all levels of study. The fund originally operated only as an extracurricular activity, but students participating in the fund now receive two hours of course credit per semester in a pass/fail format. In general, the majority of participants are undergraduate students (greater than 90 percent of all members). Although the fund is housed in an agricultural and applied economics department, students from all majors can apply to participate.

Students are recruited to the fund through a general recruitment effort that generally occurs in the fall semester of each year, but is also sometimes conducted in the spring as well. Acceptance to the fund is determined by a formal interview process provided that the candidate has a minimum grade point average of 3.0 and at least three semesters of study remaining. The interview process consists of submission of a resume, a technical interview, and a behavioral interview. In the most recent recruitment cycle, 159 students applied to the fund, and 30 students were admitted after formal interviews.

After training, students take the role of a commodity analyst and are responsible for a specific part of the fund's overall portfolio. To simplify operation of the fund, the portfolio is composed of exchange traded funds (ETFs) and exchange traded notes (ETNs), rather than futures contracts, that would require margins calls and the possibility of physical delivery. The students in this fund invest in a total of 15 commodities in three sectors. There are the agricultural commodities, such as cotton, corn, a livestock index, coffee, sugar, wheat, and soybeans; the energy commodities Brent crude oil, gasoline, natural gas, and U.S. oil; and the metal commodities copper, gold, nickel, aluminum, and silver.

Analyst performance is determined not on an absolute basis, but on performance relative to a benchmark fund: the Bloomberg Commodity Index in this instance. Students meet roughly twice a week to take part in activities related to the fund. These include training meetings—typically a lecture, outside speaker, or group activity—and the weekly trading meeting. Analysts on a commodity make a trade proposal at the trading meeting, and all fund members then vote on the proposed trade. The trading meeting aligns with the operation of real firms and provides the greatest opportunity for students to develop their soft skills.

If an analyst is submitting a trade at the trading meeting, the bulk of the work occurs before the trade proposal is presented. Analysts follow a template in constructing their proposal that includes information on the position they would like to take, analysis of market fundamentals, and potential exit strategies. In constructing the trade proposals, junior and senior analysts must work together in a team to arrive at a single proposal. During the proposal pitch itself, the analysts both present the proposal to the entire membership as well as defend their position. Whether the proposal is accepted depends on the quality of the analysis presented and the ability of the analysts to clearly communicate their position to the group at large.

In addition to the act of trading, students involved in the fund are also engaged in personnel management activities including the selection of fund management. Management take an active role in leading various aspects of the fund. All fund members are also involved in recruiting and interviewing potential members. Charlton, Earl, and Stevens (2015) report that a management position in a student-managed fund can be as important as trading activities, again highlighting the importance of soft skills gained through these learning opportunities. The acquisition of soft skills is an important element of many experiential learning opportunities (Marsh et al. 2016). Soft skills broadly encompass any interpersonal or behavioral skills that are not usually included in disciplinary or technical knowledge. Crawford et al. (2011) identify seven soft skill clusters including experiences, team skills, communication skills, leadership skills, decision-making skills, self-management skills, and professionalism skills. In a nationwide survey of 31 universities and 282 employers, they found that soft skills were ranked more important than discipline knowledge, technical skills, and technology skills by employers. Traditional lecture formats provide little opportunity for students to improve in these areas, but experiential learning tied to traditional coursework can result in significant improvement in students' ability to develop soft skills (Good, McIntyre, and Marchant 2013).

Even the most basic responsibility of a participating student—to place and evaluate trades—encompasses all aspects of an effective experiential learning experience. Students are placed in the new experience of making a trade using real money. They are then asked to reflect on their trade, whether successful or not, by reporting trade outcomes to the group and in regular performance reports. Students learn new concepts when their reflection gives way to new ideas or ways of thinking. And as their participation in the fund is ongoing, students then act on new ideas and knowledge. Thus, the student-

managed commodity investment fund provides experiential learning in various technical and soft skill areas by incorporating all four aspects of Kolb's (2014) experiential learning cycle.

We measure the outcomes from participating in the fund using the self-efficacy and improvement approach because measuring student performance in soft skill areas can be difficult. Moreover, attempting to set performance standards in these skill areas could ignore aspects of learning that students feel are important. Self-assessment requires students to reflect on their own outcomes and assists in monitoring progress, in addition to the information it provides to faculty (Walser 2009).

