Evidence of Teaching Effectiveness

Michael Kotrous, University of Georgia

1 Teaching Experience

I instructed a summer section of Principles of Macroeconomics that met Monday through Friday over five weeks. I anticipated that maintaining engagement during 2.5-hour meetings and returning grades and feedback promptly would be my primary challenges. To address them, I integrated "flipped" classroom activities to both break up my presentation of lecture material and provide immediate feedback on practice exercises. I also leveraged Macmillan's Achieve platform to design assignments that were integrated into the university's learning management software and provided grades immediately after completion. Although my first section had only 11 students, I purposefully designed course materials, assignments, and assessments to scale to principles courses with larger enrollments. This approach earned me excellent evaluations from my students, which are summarized in Section 2. The attached syllabus offers more information on the materials that I use and topics that I cover in my principles course.

My approach to instruction was informed by four years of experience as a teaching assistant for the graduate-level macroeconomic theory sequence taken by first-year Ph.D. students. I prepare materials that supplement the instructor's lectures and tailor my presentations to address errors that I see when grading problem sets or exams. My experience as a TA has also taught me the importance of making myself available to engage with students face-to-face in office hours and during weekly recitation sessions. My teaching reference, Roozbeh Hosseini, teaches the fall semester of the Ph.D. macroeconomic theory sequence each year.

My work as an instructor of record and teaching assistant has been recognized by my department and the University of Georgia Center for Teaching and Learning with awards that are enumerated in Section 3. My teaching experience during graduate school has ignited my passion for and informed my pedagogical approach to economics education. I believe these teaching experiences, in conjunction with my dissertation research, have prepared me well for teaching introductory and intermediate economic theory, as well as advanced electives in labor and industrial organization.

Table 1: Principles of Macroeconomics (Summer 2024) Student Evaluations

Statement	Ave. Rating[1]
The course was excellent.	**4.83**
The instructor was effective at teaching the subject matter.	**4.83**
The course was well organized.	4.83
The course objectives were clearly stated.	4.83
The instructor was available outside of class to answer questions.	4.83
The instructor stimulated student interest in the course material.	4.67
The instructor was enthusiastic about teaching this course.	4.83
The instructor was well prepared for class.	4.67
The instructor used class time effectively.	4.67
The instructor encouraged appropriate student participation in class.	4.83
The instructor presented ideas and concepts clearly.	4.67
The textbook, readings, and other materials were useful.	4.33
Assignments and activities were useful for helping me learn.	4.67
Homework, papers, and exams were returned within a reasonable period.	5.00
The exams were fair.	4.83
Feedback on graded homework and exams was valuable.	4.83
The course will be (or has been) of value to me.	4.67
I learned a lot in this course.	4.50
The course challenged me to think and learn.	4.67
I would take another course with this instructor if I had the chance.	4.83

[1] All responses are on a scale from 1 ("strongly disagree") to 5 ("strongly agree").

2 Course Evaluations & Selected Student Comments

Students who completed my Principles of Macroeconomics course were asked to complete an evaluation of the quality of the course and my instruction. Students respond to a series of statements on a scale from 1 ("strongly disagree") to 5 ("strongly agree"). A summary of the quantitative portion of the evaluation is shown in Table 1. The UGA Economics Department uses the bolded statements in the first two rows to evaluate the quality of the instructor. The other statements below offer more detailed evaluation of my in-class instruction, course materials, assignments, exams, and learning outcomes. Across all these categories, I scored well, receiving only 4's ("agree") or 5's ("strongly agree") in response to

most prompts. These responses indicate that students valued my organization, enthusiasm, and interactive approach, which I intend to maintain as I take on larger and more diverse principles sections.

Students also provided written responses to two questions when completing their course evaluations. I provide some representative responses among my principles students.

1. **Course as a whole: What was done well? How could it be improved?**

   - "I feel like the professor did a great job at having us actively participate with answering class questions to use as examples as well as giving us work in class which are great for study guides."

   - "Overall course was well organized and made having classes five days a week more manageable. Having practice assignments during class and homework assignments helped preparedness for midterm and final."

   - "The in-class notes were fantastic."

2. **Instructor: What was done well? How could the instructor improve?**

   - "He explained all chapters clearly and would answer any questions to the best of his knowledge and made sure you didn't leave without an answer."

   - "I liked the teachers slides they were really well organized."

   - "Michael Kotrous was extremely well-spoken. I could tell he genuinely had a vast understanding of the source material and wasn't just teaching out of the book. For someone's first time teaching a macroeconomics class, I believe he did a fantastic job, and I wish him the best!"

   - "He did great. I hope I can take some more classes with him."

