

NET 2022 Power Round

Introductory Division: Macroeconomics

April 2022

Instructions

This is the **macroeconomics portion** of the introductory division of the 2022 Northwestern Economics Tournament Power Round. There are three questions of *unequal* weight, accounting for a weighted *half* your score for the Power Round. You are encouraged to work together on these questions. Answer each question as clearly and succinctly as possible. You may write on a blank sheet of paper where you *clearly indicate* where your answer to each part is. It will be useful to note that a question's point value is *not* informative of its difficulty; to ensure a fair test, some (longer) easy questions are worth more points, while some (shorter) hard questions are worth less points, and vice versa. If you are unsure of your answer, take your best guess: there is no penalty for incorrect answers. If you find yourself stuck on a question, skip it and return to it at the end if necessary. It is recommended you spend approximately seventy five (75) minutes of the total exam time on this portion. Remember, we do *not* share your answers or scores with Northwestern admissions, nor do we keep them for ourselves. You are not expected to know how to answer each question on the exam; rather, this test is designed to assess your economic and formal reasoning skills. Have fun, and good luck!

Problem 1: Endogeneity and Exogeneity in the Phillips Curve (25 points)

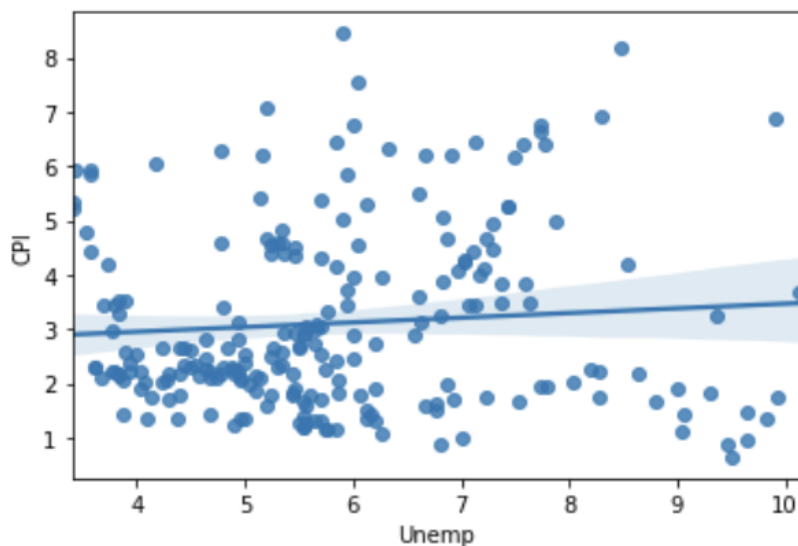
This question looks at some stylized data from FRED and uses it to consider the Phillips curve.

Part A (3) Assume that the labor market is experiencing a shortage (e.g. unemployment has fallen below the natural level), so that companies cannot find enough workers. What will happen to wages? Cite two possible channels through which inflation might change, and be clear about the directions.

Part B (2) Draw a graph with unemployment on the x -axis and inflation on the y -axis based on your conjecture in Part (A). In particular, make clear in what regions your slope is negative, zero, or positive.

Part C (2) The consumer price index (CPI) measures changes in the price of a *fixed* basket of goods meant to represent consumption by an “average” household throughout time. What is a downside of this approach?

Part D (3) Inflation is often measured as percent change in CPI. Below is a graph of the relationship between inflation and CPI from the 1970s until 2021 along with its line of best fit. Is this relationship what you expected based on your your graph in Part (B)? Can you think of a reason why this graph is the way it is?