The outcomes were measured through a survey of 23 students administered at a routine trading meeting of the fund and with 100 percent participation rate. The survey was anonymous, and participants recorded demographic and educational information (such as major, graduation year, etc.) before proceeding to the second section. Participants were then presented with several possible factors influencing their decision to participate in the fund and asked to rate the relative importance of each factor. Students were then presented with a list of skills and asked to rate how confident they were in being able to complete the task and how the fund has improved their ability to complete the task. The tasks in the survey (and shown in Figures 4 and 5 presented later) are related to the expected student learning outcomes described above. Last, several open-ended questions about future careers paths were also recorded.

3 Results and Discussion

The sample includes students from nine different academic majors with varying levels of time spent in the group, from one to seven semesters. Only one fund member and survey participant at that time was a graduate student, eight students were seniors, nine were juniors, and five were sophomores. Freshmen had not been admitted to the fund at the time the survey was conducted. As shown in Figure 1, most students were from agricultural economics, business information technology, or finance backgrounds. Figure 2 shows the sample by semesters of participation. One student participated in the fund for seven semesters by transitioning directly into a graduate degree and continuing their involvement.

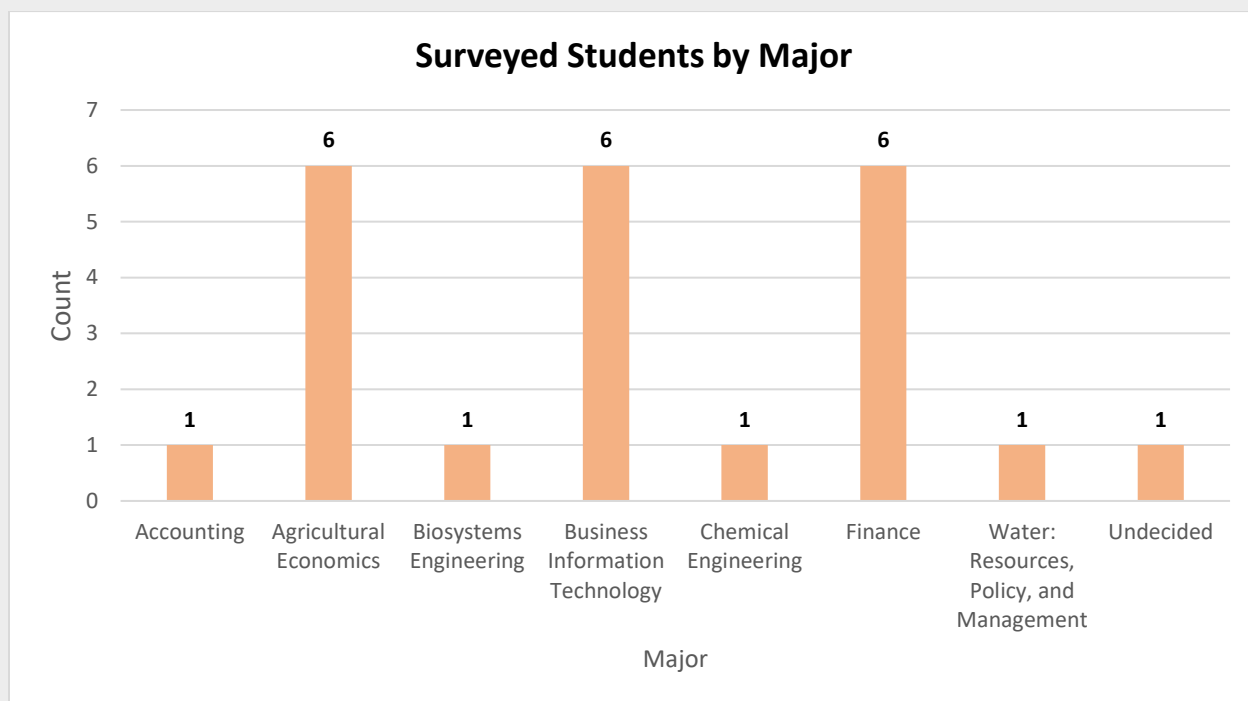


Figure 1. Surveyed Students by Major

Note: The agricultural economics category includes majors in agribusiness and applied economic management