3 Awards and Recognition

Swift Undergraduate Teaching Fellowship (2025): The John Munro Godfrey, Sr. Department of Economics honors graduate teaching assistants who have outstanding achievement in undergraduate economics teaching.

Outstanding Teaching Assistant Award (2025): The Office of Instruction and Center for Teaching and Learning at the University of Georgia recognizes superior teaching skills, as demonstrated through one's instructional work.

4　Teaching Reference

Roozbeh Hosseini
Associate Professor
John Munro Godfrey Sr. Department of Economics
University of Georgia
roozbeh@uga.edu

5　Attachments

1. Syllabus for Principles of Macroeconomics section taught in Summer 2024

2. Data Projects assigned during my Summer 2024 Principles of Macroeconomics section

ECON 2105: Principles of Macroeconomics
Summer 2024, May Session

Instructor: Michael Kotrous
Office: Amos Hall B458
Email: michael.kotrous@uga.edu **(Please begin subject line with "ECON 2105")**
Office Hours: Each class day, MTRF 1:30p.m. – 4:30p.m., W 2:00p.m. – 4:30p.m.

Class Meetings
Time: Monday–Friday, 9:30–12:00
Location: Ivester E101

Course Overview
Economists study how individuals and businesses make choices among alternative uses of scarce resources. This course introduces students to how markets align the interests of individuals and businesses to efficiently allocate the economy's scarce resources. Students will learn about supply, demand, and market equilibrium, as well as how economists study the welfare implications of government policies that alter market outcomes.

With the core tools of economic analysis at hand, students turn their attention to the subdiscipline of macroeconomics. Macroeconomists analyze the aggregate economic performance of nations. As macroeconomists do, the course separates the study of long-run economic growth from analysis of the short-run fluctuations of the business cycle. To engage in macroeconomics, students learn how macroeconomists measure key economic indicators like gross domestic product (GDP), inflation, and unemployment. Further, students learn about the key macroeconomic institutions in the U.S. and how to separately evaluate monetary and fiscal policy actions by applying the economic model of aggregate supply and aggregate demand.

Prerequisites: N/A

Course Materials
The textbook for this course is ***Modern Principles: Macroeconomics* (Sixth Edition) by Tyler Cowen and Alex Tabarrok**. An electronic version of this textbook is made available on the Achieve platform by MacMillan Learning.

Students must register an account and enroll in the course on the Achieve platform. We will use Achieve to access the textbook, other supplemental materials, and complete graded homework assignments. All materials and assignments on the Achieve platform are linked on eLC.

An Achieve license should be purchased as soon as possible. The first homework assignment is due on Thursday, May 16, and late homework submissions will not be accepted.

You should purchase an Achieve license directly from the publisher using the "Student Registration – Start Here" link in eLC. Detailed instructions are provided in eLC. You should **NOT** buy the textbook or Achieve license through the UGA bookstore. The bookstore only handles physical copies of the textbook, and purchasing from the bookstore will delay delivery of your access code.

When creating your Achieve account (or using an existing account), you **must** use your UGA MyID email (e.g., mk91537@uga.edu), not a pseudonymous email (e.g., michael.kotrous@uga.edu) or personal email (e.g., Gmail). Failure to use the correct email address (or enroll in the correct course) will result in technical difficulties linking your grades in eLC and Achieve.

Grading

Midterm Exam, May 22	20%
Final Exam, June 5	25%
Data Projects (2)	20% (10% each)
Homework (lowest score dropped)	25%
Participation (highest 11/14)	10%

Letter grades will be assigned according to the following minimum-grade thresholds.

A: 94   A-: 90   B+: 87   B: 84   B-: 80   C+: 77 C: 74   C-: 70   D: 60   F: 0

Final grades **will not be rounded**. Thus, a final grade of 93.99 will earn a letter grade of A-.

Exams
Two 90-minute, paper-based exams will be administered to assess your mastery of the application of economic theory and the empirical facts presented in this course. The midterm exam will be assessed during the normal class time on **Wednesday, May 22, 9:30 a.m.—11:00a.m. in Ivester E101**. The final exam will also be during the normal class time on **Wednesday, June 5, 9:30a.m.—11:00a.m. in Ivester E101**.

If you have a known scheduling conflict with either exam date, please notify the instructor as soon as possible.

Make-up exams can be scheduled for those who face a sudden illness or emergency on the day of the exam or participate in a pre-scheduled, university-sanctioned event (e.g., varsity athletics). Proper documentation of your illness, emergency, or scheduling conflict must be presented to the instructor before the make-up exam can be taken. If there are compelling privacy concerns for you to not disclose the cause of your absence to the instructor, you may coordinate with the office of Student Care and Outreach to provide such documentation.

