Week 7 Recitation

Practice Problems

This week we are going to explore the components of Aggregate Demand, aiming to understand how they contribute to GDP in the short-run—which is the focus of the Keynesian Perspective. We'll start with some theoretical definitions, then we'll move to the analysis of some real-world data for the United States.

1. How do we define Aggregate Demand (AD) and what are its components? What's the relationship between AD, Real GDP, and Potential GDP?

From last week's recitation, the students know that Aggregate Demand is total spending, economy-wide, on domestic goods and services. Its components are AD = C + I + G + (X − M), which is the same formula for Real GDP (for a given year; across time, we need to consider prices). As students must remember from previous weeks, GDP is the sum of all goods and services produced in a given place, in a given period of time. Since the supply side and the demand side of the GDP must be identical, aggregate supply must be equal to aggregate demand. Potential GDP refers to the availability of the factors of production, so it measures what an economy could produce if it ran at full capacity—that's the focus of the neoclassical perspective, that we're going to debate next week—, while Real GDP measures what was actually produced. As discussed last week, the economy produces at the equilibrium point where AD=SRAS (Real GDP), and the distance between that equilibrium and Potential GDP gives us the level of unemployment.

2. What are recessionary gaps and why does the Keynesian perspective postulate that economies tend to stay in a recessionary gap for a long period of time (explain the coordination argument and the concept of menu costs in your answer)? What's the key policy suggestion to reduce that gap?

Recessionary gaps are moments in which AD falls below full-employment (decrease in Real GDP). This happens because AD is highly volatile, due to expectations: when households have low expectations for the future (high probability of losing their job, no expectation of receiving a raise, etc.), their consumption tends to fall, specially of durable goods (like cars), that in general involve loans (↓C). Likewise, businesses that have no expectation of selling will not increase their production (↓I). If prices could adjust to this reduced demand by households and wages could adjust to this reduced demand of workers from businesses, the gap would close fast; the problem is that, according to Keynesian theory, <u>prices and wages are sticky</u>.
One main reason for the existence of sticky wages is the coordination argument. This argument points out that, even if most people would be willing—at least hypothetically—to see a decline in their own wages in bad economic times as long as everyone else also experienced such a decline, a market oriented economy has no obvious way to implement a plan of coordinated wage reductions. Wage cuts also depress the morale and hurt the productivity of the existing workers.
One main reason for the existence of sticky prices is the existence of the so-called "menu costs". Even when businesses are able to observe the forces of supply and demand to guide them towards a price change, they must update sales materials, change billing records, and redo product and price labels. Also, frequent price changes may leave customers confused or angry—especially if they discover that a product now costs more than they expected.
Given the presence of expectations and sticky prices and wages, which tend to keep C and I at

low levels, and since a domestic economy doesn't have control over the consumption of the rest of the world (X-M), increasing government spending (G) and using other government tools (such as government transfers, changes in taxes and changes in the interest rate) are the policy suggestions by Keynesians to close the recessionary gap.

3. Describe what is meant by the Keynesian expenditure multiplier. To calculate the multiplier, we need the marginal propensity to consume (MPC) of our economy, how do we define MPC? Finally, assume MPC is 0.7, what is the expenditure multiplier and how much will GDP rise from an initial demand shock of $10 million?

   The Keynesian expenditure multiplier states an initial change to demand will be amplified to much larger effects on GDP. This happens because one person's spending becomes another person's income, so the total change in GDP will be larger than the change in spending. The MPC is the share of an additional dollar of income a person spends on consumption. The formula for expenditure multiplier is 1/(1-MPC). If MPC=0.7, multiplier= 3.33. To find the rise in GDP, multiply the multiplier by the initial change in demand. 3.33*$10 million = $33.3 million. An initial boost in demand by $10 million leads to a GDP rise of $33.3 million.