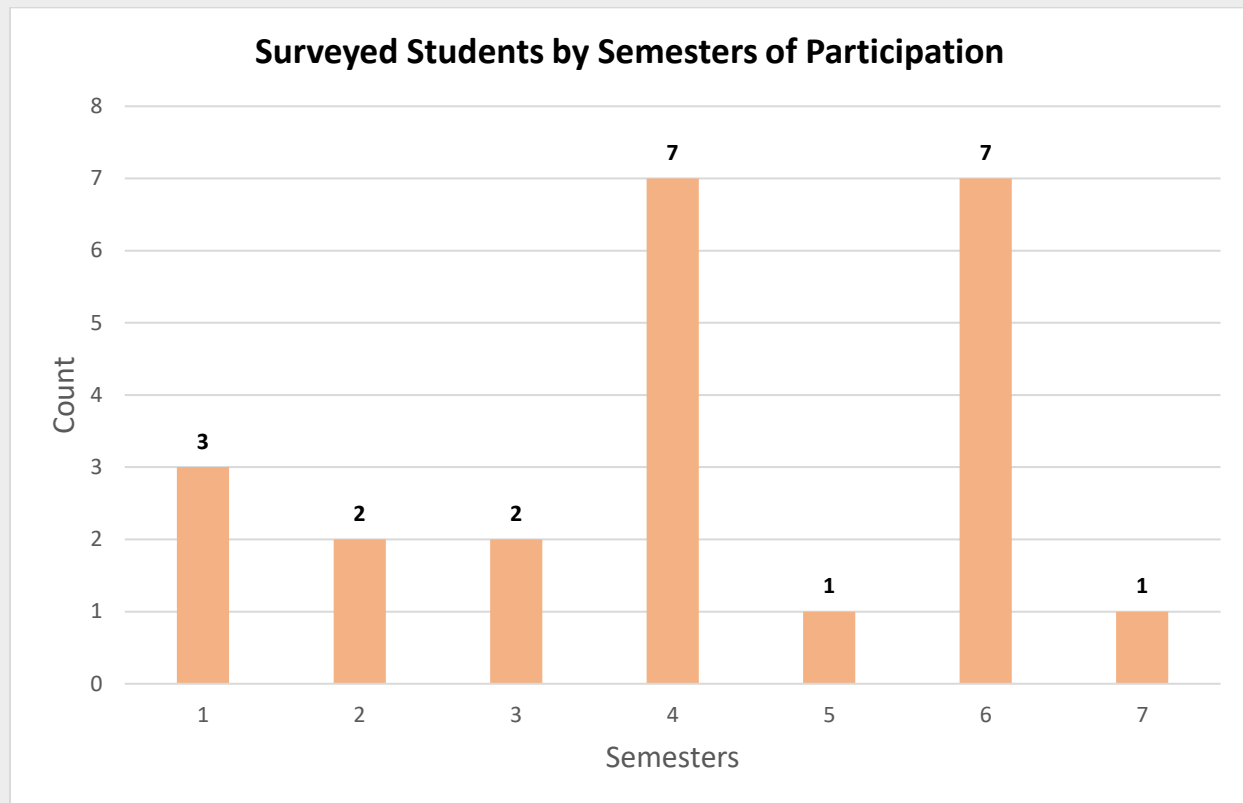


Figure 2. Surveyed Students by Semesters of Participation

3.1 Motivation

Students were first asked to rank 13 different possible factors motivating their participation in the fund. These ranged from employment and internship opportunities to the acquisition of technical skills and soft skills. Importance of the factors was measured using a Likert scale with students responding with either “Not Important,” “Somewhat Important,” or “Very Important.” The responses were assigned numerical values (1–3) and then ranked based on relative importance across the entire sample. While some of the factors are not related to skill acquisition, we categorize “knowledge of investment markets,” “software and/or data analysis training,” and “improved academic performance” as linking to technical skills and knowledge. We consider “public speaking” and “hands-on learning” to most closely link to soft skill acquisition.

As seen in Figure 3, the five most important factors in determining participation were “hands-on learning,” “knowledge of investment markets,” “employment/internship opportunities,” “professional development opportunities,” and “leadership opportunities.” The five least important factors, from least important to most important were “social opportunities,” “interdisciplinary membership,” “improved academic performance,” “the fund as a supplement to academic courses,” and “software/data analysis training.” In general, these results indicate a high amount of importance being placed on employment, soft skills, and opportunities that can boost employment prospects. Less weight is given to technical skills and links between fund participation and academic courses. Research has shown that soft skills can be an important predictor of future success (Heckman and Kautz 2012). Students may be viewing the fund as an avenue for acquiring such skills to complement traditional classroom education.