Make-up exams will not be offered to students who miss an exam for reasons other than those stated above, and they will earn a zero on that exam.

Students with disabilities or who otherwise need accommodation to complete the exams must register with the Disability Resource Center (DRC) **prior to the exam**—accommodations cannot be applied retroactively, and I will not make accommodations for students who are not registered with the DRC. Accommodations may take several days to process, so I recommend contacting the DRC as soon as possible. See Accommodations for Disabilities in this syllabus for more information.

Data Projects
Economics is a social science, meaning that economic theory is tested scientifically using empirical observation and data. Further, an understanding of the macroeconomy requires learning key empirical facts that motivate economists, policymakers, and business leaders. Students will

complete 2 data projects during the semester. Completing these projects requires only the use of Microsoft Word and Excel, or Google Docs and Sheets, all of which can be accessed for free via the University.

Tentatively, the due dates for each project are 1) Friday, May 24 and 2) Tuesday, June 4. Each data project will be posted to eLC one week prior to its due date. **Late submissions will not be accepted.** Detailed instructions related to these projects will be provided during the course.

Homework
Homework in this course consists of 7 online assignments on the Achieve platform. Homework assignments will assess your understanding of the material covered in lecture and offer immediate feedback on your preparedness for the midterm and final exams.

Homework assignments generally will be due at 11:59p.m. on the class day **after** the in-class material is finished. For example, the in-class material for Gains from Trade is scheduled to be completed on Wednesday, May 15, so the corresponding homework will be due at 11:59p.m. on Thursday, May 16. **Late submissions will not be accepted.**

You are welcome to work with your classmates on the homework assignments, and you may refer to the textbook or other course materials while you complete these assignments.

I will drop the lowest score of the 7 homework assignments for each student. Scores on the top 6 graded homework assignments will be equally weighted when calculating your final course grade.

Participation
A participation grade will be recorded each class day (other than the dates of the midterm and final exam) on the following scale:

> 3pts. Satisfactorily completed the participation assignment.
> 2pts. Attempted the participation assignment.
> 0pts. Did not attempt the participation assignment.

Participation assignments will be announced each day and generally consist of an in-class activity that involves practicing the concepts discussed in that day's lecture. Thus, whether you earn 3 points or 0 points for a given day's participation assignment will largely be determined by whether you attended that day's class.

The aggregate participation grade will be calculated by dividing the sum of your top 11 participation scores by 33. There are 14 class meetings at which participation will be recorded, meaning the lowest 3 will be dropped when calculating your participation grade.

Attendance & Excused Absence Policy
Attendance is not required, but I emphasize the importance of attending every class that you can attend. In the May Session, missing one class is equivalent to missing an entire week of a Fall or Spring semester course.

There are no "excused" absences for non-exam class days. In practice, this means that I will not award participation credit or excuse an additional homework assignment if you must miss class due to an illness or emergency. The grading policies are defined such that you may miss up to three

classes for any reason and earn full credit for course participation. Further, your lowest homework score will be dropped when calculating your final course grade.

You are allowed to complete a make-up exam if you face a documented illness or emergency (or have a valid scheduling conflict) that prevents you from taking the exam during the allotted class time. See the section above about the grading policy for exams for more details.

If illness or an emergency may result in you missing more than three classes, please contact Student Care and Outreach using the information under UGA Well-Being Resources in this syllabus.

Academic Honesty
As a student at the University of Georgia, you have agreed to abide by the University's Student Honor Code: *"I will be academically honest in all of my academic work and will not tolerate academic dishonesty of others." A Culture of Honesty*, the University's policy, and procedures for handling cases of suspected dishonesty can be found at https://www.uga.edu/ovpi.

Accommodations for Disabilities
If you plan to request accommodation for a disability, please register with the Disability Resource Center. That office can be reached by visiting Clark Howell Hall, calling 706-542-8719 (voice) or 706-542-8778 (TTY), or by visiting https://drc.uga.edu.

UGA Well-Being Resources
UGA Well-being Resources promotes student success by cultivating a culture that supports a more active, healthy, and engaged student community. Anyone needing assistance is encouraged to contact Student Care & Outreach (SCO) in the Division of Student Affairs at 706-542-8479 or visit https://sco.uga.edu. Student Care & Outreach helps students navigate difficult circumstances by connecting them with the most appropriate resources or services. They also administer the Embark@UGA program which supports students experiencing, or who have experienced, homelessness, foster care, or housing insecurity.

UGA provides both clinical and non-clinical options to support student well-being and mental health, any time, any place. Whether on campus, or studying from home or abroad, UGA Well-being Resources are here to help.

