

**Cross-Hedging in the Classroom: Engaging Students in Developing Scholarly Extension**

**Output**

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**Online Supplementary Appendix**

**Table A1. List of Questions Included on the Pre-Test and Post-Test Used to Evaluate Students' Understanding of Linear Regression and Cross Hedging Prior to and after Participating in the Project.**

Topic	Question	Statement	Choices
Regression	1	Please match each of the terms below with their definition.	
	a	The variable the regression line predicts	a. Regression line
	b	A representation of the regression model	b. Residual
	c	The difference between an actual outcome value and the value predicted by the line	c. Coefficient
	d	Represents how much of the outcome the regression line explains	d. Outcome variable
	2	The following formula represents a regression line which uses the number of days a student spent studying ( $x$ ) to predict their score (%) on a Spanish test ( $y$ ): $y = 5x + 15$ . Please match the explanations with the numbers in the boxes by choosing each one.	
	a	The value of $y$ when $x$ is 0 (intercept)	a. 5 b. 15 c. 17
	b	Extra % scored on test with each day spent studying	
	c	The number of days of studying which the model predicts are necessary to score 100%	
	d	The expected exam score if the student did not spend any days studying	
	e	The slope of the regression line	
	3	Which of the following is a possible value of $R^2$ , which indicates the strongest linear relationship between two quantitative variables?	a. -90% b. 0% c. 80% d. 120%

Cross-hedging	4	Why is cross-hedging sometimes necessary?	<p>a. You lose as much from one market as you make in another market.</p> <p>b. It is difficult to determine the corn spot price.</p> <p>c. A futures contract does not exist for the commodity that you want to hedge.</p>
	5	What data do you need in order to decide whether and how to cross-hedge?	<p>a. Historical spot prices for the commodity that you grow.</p> <p>b. Historical basis values from the nearest 4 counties.</p> <p>c. Historical futures prices for the appropriate futures contracts.</p> <p>d. Hedge-to-arrive prices from the past 3 years.</p> <p>e. a) and b)</p> <p>f. a) and c)</p> <p>g. c) and d)</p>
	6	The hedge ratio is the ____ of a regression line obtained using changes in prices.	<p>a. intercept</p> <p>b. <math>R^2</math></p>
	7	The hedging effectiveness is the ____ of a regression line obtained using changes in prices.	<p>c. slope</p> <p>d. residual</p>

## *Student feedback*

1. What did you like about the project?

- *I enjoyed being able to do this project as a group because we all had different strengths and weaknesses that would have been much more difficult to do individually.*
- *I like that the project challenged us. Even though it was difficult it challenged us to really try to understand the materials.*
- *I liked the combination of two classes to work on the project. I also like the structure of having the Peterson report as a reference.*
- *I enjoyed understanding the material better there towards the end. I was able to work with some people that really put in effort, and others that didn't....*
- *I liked that it forced our group to come together and work and communicate to finish the project.*
- *I liked how this applied to the real world, and we could use real world examples to better understand both the futures and cash markets, as well as what we are learning is being applied to the real world.*
- *I liked getting to working with my teammates and getting to meet new people*
- *I liked that the project allowed us to go through the functional steps of working through a problem and proposal.*
- *Presented a practical way to use what we've learned.*
- *I liked that it involved two aspects: the Excel spreadsheet and the written analysis of those results. I was more involved in the written part, and found it fun to kindly debate with my teammates about which commodity was the best to cross-hedge with. Reading*

*Peterson's paper was my job, and I dove deep into it and guided the project to point to soybeans. All of the other group projects I have done in other classes were just Powerpoints, but I liked that this one was actually applying our knowledge and cooperative skills. I also liked that the teachers were helpful and more than happy to answer questions considering the project. It wasn't all or nothing; the teachers really wanted us to learn how to do it right.*

- *I thought it was really interesting how we were able to combine two classes for a project.*
- *It taught real life scenarios that can be used in real life.*
- *I liked that the project incorporated a lot of different aspects from what we learned in class. I also felt like this project was a useful real-world example.*

2. What could be improved for future semesters?

- *Having some members only be in prices or only in Quan did bring some difficulties in how to divide the work and the level of understanding*
- *I was the only student in both Quantitative Methods and Ag Prices in my group. So it was difficult for some of my group members to remember things from other classes they had taken in previous semesters. I heard a few other groups say the same thing.*
- *I think that there needs to be direction of how to represent what constitutes the best strategy if there is not a good hedge option.*
- *Mainly just making sure all the students involved have a good understanding of the material and what is required. We went through a long spell of being clueless as to what*

*to do. After speaking with the instructors, we understood a little better and was able to piece it all together*

- *I think the semester went pretty well considering all the Covid factors*
- *I think having in person classes will help, primarily for the communication between groups, and not waiting until the last minute to do the project.*
- *I don't think much can be improved the course challenged me to be better every day.*
- *Having the project based solely off of one class.*
- *More clearly outline expectations and due dates.*
- *A clarification for each question may be helpful. I remember needing more information for each question, as I felt that some of them were repetitive or copies of previous questions.*
- *There is not much that can be improved on the project itself.*
- *Idk, not much complaints but I did think it was really hard individually. I felt like it would've been better to be in a group for the project. [Comment from an MS student who had to complete the project individually.]*
- *Students in the future may not have this issue, but when I started at [University], quantitative methods wasn't required for our degree so I took something else. By not having the background knowledge in that class, it made it difficult for me to check the other students work because I didn't know much about a lot about what they were doing. This may be something to take into account in the future. Some students might hate me for saying this, but I honestly think a smaller student individual project would be a good idea. Our group was a little frustrating so I would've honestly found it easier to do on my own (and on my own time frame) instead of constantly asking people to pitch in.*