

MS Applied Economics

Assessment Report for AY 2020-2021

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Mission Statement

“The Master of Science in Applied Economics at the University of San Francisco will train students to apply the theoretical insights and empirical techniques of modern economics to practical problems in the business, government, and non-profit sectors. Students will learn how to use the tools of economically informed data analysis to grapple with the implications of the new markets and new information sources created by advances in information technology.”

Program Learning Outcomes

PLO-1: Economic Data Manipulation: Students will be able to effectively use modern programming languages to clean, organize, query, summarize, visualize, and model large volumes and varieties of data.

PLO-2: Economic Data Analytics: Students will possess a theoretical and applied understanding of the use of econometrics and statistics for descriptive and causal inference.

PLO-3: Applied Economic Theory: Students will be able to understand and apply economic theory to understand how businesses and other organizations interact with each other and with users/customers/clients and use this understanding to guide data analysis.

PLO-4: Economic Problem Solving: Students will be able to solve real-world data-driven business and policy problems working with economists, policy makers, data scientists and business practitioners.

PLO-5: Economic Communication: Students will be able to communicate their research approach and findings at an excellent level, both in writing and verbally.

Curricular Map

Course	PLO-1: Economic Data Manipulation: Students will be able to effectively use modern programming languages to clean, organize, query, summarize, visualize, and model large volumes and varieties of data.	PLO-2: Economic Data Analytics: Students will possess a theoretical and applied understanding of the use of econometrics and statistics for descriptive and causal inference.	PLO-3: Applied Economic Theory: Students will be able to understand and apply economic theory to understand how businesses and other organizations interact with each other and with users/customers/clients and use this understanding to guide data analysis.	PLO-4: Economic Problem Solving: Students will be able to solve real-world data-driven business and policy problems working with economists, policy makers, data scientists and business practitioners.	PLO-5: Economic Communication: Students will be able to communicate their research approach and findings at an excellent level, both in writing and verbally.
KEY	I = Introductory; D = Developing; M = Mastery	I = Introductory; D = Developing; M = Mastery	I = Introductory; D = Developing; M = Mastery	I = Introductory; D = Developing; M = Mastery	I = Introductory; D = Developing; M = Mastery
CORE COURSES					
ECON 601 Microeconomics: Theory & Appl			I		
ECON 611 Computation for Economic Analysis	I	I		I	I
ECON 615 Mathematics for Economists			I		
ECON 620 Graduate Econometrics	D	D			D
ECON 641 Micro for the Digitized Economy			D	D	D
ECON 692 Digital Economics Seminar	M	M	M	M	M
PC680 Graduate Program Writing					I
AEM ELECTIVES					
ECON 621 Data Science for Applied Economics	I	I		I	I
Econ 622 Machine Learning for Econ	D	D		D	
Econ 624 Fundamentals of Macro Data			I	I	I
ECON 625 Econometrics of Financial Markets	M	M		M	D
Econ 626 Experiments and Causal Inference	D	D		D	D
ECON 627 Applied Econometrics	M	M			D
ECON 628 Advanced Applied Econometrics	M	M			D
ECON 631 Data Visualization	D			D	D
Econ 640 Institutions Markets Platforms			I	I	D
ECON 663 Experimental Economics		D	M	M	D
ELECTIVES					
ECON 650 money, banking and financial institutions			M		
ECON 651 Monetary Economics			M		
ECON 655 Options and Futures			M	M	
ECON 656 Fixed Income and Derivatives			M	M	
ECON 665 Law and Economics			M		M
ECON 670 International Trade			M	D	D
ECON 691 Special Topics	D	D	D	D	D
ECON 696 Internship	M	M		M	
ECON 698 Directed Reading/Research	D	D	D	D	D
ECON 699 Thesis	M	M	M	M	M

Assessment Schedule

Year	PLO Assessed
AY 2017-18	Previous Program (MA Econ)
AY 2018-19	None (First Year of New Program)
AY 2019-20	Reflections Document
AY 2020-21	PLO 2
AY 2021-22 (Projected)	PLO 1

Description of Direct Assessment Methodology

The PLO being assessed is PLO2, relating to student mastery of econometric and statistical analysis of data. The course from which student work was derived for assessment is ECON 620 Econometrics, a required course for all students in the program taught remotely by Timothy Tung in Spring 2021.