- Well-being Resources: https://well-being.uga.edu
- Student Care and Outreach: https://sco.uga.edu
- University Health Center: https://healthcenter.uga.edu
- Counseling and Psychiatric Services: https://caps.uga.edu or CAPS 24/7 crisis support at 706-542-2273.
- Health Promotion/ Fontaine Center: https://healthpromotion.uga.edu
- Disability Resource Center and Testing Services: https://drc.uga.edu
- Additional information, including free digital well-being resources, can be accessed through the UGA app or by visiting https://well-being.uga.edu.

Disclaimer
The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary.

Tentative Course Schedule

Unit 1: Fundamentals of Microeconomics (May 14—17)

- Gains from Trade
- Supply and Demand
- Market Equilibrium and Welfare

Unit 2: Economic Growth (May 17—21)

- Gross Domestic Product: Definition and Measurement
- Economic Growth: Catching Up vs. Cutting Edge
- Saving, Investment, and the Financial System

Midterm Exam: Wednesday, May 22, 9:30a.m.—11:00a.m. in Ivester E101

Unit 3: The Business Cycle (May 23—30)

- Unemployment and Labor Force Participation
- Inflation and the Quantity Theory of Money
- Aggregate Demand and Supply

Class Cancelled: Monday, May 27 (Memorial Day)

Unit 4: U.S. Macroeconomic Institutions (May 31—June 4)

- The Federal Reserve and Monetary Policy
- The Federal Budget and Fiscal Policy

Final Exam: Wednesday, June 5, 9:30a.m.—11:00a.m. in Ivester E101

ECON 2105 – Principles of Macroeconomics
Data Project 1. GDP and Economic Growth
Due: Tuesday, May 28 at 11:59p.m.

Name: _____

Instructions: Read each question below and put your answers in the indicated space. Exercise 1 and Exercise 3 require use of data in the file "ECON2105_DataProject1.xlsx." For each exercise, there is a corresponding worksheet in the Excel workbook. In Exercise 2, you will gather data from the U.S. Bureau of Economic Analysis.

When submitting this assignment, you will upload two items to eLC:

1) A completed version of this document *as a PDF*, and
2) Your Excel file that "shows your work" in working with the data and creating each chart. I should be able to see all of your charts in the Excel file, as well as any columns of data that you needed to create to complete the assignment.

Grading: There are three exercises worth a total of100 points. The points allocated to each exercise are stated in the text below.

Exercise 1 (40 points)

Figure 6.1 in the textbook shows the *level* of India's Real GDP per capita between 1950 and 2019. In this exercise, you will analyze the *annual growth rate* in India's real GDP per capita. The data needed to do this exercise is provided in the worksheet "Exercise 1" in "ECON2105_DataProject1.xlsx."

1. Create a time series plot that shows the annual growth rate in India's real GDP per capita between 1951 and 2019. Follow these steps:
   a. Fill in the orange-shaded cells in column D of the Exercise 1 worksheet with values for the growth rate in India's real per capita GDP for each year between 1951 and 2019. (*Hint:* You will need to define a math formula that calculates the growth rate using values in column A.)
   b. Create a line graph using the data in columns B and C. This short video tutorial on how to make a line graph in Excel may be helpful.
   c. If you right-click your chart in Excel, you can select the option to "Save as picture." You can then insert an image of your chart below.

   [Insert your plot here]

2. What was the average annual growth rate in real GDP per capita in India between 1951 and 1990? (1 sentence)

   [Write answer here]

3. What was the average annual growth rate in real GDP per capita in India between 1991 and 2019? (1 sentence)

   [Write answer here]

4. Read this short article describing economic reforms that India adopted in 1991. In **3-5 sentences**, discuss how these institutional reforms contributed to the increase in the growth of India's standard of living since 1991. (You may find it helpful to review Section 7.3 of the textbook on Incentives and Institutions.)

   [Write answer here]

Exercise 2 (30 points)

The U.S. economy faced a sharp downturn in early 2020 at the onset of the Covid pandemic. The National Bureau of Economic Research (NBER) dates the Covid recession as beginning in the fourth quarter of 2019 (2019Q4) and ending after the second quarter of 2020 (2020Q2).

The U.S. Bureau of Economic Analysis (BEA) calculates U.S. GDP each quarter and year. In this exercise, you will gather BEA data to analyze the severity of the Covid recession. Instructions for how to fill the table are provided below.