4. Now let's take a look at some recessionary gaps throughout the United States recent history, and which AD component influenced the Real GDP changes the most. We'll be using data from FRED – Federal Reserve Economic Data. To download it, follow the steps below:

Step 1: Go to the FRED website (https://fred.stlouisfed.org/) and type "Contributions to percentage change in real gross domestic product: Personal consumption expenditures" in the search box. Click at that series, and you'll see a graph of that variable across time.

Step 2: At the right corner of the graph, click on "Edit Graph" and, under the tab "Add Line", look for the following variables (click "Add data series" after selecting them):
- "Contributions to percentage change in real gross domestic product: Gross private domestic investment"
- "Contributions to percentage change in real gross domestic product: Government consumption expenditures and gross investment"
- "Contributions to percentage change in real gross domestic product: Net exports of goods and services"

Step 3: Now that we have all the components of our Real GDP, let's add the data for the total Real GDP variation. Click on "Edit Graph" again and, under the tab "Add Line", look for the "Real Gross Domestic Product" variable. Make sure that all the GDP components are in Percentage Points at Annual Rate Units, and the Real GDP is in Compounded Annual Rate of Change Units; all variables must be in Quarterly Frequency (check all that information under the "Edit Lines" tab).

Step 4: Once you have all five variables in the graph, click on "Download" at the top of the graph, and open the document at Excel or Google Sheets.

Step 5: Rename the consumption variable column as "C", private investment as "I", government consumption and investment as "G", net exports as "X-M", and the Real GDP as "GDP".

In a new column, sum the four components of GDP. Remember our definition of AD in Question 1. Can we observe that relationship in the data? (Tip: remember that the AD expression can also be written in terms of percent variation).

AD = C + I + G + (X − M) -> %ΔAD = %ΔC + %ΔI + %ΔG + %Δ(X − M)

Therefore, the variation on GDP must be similar to the sum of the variation of all of its components. As we can see in the attached spreadsheet, that holds true.

5. Let's see how those variables behaved during the 2008 crisis. Describe the contributions to US GDP growth in the recession (2008 Q1 to 2009 Q2) and in the recovery phase (2009 Q3 to 2010 Q4). What might explain the differences seen in the role of consumption and investment during the recession and recovery phases of the business cycle? From the contribution to GDP growth of government consumption, what can you infer about the US government's policy during the crisis?

From the spreadsheet we can see that, during the recession, Investment was the factor pushing GDP down the most, followed by consumption (except in the second quarter of 2008). The factors stopping GDP from a further decrease were government expenditure and net exports, meaning that the 2008 crisis took a little time to hit the rest of the world.

During the recovery phase, we can see that investment and consumption both push the GDP up for most of the quadrants, while government consumption decreases when compared to recession period. We can also see that net exports also reduced, meaning that the crisis hit the rest of the world (because now they decrease their consumption of US-manufactured goods and services).

This data suggests a macroeconomic policy closer to what the Keynesian perspective prescribes: during recessionary gaps, the government spends more, decreases taxes and lowers the interest rate. So, in the following years (recovery period), consumption and investment will rise as a response to the tax and interest rate policies, together with better expectations given the push on GDP brought by the government expenditures in the past, that can now decrease during the recovery phase of the cycle.

6. Now, let's perform the same analysis for the COVID crisis. Describe the contributions to US GDP growth in the recession (2020 Q1 to 2020 Q2) and in the recovery phase (2020 Q3 to 2021 Q4). What might explain the differences seen in the role of consumption and investment during the recession and recovery phases of the business cycle? From the contribution to GDP growth of government consumption, what can you infer about the US government's policy during the crisis?

Again, during the crisis, Investment and Consumption pushed the GDP down, while government expenditure prevented a further decrease. The first stimulus checks arrived for families in mid-April, together with stimulus packages for businesses. Therefore, in 2020 Q3, we can see a significant change both in Consumption and Investment, together with a decrease in government spending–remember that government transfers ARE NOT part of government consumption and investment (G); they are intermediate transfers (from government to households and businesses), and therefore appear in GDP in the C and I components. We can also observe the impact of the COVID crisis in the rest of the world, given the high negative values of net exports.