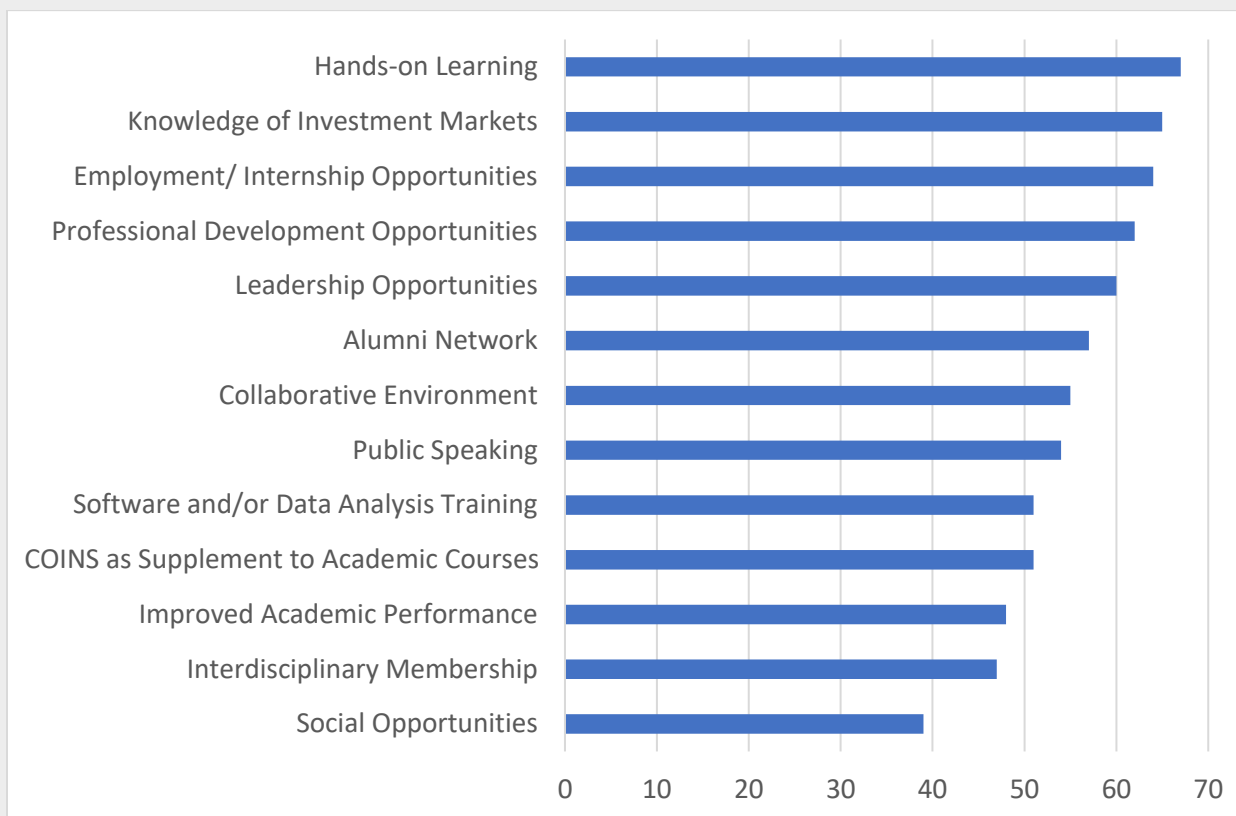


Figure 3. Importance of Different Factors in Determining Participation in a Student-Managed Commodity Investment Fund