Row	Series	2019Q4	2020Q2
1	Personal consumption expenditures		
2	Gross private domestic investment		3,145.2
3	Government consumption expenditures and gross investment		
4	Net exports of goods and services	-565.0	
5	Real Gross Domestic Product		
6	Growth Rate in Real GDP	--	
7	Growth Rate in Real GDP (annualized)	--	

Instructions for filling in the table:

- Fill in rows 1-5 by finding the appropriate data in the National Income and Product Accounts (NIPA) Data on the BEA website. These data can be sourced from Section 1 – Domestic Product and Income > Table 1.1.6 Real Gross Domestic Product, Chained Dollars. Click "Modify" above and to the right of the table and change "First Year" to "2019 A & Q." Check that "Scale" is set to Billions and Series is set to Quarters. Then click "Refresh Table" to load in the data that you need.
    - It is okay if row 5 does not *exactly* equal the sum of rows 1 through 4. Small discrepancies can occur due to minor errors in measuring the subcomponents of GDP.
- To complete row 6, compute the growth rate in real GDP between 2019Q4 and 2020Q2 using the growth rate formula.
    - The growth rate that you just calculated in row 6 tells you how much GDP changed over two quarters. Economists regularly "annualize" growth rates to make apples-to-apples comparison among different growth rates. *Annualized growth rates tell you how much something would grow (or decline) if that rate were to continue for an entire year.*

- To fill in row 7, use this formula to calculate an annualized growth rate g:

$$g = 100 \times \left(\left(\frac{\text{real GDP in 2020Q2}}{\text{real GDP in 2019Q4}} \right)^2 - 1 \right)$$

Use the table that you completed above to answer the following questions:

1. Which component of GDP is the largest as a percent of GDP in both quarters? (1 sentence)

   [Write answer here]

2. (a) Which component of GDP decreased the most (in percentage terms) between 2019Q4 and 2020Q2? (1 sentence)

   [Write answer here]

   (b) By what percent did it decline? (1 sentence)

   [Write answer here]

3. (a) Which component of GDP increased between 2019Q4 and 2020Q2? (1 sentence)

   [Write answer here]

   (b) Can you think of a reason why it grew? (1-2 sentences)

   [Write answer here]

4. The BEA's data on real GDP extends back to 1929, the first year of the Great Depression. The worst year of the Great Depression, 1932, saw an annual decline in real GDP of 12.9%. How does annualizing the growth rate from 2019Q4 to 2020Q2 affect your conclusion about the severity of the Covid recession, compared to the Great Depression? (1-2 sentences)

   [Write answer here]

Exercise 3 (30 points)

This exercise is related to Exercise 1, but rather than study how one country's institutional reforms have affected its growth over time, we will analyze how differences in institutions correlate with differences in living standards across countries in the year 2017.

About the data:

The Fraser Institute publishes an annual [Economic Freedom index](#) that summarizes a variety of institutional factors that affect national economic growth—including the quality of its legal system and enforcement of property rights, freedom to trade internationally, and level of regulation that restrict workers and business owners.

Data is also sourced from [the Penn World Tables](#) is a database of income, output, input, and productivity data for 183 countries between 1950 and 2019.

The Excel worksheet "Exercise 3" in the provided file includes the following data:

1. *Economic Freedom Summary Index* is the aggregate economic freedom index. The values range between 0 and 10, with higher values meaning greater economic freedom.
2. *Legal System & Property Rights* is a sub-index focused on the quality of the courts and fair enforcement of property rights. The values range between 0 and 10, with higher values meaning the nation has a better legal system and better enforcement of property rights.
3. *Real GDP per capita* is "Real GDP per capita, in 2017 US dollars and at 2017 purchasing power parity (PPP)." PPP is a cross-country price index that allows for better comparisons of incomes across countries. This measure of real GDP per capita is sourced from the Penn World Tables 10.01.

Questions:

1. (a) Based on what we discussed in class, do you expect to see a positive correlation, negative correlation, or no correlation between economic freedom and real GDP per capita in a scatter plot? Briefly justify your reasoning. (2-3 sentences)

   <mark>[Write answer here]</mark>

   (b) Create a scatter plot showing the *Economic Freedom Summary Index* on the x-axis and *real GDP per capita* on the y-axis. Make sure to modify the title of your chart to read "Economic Freedom Summary Index" so it is clear which index is being

used. (*Hint*: You should use the data highlighted in green to create this scatter plot. You may find this Excel tutorial video that shows how to make a scatter plot helpful.)