A final exam question was devised specifically to assess student mastery of PLO2. The question is as follows:

MSAE Assessment Question

Goal: Students will possess a theoretical and applied understanding of the use of econometrics and statistics for descriptive and causal inference.

1. Using the wage1 data set, estimate the following regression model:

$$\text{wage} = B_0 + B_1 \text{educ} + B_2 \text{exper} + B_3 \text{tenure} + u$$

Where wage is average hourly earnings, educ is years of education, exper is years of experience, and tenure is the years with the current employer.

- a. **Estimate** this model using R and **interpret** the coefficients of your estimated model.
- b. Which of the independent variables in this model are **statistically significant** at the 5% level? Explain and show all work.
- c. What is the **highest level** of significance in which you could reject the null hypothesis that exper is **not** statistically significant? Explain and be clear.
- d. Determine if exper and tenure are **jointly** significant determinants of wage. Explain your process and be clear.
- e. Do you believe the estimates ascertained from this model may be **biased**? Why or why not?
- f. If a researcher desires a percentage change interpretation of the model's estimated coefficients, which **functional form transformation** should be used and why? Rewrite this regression model with the appropriate transformation.
- g. Suppose a researcher is interested in the impact of gender on the **return to education**. Explain how this researcher can implement a change to this model to produce this outcome.
- h. Is there evidence of heteroskedasticity? If so, what are the implications of this heteroskedasticity? (Hint: Use any of the 4 tests of heteroskedasticity discussed in class)

Rubric

The rubric applied breaks up the elements of the PLO being assessed into component parts, each of which is directly assessed using the associated element of the student work product (eight parts of the exam question). The requirement to achieve the given level (Introductory, Developing, Mastery) are clearly articulated within the rubric.

	<u>Introductory:</u> -Answers satisfy the core questions. However, deeper understanding and explanation of foundational concepts should occur. The level of course comprehension need to increase.	<u>Developing:</u> -Answers satisfy the core questions and expand on the applications of our course content. However, the overall depth and precision can be improved. Full mastery of the material has not occurred.	<u>Mastery:</u> -Students demonstrate 100% comprehension of all relevant topics. Answers are detailed, precise, and complete. Students are ready to apply knowledge in many future applications.
<u>Part a:</u> -Are estimates and regression output correctly produced? -Are the interpretations of the coefficients precise/well-developed?			
<u>Part b:</u> -Are T-stats, T-critical values, and T-tests correctly explained and interpreted?			
<u>Part c:</u> -Does the answer correctly identify and explain the relevance of p-values for this question?			
<u>Part d:</u> -Is the correct procedure for the F-test utilized and explained? -Is appropriate regression output included?			

<p><u>Part e:</u> -Do students correctly identify issues with endogeneity and/or omitted variables bias. -Is there a discussion of other potential violations?</p>			
<p><u>Part f:</u> -Is the appropriate log form used? -Is there an explanation of why this functional form should be utilized?</p>			
<p><u>Part g:</u> -Is the correct regression model with the correct slope dummy utilized? -Do students correctly identify the need for this type of dummy variable?</p>			
<p><u>Part h:</u> -Is an appropriate test of heteroskedasticity used? -Are the consequences of heteroskedasticity correctly explained?</p>			
<p><u>Overall</u></p>			

Results

The majority of students showed a developing or mastery level understanding of the elements of Economic Data Analysis based this direct evidence, whereas 25% showed an introductory level. The frequencies of overall levels are shown below:

Level	Number	Percent
Introductory	7	25%
Developing	13	46%
Mastery	8	29%

Conclusions and Closing the Loop

These results are basically satisfactory at this point. As this course is the first econometrics course students take, we do not expect mastery, however 25% at the introductory level is lower than we want. We will discuss further as a faculty what advice we can offer to Professor Tung and other future instructors to help more of the students get past that introductory level. We are also looking at tightening our admissions criteria to ensure that entering students have the background necessary to make the most of a course at this level.