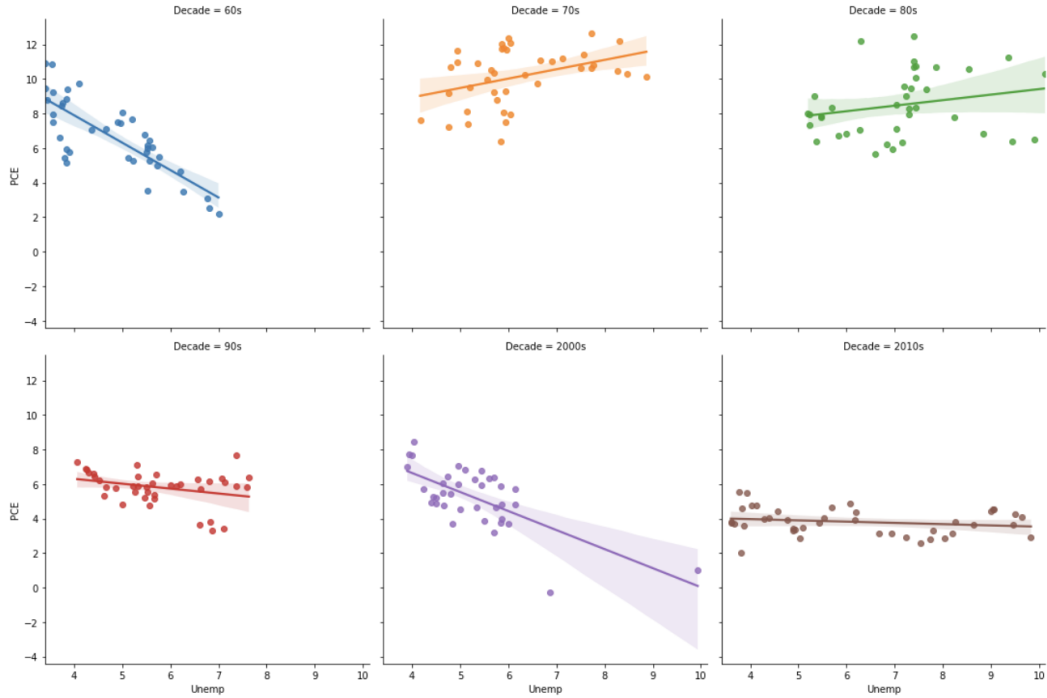


Part E (3) Let's now consider interest rates. Suppose that individuals are spending more money for a variety of reasons (e.g. a demand shock), so that they are spending more instead of saving. If the interest rate for savings increases, how will consumers respond? Justify your answer. Based on this response, explain how the Federal Reserve increasing interest rates might affect inflation.

Part F (3) However, when interest rates increase, they may have other effects. For example, consider a firm which can borrow money to finance a capital project but must pay it back (with interest) in the future. How will an increase in the interest rate affect the money spent on projects? How will this affect unemployment?

Part G (3) The Federal Reserve has a dual mandate to balance both inflation and unemployment; thus, when inflation or unemployment is different from their target levels, they will take actions to change one (possibly affecting the other as well). Based on your answers in Part (E) and (F), modify (or add additional justification) to your explanation of the shape of the graph in Part (D).

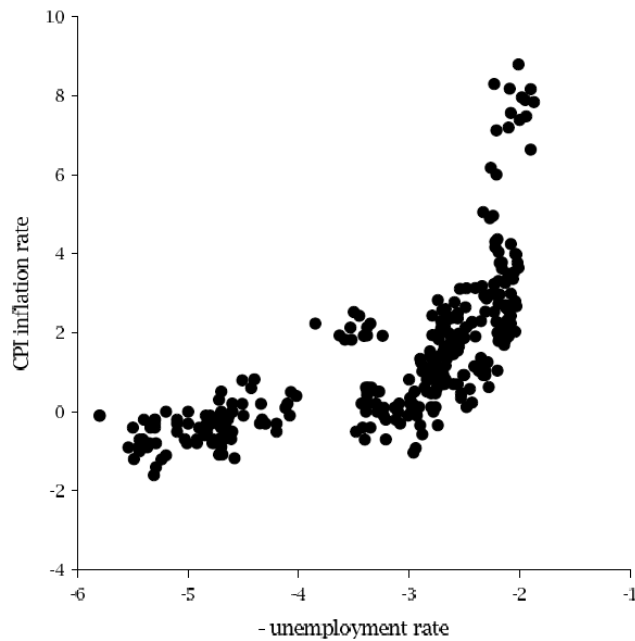
Part H (4) In the 1970s the United States experienced a hyperinflation which did not subside throughout a good portion of the 1980s. Below is the Phillips curve, but for each decade for which the FRED data was available for core personal consumption expenditures, a somewhat more consistent measure of inflation. Ignoring the period from 2010 onwards, interpret whether or not this data supports or refutes your answer in Part (G).