(c) Are countries where people and businesses have greater economic freedom more likely to be richer or poorer, on average? (1 sentence)

(d) Do your results support or contradict the hypothesized relationship between economic freedom and real GDP per capita that you wrote in part (a)? (1 sentence)

2. (a) Create another scatter plot, this time showing the relationship between real GDP per capita and the *Legal System & Property Rights* index. Again, create a scatter plot such that the *Legal System & Property Rights* index is on the x-axis and GDP per capita is on the y-axis. Make sure to modify the title to read "Legal System & Property Rights" so that one can clearly distinguish which index is being used to create each plot. (*Hint:* This time, you should use the orange-shaded data to create the scatter plot.)

(b) Does the *Legal System & Property Rights* index appear to have a *stronger correlation* or *weaker correlation* with living standards than the *Economic Freedom Summary* index?

ECON 2105 – Principles of Macroeconomics
Data Project 2. Unemployment, Inflation, and the Business Cycle
Due: Tuesday, June 4 at 11:59p.m.

Name: _____

Instructions:

All exercises in this project will require use of the Federal Reserve Economic Data, or FRED, website to transform macroeconomic data and create plots. There is also an Excel file attached to the eLC assignment titled "ECON2105_DataProject2.xlsx." This file contains one worksheet with BEA data that cannot be obtained via FRED. The appropriate time to make use of this Excel file will be made clear in the exercise-specific instructions below.

Read each of the exercises carefully. Each exercise has a list of step-by-step instructions for how to create the FRED plot necessary to answer that exercise's questions. You will insert images of your plots and writ e your answers in the indicated spaces. **Whenever you insert the image of a plot generated using the FRED website, I also require that you to copy-and-paste a unique URL for that plot.** This URL allows me to verify that you created the plot in FRED and did not simply copy a plot that has been made by a third-party. **To be clear, I will give zero credit to any plot that does not have a unique URL attached to it.** Detailed instructions on how to generate this link is provided on the second page of this document.

Submission:

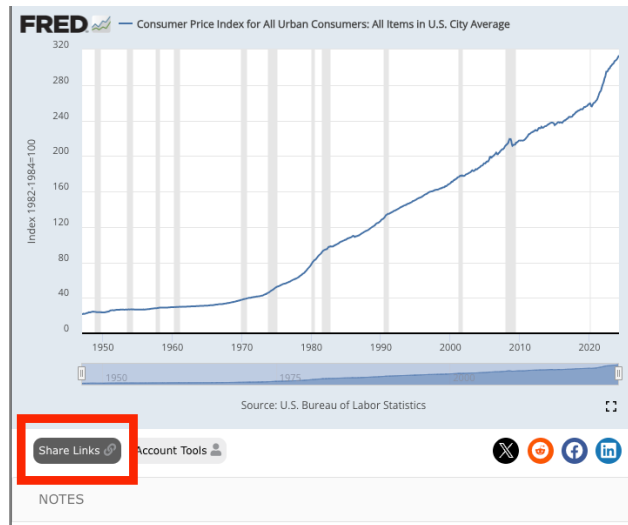When submitting this assignment, you will upload one item to eLC:

1) A completed version of this document *as a PDF*. Ensure that you have written your name at the top of this page.
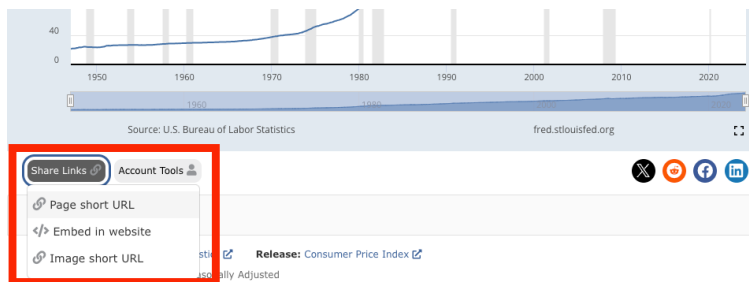
Grading:

There are four exercises worth a total of 105 points. The total grade on this project will be calculated **out of 100 points**. Thus, you can possibly earn a 105/100, or 105%, on this project. The grade you earn on this project will count for **10% of your final course grade.** The points allocated to each exercise are stated in the text below. The first exercise is a simple "bonus" exercise that earns you 3 points. **If you fail to include a unique FRED URL with the image of the plot that you insert for any exercise, I will give zero credit for that plot**. Instructions for creating this link are provided on the second page of this document.