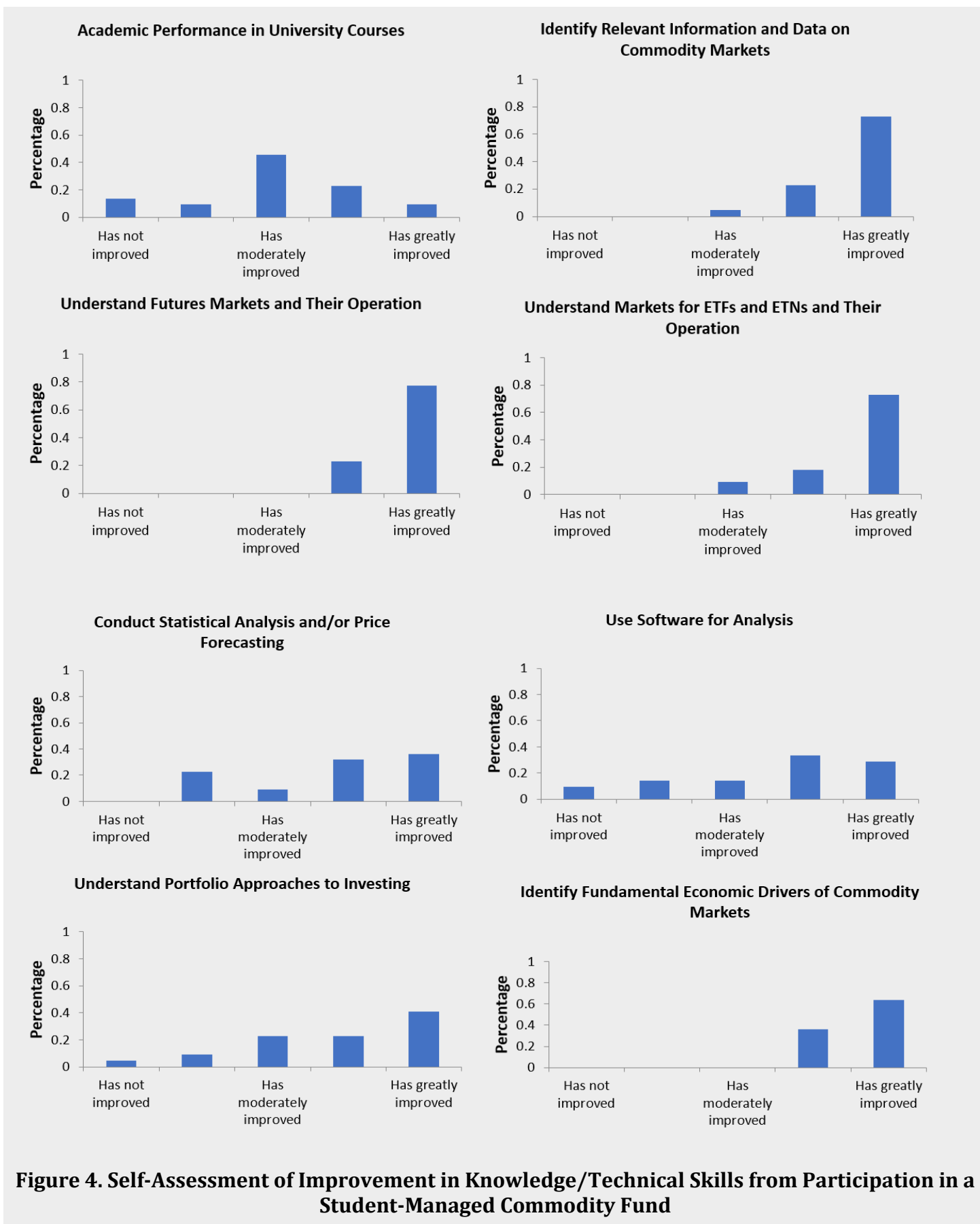
Note: Score is sum of individual member rankings using 3-level Likert scale. Maximum score is 69

3.2 Technical Skills

Students also completed a self-efficacy and improvement questionnaire, which included 11 items denoted as “Knowledge/Technical Skills,” 7 items denoted as “Communication Skills,” and 5 items denoted as “Leadership Skills.” Efficacy and improvement were both assessed using a 5-point Likert scale. In the case of self-efficacy, 1 corresponded to “Cannot do at all,” 3 to “Moderately can do,” and 5 to “Highly certain can do.” For improvement, the scale was 1 meaning “Has not improved,” 3 indicating “Has moderately improved,” and 5 indicating “Has greatly improved.”

Figures 4 and 5 show students’ self-assessment of improvement in 8 knowledge/technical skills and 8 communication/leadership skills. The figures show that the greatest improvement was in what might broadly be termed commodity market knowledge. That is, 100 percent of the sample reported at least moderate improvement in understanding mechanics of futures, options, ETF, and ETN markets. This includes the fundamental economic analysis that market participants use to guide their investment decisions. Fewer students reported strong improvement in understanding portfolio approaches to investing.

