Homework 9 (36 Points)

Note. All of the following problems can be completed using data from the FRED database at the Federal Reserve Bank of St. Louis.

Problem 1 (6 Points)

1. In one graph, plot the annual nominal GDP of the U.S., China, Germany, Japan, and Korea from 1970 to 2015[1]. (2 Points)

2. In one graph, plot the annual real GDP *per capita*[2] of the U.S., China, Germany, Japan, and Korea from 1970 to 2015[3]. (2 Points)

3. Construct a real GDP *per capita* index that is equal to 1 for all countries in 1970. To do this, divide each series by its 1970 value[4]. In one graph, plot all the series together. Which country has grown the most percentage-wise since 1970? Which country has seen the second largest growth? (2 Points)

Problem 2 (2 Points)

In one graph, plot the annual nominal GDP, GNP, National Income (NI), Personal Income (PI), and Disposable Personal Income (DPI) of the U.S. from 1929 to 2015.

[1] For this problem, note that the GDP of China, Germany, Japan, and Korea are in dollars, while the GDP of the U.S. is in billions of dollars. Let us turn all of them into billions of dollars. This means dividing the data for China, Germany, Japan, and Korea by 1 billion (10^9).

[2] GDP *per capita* = GDP/Population.

[3] Note that all data series are expressed in 2010 U.S, dollars here.

[4] i.e., divide each year's real GDP *per capita* by 1970's real GDP per capita

Problem 3 (4 Points)

Download the annual nominal GDP and GNI of Ireland from 1960 to 2015.

1. GNI is approximately equal to GNP. Calculate and plot Ireland's GNI/GDP ratio from 1960 to 2015. (2 Points)
2. What might be the reason behind the observed changes in Ireland's GNI/GDP ratio? (2 Points)

Problem 4 (8 Points)

1. Plot the annual U.S. manufacturing labor share from 1987 to 2014. (2 Points)
2. The manufacturing sector can be divided into a durable goods sector and a non-durable goods sector. In one graph, plot the annual labor share in the durable goods sector vs. the annual labor share in the non-durable goods sector from 1987 to 2014. (2 Points)
3. Calculate the percentage change in labor share in the durable and non-durable goods sectors from 1987 to 2014[5]. In which sector – durable goods or non-durable goods – has labor share changed the most during this period of time? (2 Points)
4. What can be some of the reasons behind the observed changes in U.S. manufacturing labor share? (2 Points)

[5] $\frac{\text{Labor share (2014) - Labor share (1987)}}{\text{Labor share (1987)}}$

Problem 5 (4 Points)

In this problem we look at the value-added of different U.S. sectors before and after the 2008 financial crisis. To do so, download the quarterly real value-added of the U.S. Manufacturing, Construction, Retail, Finance, and Healthcare sector from 2005.Q1 to 2015.Q4[6].

1. Construct an index for each sector so that 2005.Q1 = 1[7]. In one graph, plot all the series together. (2 Points)

2. Describe what you observe from the data. Which sector started to decline first? Which sector experienced the most precipitous decline during the financial crisis? Which sector recovered most quickly? Which sector does not seem to be negatively affected by the crisis? Which sector *still* hasn't recovered to its pre-crisis level? (2 Points)

Problem 6 (4 Points)

In this problem we look at three components of GDP – Consumption (C), Investment (I), and Government Spending (G) – before and after the 2008 financial crisis. Download the quarterly data on U.S. real consumption, real investment, and real government spending from 2003.Q1 to 2015.Q4.

1. Construct an index for each component so that 2003.Q1 = 1. In one graph, plot all the series together. (2 Points)

2. Describe what you observe from the data. Which component of GDP started to decline first? Which component declined the most during the financial crisis? Which component actually *increased* during and immediately after the financial crisis? (2 Points)

[6]Note: in FRED, the date for Q1 is 01-Jan. The date for Q2 is 01-Apr. The date for Q3 is 01-Jul. The date for Q4 is 01-Oct.

[7]To do this, divide each series by its 2005Q1 value.

Problem 7 (4 Points)

In this problem we look at the Consumption (C), also called the Personal Consumption Expenditure (PCE), component of GDP. Consumption can be further divided into three components: consumption on durable goods, consumption on nondurable goods, and consumption on services. Download the quarterly data on U.S. real durable goods consumption, real nondurable goods consumption, and real service consumption from 2003.Q1 to 2015.Q4.

1. Construct an index for each component of consumption so that 2003.Q1 = 1. In one graph, plot all the series together. (2 Points)

2. Describe what you observe from the data. During the recession caused by the 2008 financial crisis, consumption on which component dropped the most? Which component was least affected? After the recession, which component of consumption has been growing the fastest? (2 Points)

Problem 8 (4 Points)

In this problem we look at the Investment (I) component of GDP. Investment can be further divided into business fixed investment, residential investment, and additions to inventory. For this problem, download the quarterly data on U.S. real business fixed investment and real residential investment from 2003.Q1 to 2015.Q4.

1. Construct an index for each component so that 2003.Q1 = 1. In one graph, plot both series together. (2 Points)

2. Describe what you observe from the data. Before and during the 2008 financial crisis, when did residential investment start to decline? When did business fixed investment start to decline? When did residential investment start to recover and when did business fixed investment start to recover? (2 Points)