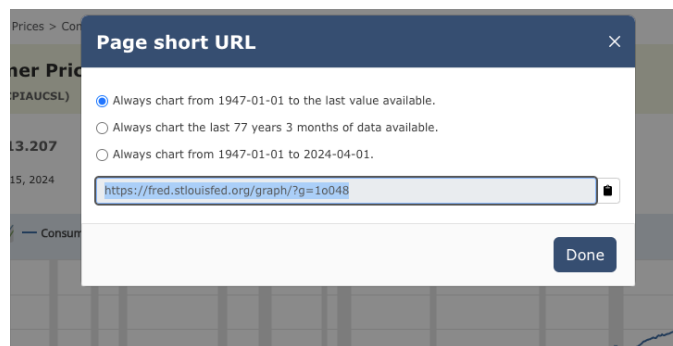# Instructions for Creating FRED Share Links for FRED Plots

1. You can generate a Share Link for any FRED plot by clicking the highlighted **Share Links button** below the bottom-left corner of the plot.

2. When you click the Share Links button, you see 3 options. Select **Page short URL.**

3. In the overlay, click the **clipboard icon** or manually highlight the URL so that you can **copy-and-paste** the URL into this document below your image of the plot. If three options above the URL appear, as in the screenshot below, you can simply keep the default option selected (the first one that reads "Always chart from .... to the last value available.").

4. Verify that the link works by copying-and-pasting it into a different web browser. The plot that you see should match *exactly* the plot that you created, downloaded, and inserted into this document. If it does not, you will need to regenerate the plot following the provided instructions.

Exercise #1 (5 Bonus Points): Calculate Unemployment Rate using FRED

This short, bonus exercise gives us a chance to practice using FRED and checks our understanding of the unemployment rate.

Instructions

Go to the FRED database.

1. Search for *Unemployment Level* (not Rate). This is the absolute number of people who are unemployed in the United States.
2. Click "Edit Graph" and under "Customize Data" search for and then add *Employment Level*. This is the absolute number of people who are employed in the United States.
3. Under "Formula," type in the formula for the Unemployment Rate and click Apply. When writing the formula, the variable '*a*' equals the unemployment level and the variable '*b*' equals the employment level. Don't forget to multiply by 100 so that your values are in percentages.
4. Click "Add Line." Search for and add *Unemployment Rate*. Did you get it right? If you did this exercise correctly, the two lines should be on top of one another.
5. Click Download, then Image (graph).
6. Insert the image of your plot, and paste the unique FRED URL to your plot, to finish this exercise. To generate this URL, see the instructions on the second page of this document.

<mark>[Insert image of plot here]</mark>

<mark>[Copy-and-paste FRED share URL here]</mark>

Exercise #2 (40 points): Trends in Manufacturing Employment & Production

In class, we discussed recent economic transformations that have affected the labor force participation of men. We will examine data that looks at the trends of one specific sector–manufacturing–in which men make up a significant majority of the workforce.

Instructions

In this exercise, you will create two plots. The first plot will show the *Share of U.S. Employment in Manufacturing*. To create this plot, you will use the FRED economic database.

1. Search for "manufacturing employment" and select *All Employees, Manufacturing*. This is the number of people (in thousands) working in manufacturing in the United States.

2. Change the dates of the plot to show data from Jan. 1997 to Jan. 2023.
3. Click "Edit Graph" and under "Customize Data" search for and add *Employment Level*.
4. Under "Formula," type in the formula to calculate *Manufacturing's Share of Employment*. The variable *a* equals the number of people working manufacturing, and the variable *b* equals the total number of people employed. Multiply by 100 so that your values are in percentages.
5. Click Download, then Image (graph).
6. Generate and retain the unique FRED URL to your plot. To generate this URL, see the instructions on the second page of this document.
7. You may find it helpful to download the data to answer the questions. To do this, click "Download," then "Excel" or "CSV" (either format will open in Excel).

The second plot will show *Manufacturing's Share of Real GDP*. You will use the provided Excel file, "ECON2105_DataProject2.xlsx" to create this plot. The sheet "BEA VA Manufacturing" has the data required to create this plot.

- The values in the column "Manufacturing" equal the Real Value Added for the Manufacturing Industry in the United States from 1997 to 2023. Value added equals the difference between the value of an industry's gross output and the cost of its intermediate inputs. Value-added is another approach (besides national spending and factor income) to decomposing GDP. If one added value-added for all industries, it would equal GDP.
- The values in the column "Real GDP" equals the U.S. real GDP from 1997–2023.

Create a plot of the time trend in *Manufacturing's Share of Real GDP* by:

1. Use the two columns (of data described above) to calculate *Manufacturing's Share of Real GDP*. Multiply the value by 100 so that your calculated shares are in percentages.
2. Insert a line chart with the year on the x-axis and your computed share on the y-axis. This short video tutorial on how to make a line graph in Excel may be helpful.
3. If you right-click your chart in Excel, you can select the option to "Save as picture." You can then insert an image of your chart below.