Students found less improvement in their ability to use statistical software, complete statistical analyses, or conduct price forecasting. This may not be surprising given that, while students in the fund are encouraged to include data-driven analyses in trade proposals, this is not a requirement. At the time this survey was conducted, training of junior analysts did not include structured training in software or statistical analysis. However, a new online course now accompanies new member training with modules



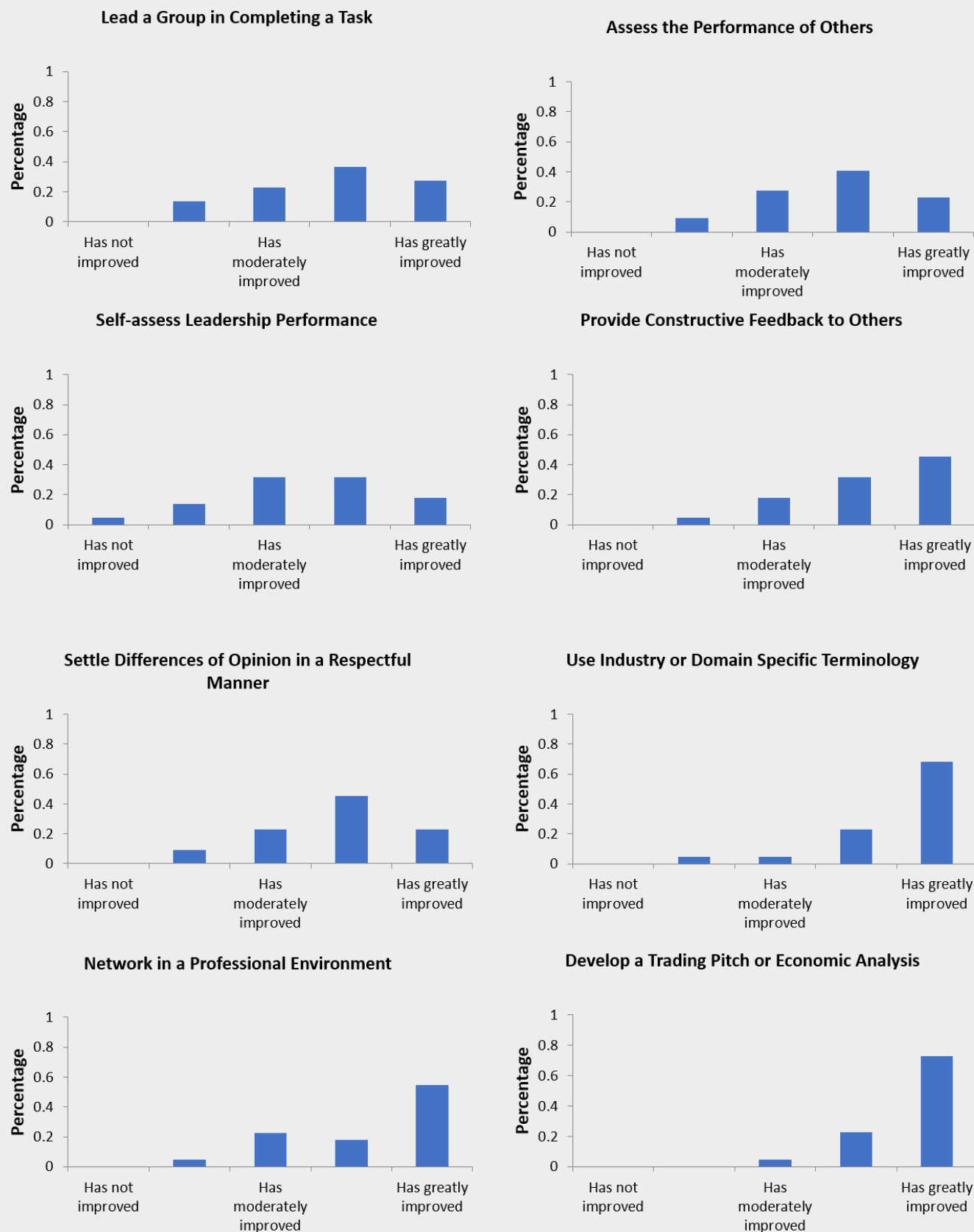


Figure 5: Self-Assessment of Improvement in Communication and Leadership Skills from Participation in a Student-Managed Commodity Fund

in these areas. Successive implementations of this survey may provide evidence that structured software and price analysis modules result in improved efficacy.

3.3 Soft Skills

In terms of communication and leadership, the most improvement was in the use of domain-specific terminology and development of a trading pitch. These skills are necessary to function in a professional finance environment. Fewer members felt that they improved in leadership performance and leading a group. While all members of the group have a hand in selecting leadership, only a few members of the group will be in leadership roles. However, as members advance through the group, they generally take on at least one leadership role as senior analyst for a commodity. Two out of three students that gave a 2 on improvement in leading a group had been in the group for two semesters or less.