Part I (2) Now focus on the period from 2010 onwards. One popular theory (the *New Keynesian model*) posits that the Phillips curve is derived from price stickiness: the idea that firms have a hard time changing their prices. Can you think of something that may have changed about price-setting in the past decade that may cause the relationship you observe in the sixth panel of the graph above?

Bonus (1) Below is a modified version of Japan's Phillips curve. What country does it most closely resemble?

**Figure 2: Japan's Inflation Rate and (Minus) Unemployment Rate
January 1980 to August 2005**



Problem 2: Comparing Fixed and Floating Exchange Rates (15 points)

An exchange rate is the price of one currency in terms of another. In order to express the exchange rate, we write how much one unit of a currency is worth in terms of another currency. For example, "\$1 is worth €0.88."

Part A (2) If a particular jacket costs 1200 Canadian dollars, and one Canadian dollar is worth 0.78 US dollars, how much does that jacket cost in US dollars?

Part B (3) GDP has a positive relationship with the total value of exports and a negative relationship with the total value of imports. If the US dollar depreciates (the exchange rate between dollars and all other currencies decreases), explain what happens to the total value of US exports and imports, and the effect on US GDP.

There are two broad types of exchange rates: fixed and floating exchange rates. A fixed exchange rate is one where a central actor (usually the central bank) determines and maintains an exchange rate. By contrast, a floating exchange rate is determined by a market for the currency, and fluctuates because of supply and demand.

Part C (4) Even in countries with fixed exchange rates, central banks still must maintain the fixed exchange rate by influencing the market for their national currency. Identify a tool central banks may use to regulate the exchange rate and explain what role it plays in a country's money market.

Part D (3) Floating exchange rates more accurately reflect the value of a currency than fixed rates because they easily capture day-to-day fluctuations caused by shifts in the money market. Why might an investor prefer investing in a country with a fixed exchange rate because of this?

Part E (3) Today, all major economies use a floating currency instead of a fixed one. How might a fixed currency present potential challenges for developed economies?

Problem 3: Economic Development and the Three-Sector Model (20 points)

As its name implies, the three-sector model divides the economy into three sectors: raw materials, manufacturing, and services (often called the primary, secondary, and tertiary sectors respectively). While it is certainly a rather wide generalization, it is an often-observed trend that, as national economies grow, they progress from a focus on the primary sector to the secondary sector to the tertiary sector. Answer some questions about the causes and effects of these trends.

Part A (4) One important part of the first sector is foodstuffs: namely, agriculture and livestock. Hypothesize about why agriculture tends to dominate the economies of the poorest countries. Detail 2 fundamentally distinct reasons (approximately 2-3 sentences each).

Part B (6) In previous centuries of the Industrial Revolution, countries in the manufacturing stage would often have their industries primarily supported by domestic investment (think about Standard Oil, owned by the American J.D. Rockefeller, in the turn-of-the-century US). However, in more modern times, a great deal of investment in manufacturing economies comes from foreign investment through outsourcing (think about what company sold you the shirt you are wearing vs. where it was produced). These firms are paying transport costs which they would not have to pay if they produced domestically. Clearly, there must be some other differences in costs which favor outsourcing over domestic production, or else outsourcing wouldn't be nearly as prevalent as it is today. Give 2 such differences in costs, and detail the causes of these differences (approximately 2-3 sentences each).

Part C (4) We tend to observe that the countries which are the wealthiest also have the largest service sectors, proportional to the size of their whole economy. Give 2 fundamentally different reasons as to why high per-capita wealth is helpful in growing a proportionally large service sector (2-3 sentences each).

Part D (6) Select one of these three news headlines and discuss it in light of your answer to one of the previous questions (approximately 4-6 sentences). You may want to consider questions like:

- (1) How does the article's topic fit into the model you've just discussed?
- (2) Does the article's topic change your understanding of the model in any way?
- (3) What implications might the article's topic have for the countries/sectors/economies in question?

Be creative with this! You can click the headlines below to view the article in question - a very basic understanding of the events or trends that the articles are reporting on will suffice to provide the basis for your response.

How to Keep Crops Alive In a Warmer, Drier World

There are a growing number of startups with inventions aimed at adapting food to drought. But will it be enough to make a difference?

4.3 million people quit their jobs in January as the Great Resignation shows no sign of slowing down

Samsung Agrees to Compensation Deal Over Chip Worker Deaths, Illnesses

Parties will accept—in advance—a settlement plan by an independent mediator