Questions

(a) Insert the two figures here. Be sure to clearly title/label each plot so I know which plot is which.

[Insert image of plot for Share of U.S. Employment in Manufacturing here]

(b) Calculate the percentage change in the manufacturing share of employment between Jan. 1997 and Jan. 2023. By how many percentage points has the manufacturing share of employment fallen over this period?

(c) Based on our class discussion, what are two major reasons that explain the observed trend in the manufacturing share of employment between 1997 and 2023?

(d) Compare the manufacturing share of real GDP to the manufacturing share of employment. Does the manufacturing share of real GDP show a similar trend to the manufacturing share of employment? If someone claimed that "America no longer manufactures anything," would your plot support or contradict their claim?

Exercise #3 (30 points): Stability of the "Velocity of Money" in the Quantity Theory

An assumption of the quantity theory of money is that the velocity of money is stable over time. We can test this assumption by rearranging the equation that defines the quantity theory of money.

$$MV = PY \Leftrightarrow V = PY/M$$

Both PY and M are observed in the data, so we can test this assumption empirically.

Instructions

In this exercise, we will plot the velocity of money using the FRED economic database.

1. Search "Gross Domestic Product." Confirm that the units are "Billions of Dollars, Seasonally Adjusted." (We want nominal, not real, GDP.)
2. Click "Edit Graph" and under "Customize Data," search and add "M2." M2 is a measure of the U.S. money supply defined by the Federal Reserve.
3. Enter the formula that divides nominal GDP by the money supply.

4. Near the bottom of the Edit Line sidebar, below "Finally, you can change the units of your new series," change "Units" to "Percent Change from Year Ago." Your plot should now display the annual percent change in the velocity of money in the United States.
5. Click "Download," then "Image (graph)" to save your plot.
6. Generate and retain the unique FRED URL to your plot. To generate this URL, see the instructions on the second page of this document.
7. You may find it helpful to download the data to answer the questions. To do this, click "Download," then "Excel" or "CSV" (either format will open in Excel).

Questions

(a) Insert your plot (and share URL).

[Insert plot]

[Copy-and-paste share URL]

(b) If we assume that V is stable over time, what should the annual percentage change in the velocity of money equal, on average?

[Write answer here]

(c) Calculate the average velocity of money from the first quarter of 1960 to present.

[Write answer here]

(d) Does the data support or contradict the assumption of the quantity theory of money that the velocity money is stable over time?

[Write answer here]

(e) When did the velocity of money decrease the most? Can you think of a reason why the velocity of money decreased during this time?

[Write answer here]

Exercise #4 (30 points): Inflation and Interest Rates

In class, we discussed the relationship between inflation and interest rates. Let's look at data on the inflation rate and the interest rate on 30-year mortgages in the United States.

Instructions

Use the FRED economic database to collect the data required for this exercise.

1. Search for "Consumer Price Index for All Urban Consumers: All Items in U.S. City Average."
2. Click "Edit Graph" and do the following:
   a. Change "Units" to "Percent Change from Year Ago." The plot will now show the inflation rate.
   b. Change "Frequency" to "Annual" to get the annual inflation rate (rather than the monthly inflation rate). The aggregation method "Average" is okay.
   c. Click "Add Line" and search "Mortgage." You should be able to add the series "30-Year Fixed Rate Mortgage Average in the United States."
   d. Change the "Frequency" of the mortgage rate series to "Annual" and "Units" to "Percent."
3. Change the dates on your plot to show Jan. 1971 to Jan. 2023.
4. Click "Download," then "Image (graph)" to save your plot showing inflation and mortgage interest rates.
5. Generate and retain the unique FRED URL to your plot. To generate this URL, see the instructions on the second page of this document.
6. You may find it helpful to download the data to answer the questions. To do this, click "Download," then "Excel" or "CSV" (either format will open in Excel).

Questions

(a) Insert your plot here.

[Insert plot]

[Copy-and-paste share URL]

(b) Analyze the trends in the data by answering the following questions:
   a. As inflation rose in the 1970s, what happened to mortgage interest rates?

[Write answer here]

   b. As inflation fell in the 1980s and 1990s, what happened to mortgage interest rates?

[Write answer here]

   c. What do we call this effect?

[Write answer here]

(c) Now we'll think about how changes in inflation transfer wealth from borrowers to lenders.
   a. In 1981, what was the average interest rate on a 30-year mortgage?

[Write answer here]

b. What was the inflation rate in 1981?

[Write answer here]

c. What was the average inflation rate from 1982 to 2023?

[Write answer here]

d. Did inflation transfer wealth from home buyers to lenders? Or from lenders to home buyers? Why?

[Write answer here]