3.4 Heterogeneity in Self-Assessed Improvement

We also examine whether there are any clear differences in student self-assessed improvement by major. There are three majors represented in sufficient amounts in the sample to justify exposition: finance, agricultural economics, and business information technology. Average scores for self-assessed improvement are shown in Table 1. Improvement in most knowledge/technical skills is largest for finance majors. In comparison, agricultural economics majors generally report the least improvement. Although, we cannot make any definitive statements about the causes of these differences, we hypothesize that agricultural economics majors may have more familiarity with, and understanding of, commodity markets compared with their peers in business-related majors, which typically focus on corporate finance or equities and bonds as investment instruments. Improvement in nonagricultural economics majors suggests that the student-managed commodity investment fund is a useful tool for bringing the benefits and strengths of the agricultural economics department to the wider student body.

3.5 Limitations

Given the limitations of the sample, the results of this survey provide some evidence that the student-managed commodity investment fund helps students improve a range of soft skills. Several improvements to fund operation have now been implemented and may result in improvement in both technical knowledge and skill acquisition. These include structured training programs in price analysis and basic statistics. Analysts are also required to give market updates at training meetings even if they don't have a trade proposal. This ensures that members speak in front of the entire membership at least biweekly.

We note that the results of this assessment only apply to students who actually apply and participate in a student-managed commodity investment fund. Because students participate in the fund voluntarily, we are cautious about making any general statements about outcomes because of issues of selection bias. Students applying for the fund may have a stronger drive for extracurricular enrichment. As well, students accepted into the fund may have stronger baseline technical and soft skills given that they successfully navigated the interview process. A logical next step in assessing the educational outcomes from the student-managed commodity investment fund is to establish a control group of students who did not enter the fund and provide more comprehensive measurement of skill improvement.

Table 1. Average Score for Self-Assessed Improvement in Knowledge/Technical Skills by Major

Question	Agricultural Economics	Finance	Business Information Technology
Academic Performance in University Courses	2.83	3.66	3.00
Identify Relevant Information and Data on Commodity Markets	4.33	5.00	4.83
Understand Futures Markets and Their Operation	4.83	5.00	4.66
Understand Markets for ETFs and ETNs and Their Operation	4.33	4.83	4.66
Conduct Statistical Analysis and Price Forecasting	3.83	3.83	4.17
Use Software for Analysis	3.16	4.16	3.66
Understand Portfolio Approaches for Investing	2.83	4.33	4.00
Identify Fundamental Economic Drivers of Commodity Markets	4.5	5.00	4.66

4 Conclusions

Graduates of agricultural and applied economics programs have a diverse skill set that allows them to work in a number of professions. Employers place emphasis not only on discipline-specific knowledge, but also on graduates' soft skills. While traditional academic coursework provides limited opportunities for developing such skills, experiential learning classes, such as student-managed investment funds are an excellent venue for gaining and applying such skills. Commodity-focused funds allow for creating such venues within a field of agricultural and applied economics.

The student-managed fund provides opportunities for students to experience the role of a fund manager. Properly structured, the fund also provides opportunities for students to reflect on their experiences, think about the experiences or conceptualize them abstractly, and then actively experiment. This reflection is analytical and rigorous, collaborative, and ultimately an important part of knowledge creation and skill acquisition. While classroom instruction can be designed to provide a similar environment, the student-managed fund offers a holistic approach for the incorporation of experiential learning in the agricultural economics curriculum.

Results of a survey of students participating in a student-managed commodity investment fund indicate that many students join the fund for a hands-on learning opportunity, to improve knowledge of commodity markets, and to improve employment opportunities. Students reported improvement from participation in the fund in both technical skills and almost all soft skills. Reported improvement was broadly consistent with student motivations for joining the fund. This is encouraging that, at least thus far, the benefits of the fund have aligned with student expectations. Moreover, the soft skills improved by participation are important criteria for employment.

Successive iterations of student surveys will allow for a more detailed examination of reported student improvement in the future. Furthermore, they will provide a larger sample from which statistical differences in student subpopulations can be determined. In addition to self-assessment of outcomes, pre- and post-tests could be developed to measure technical knowledge. Given that participation in the fund also involves management and leadership skills, peer evaluation is another avenue for future research. These improvements are left for later work.

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References

- Artz, G.M., K.L. Kimle, and P.F. Orazem. 2014. "Does the Jack of All Trades Hold the Winning Hand? Comparing the Role of Specialized versus General Skills in the Returns to an Agricultural Degree." *American Journal of Agricultural Economics* 96(1):193–212.
- Bransford, J.D., A.L. Brown, and R.R. Cocking. 2000. *How People Learn* (Vol. 11). Washington, DC: National Academy Press.
- Charlton, W.T., Jr., J. Earl II, and J.J. Stevens. 2015. "Expanding Management in Student Managed Investment Funds." *Journal of Financial Education* 41(2):1–23.
- Clinebell, J., and J. Murphy. 2016. "Student Managed Investment Funds: The Perspectives of Alumni." *Journal of Financial Education* 42(3):304–312.
- Crawford, P., S. Land, W. Fink, R. Dalton, and L. Fielditz. 2011. *Comparative Analysis of Soft Skills: What Is Most Important for New Graduates*. Washington, DC: Association of Public Land Grant Universities.
- Curtis, K., and J. Mahon. 2010. "Using Extension Fieldwork to Incorporate Experiential Learning into University Coursework." *Journal of Extension* 48(2):1–8.
- Dolan, R.C., and J.L. Stevens. 2006. "Business Conditions and Economic Analysis: An Experiential Learning Program for Economics Students." *The Journal of Economic Education* 37(4):395–405.
- Dolan, R.C., and J.L. Stevens. 2010. "Experiential Learning for Undergraduates in Economics and Finance: A True Top-Down Investment Fund." *Journal of Financial Education* 36(1):120–136.
- Good, D.J., C.M. McIntyre, and M.A. Marchant. 2013. "The USDA Scholars Program: Innovations in a Summer Undergraduate Research Program." *NACTA Journal* 3:62–70.
- Hawtrey, K. 2007. "Using Experiential Learning Techniques." *The Journal of Economic Education* 38(2):143–152.
- Heckman, J.J., and T. Kautz. 2012. "Hard Evidence on Soft Skills." *Labour Economics* 19(4): 451–464.
- Isengildina-Massa, O., and A.F. Ramsey. 2019. "Student-Managed Commodity Fund: A New Frontier in Experiential Learning." *Journal of Agricultural and Applied Economics*.
- Kolb, D. 2014. *Experiential Learning: Experience as the Source of Learning and Development*. FT Press.
- Kolb, D.A. 2007. *The Kolb Learning Style Inventory*. Boston, MA: Hay Resources Direct.
- Kolb, A., and D. Kolb. 2005. "Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education." *Academy of Management Learning and Education* 4(2):193–212.
- Koontz, S.R., D.S. Peel, J.N. Trapp, and C.E. Ward. 1995a. "Teaching Agricultural Economics with an Experiential Learning Tool: The 'Packer-Feeder Game.'" *NACTA Journal*: 23–28.
- Koontz, S.R., D.S. Peel, J.N. Trapp, and C.E. Ward. 1995b. "Augmenting Agricultural Economics and Agribusiness Education with Experiential Learning." *Review of Agricultural Economics*: 267–274.
- Lawrence, E.C. 1990. "Learning Portfolio Management by Experience: University Student Investment Funds." *The Financial Review* 25(1):165–173.
- Marsh, L. E., Hashem, F. M., Cotton, C. P., Allen, A. L., Min, B., Clarke, M., & Eivazi, F. (2016). Research internships: A useful experience for honing soft and disciplinary skills of agricultural majors. *NACTA Journal*, 60(4), 379–384.
- Peng, Z.J., W.P. Dukes, and R. Bremer. 2009. "Evidence on Student-Managed Funds: A Survey of U.S. Universities." *Business Education & Accreditation* 1:55–64.
- Riley, J.M. 2019. "Hedging with Futures: An Experiential Learning Game." *Applied Economics Teaching Resources* 1:1–8.
- Spencer, R.W., and D.F. Van Eynde. 1986. "Experiential Learning in Economics." *The Journal of Economic Education* 17(4):289–294.
- Trapp, J.N. 1989. "A Commodity Market Simulation Game for Teaching Market Risk Management." *Journal of Agricultural and Applied Economics* 21(1):139–147.

Walser, T.M. 2009. "An Action Research Study of Student Self-Assessment in Higher Education." *Innovative Higher Education* 34(5):299.

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