

Study Guide: Chapter 1 - The Science of Macroeconomics

Introduction: Understanding the Big Picture

This study guide provides a focused overview of the core concepts presented in Chapter 1, "The Science of Macroeconomics." The aim is to foster a deep understanding of what macroeconomics is, how economists approach its study using models, and the fundamental ideas that will underpin further learning in this field. [cite: 229, 338, 339] We will explore these concepts by drawing from your lecture transcript and course materials, emphasizing clarity and application. [cite: 235, 350]

Section 1: What is Macroeconomics?

1.1 Defining Macroeconomics

Macroeconomics is the study of the economy as a whole. [cite: 8] It examines broad issues affecting entire countries and societies, such as:

- The creation and destruction of wealth. [cite: 8]
- Growth in incomes.
- Changes in the overall price level (inflation and deflation).
- The rate of unemployment.
- The distribution of wealth within a society. [cite: 9]

Macroeconomists attempt to explain economic events and devise policies to improve economic performance.

1.2 Key Questions in Macroeconomics

Macroeconomics seeks to answer critical questions about economic performance and policy, such as: [cite: 340]

- Why do some countries experience rapid growth in incomes while others remain poor? [cite: 12, 13]
- What causes inflation, and why does it vary across countries and time periods? [cite: 11, 12]
- What are the causes of unemployment?
- How do trade relationships and international finance affect national economies? [cite: 13, 14]
- What policies can governments use to promote growth, reduce unemployment, and stabilize prices?
- What makes an economy sustainable or unsustainable? [cite: 16, 17]

(Active Recall Prompt: In your own words, what is the primary goal of a macroeconomist?) [cite: 313]

Section 2: How Economists Think – The Role of Models

Economists use **models** to understand and explain complex economic phenomena. [cite: 19, 25]

2.1 Why Use Models?

- **Simplification of Reality:** Models are simplifications of the real world, designed to strip away irrelevant details and focus on important economic relationships. [cite: 25] This involves making assumptions to make the analysis tractable. [cite: 25, 26]
- **Forecasting:** Models can be used to make forecasts about future economic outcomes. [cite: 26] Often, simpler models can produce better forecasts than more complicated ones. [cite: 27]
- **Understanding Relationships:** Models help us understand how **exogenous variables** (those taken as given, outside the model) influence **endogenous variables** (those determined within the model). [cite: 144, 148, 154]

(Elaboration Prompt: Why is it often true that simpler economic models can produce better forecasts than more complex ones?) [cite: 324]

2.2 Endogenous and Exogenous Variables

Understanding the distinction between these types of variables is crucial for working with economic models: [cite: 175, 176]

- **Endogenous Variables:** These are the variables that a model attempts to explain or predict. Their values are determined by the interactions within the model. [cite: 144, 145]
 - *Example from the car market model:* The price of cars (P) and the quantity of cars sold (Q) are endogenous. [cite: 146, 147]
- **Exogenous Variables:** These are variables that are taken as given when constructing a model. They are inputs into the model, and their values are determined outside the scope of the specific model being used. [cite: 148, 149]
 - *Example from the car market model:* Aggregate income (Y) and the price of steel ((P_s)) are exogenous. [cite: 150, 152]

Think of exogenous variables as the "ingredients" that go into the "cooking process" (the model) to produce the "meal" (the endogenous outcomes or forecasts). [cite: 155, 156, 157]

2.3 The Use of Multiple Models

No single economic model can answer all questions or explain every aspect of the economy. [cite: 161, 162, 163] Macroeconomists use different models to study different issues. For example, a model designed to explain long-run economic growth will differ from one designed to analyze short-run fluctuations in employment and inflation. [cite: 163]

(Self-Assessment Prompt: How confident are you in distinguishing between an endogenous and an exogenous variable in a new economic model you might encounter?) [cite: 332]

Section 3: A Closer Look at an Economic Model – The Market for Cars

Let's explore a simplified model of the market for new cars to illustrate these concepts. [cite: 36, 330, 77]

3.1 Assumptions of the Car Market Model

To simplify reality, this model makes several key assumptions: [cite: 25, 46]

- **Many Buyers and Sellers:** Each individual buyer and seller is too small to affect the market price. [cite: 47, 49] (Note: This is a simplifying assumption; in reality, large manufacturers might influence prices). [cite: 49, 50, 51]
- **Homogenous Good:** We assume an "average car," rather than distinguishing between many different models and features. [cite: 57, 58, 60, 61] This allows us to talk about a single price for cars.

3.2 Variables in the Model

The following variables are used: [cite: 370]

- Q^D : Quantity of cars demanded by buyers. [cite: 54]
- Q^S : Quantity of cars supplied by producers. [cite: 55]
- P : Price of new cars (average price). [cite: 57]
- Y : Aggregate income (or Real GDP, output) of the society. [cite: 63, 64]
- P_s : Price of steel (an input in car production). [cite: 75]

3.3 Demand for Cars

The **demand function** shows the relationship between the quantity of cars demanded and the factors that influence it: [cite: 82] $Q^D = D(P, Y)$ This general form states that the quantity demanded (Q^D) is a function of the price of cars (P) and aggregate income (Y). [cite: 83]

- **Effect of Price (P):** If the price of cars (P) increases (and income Y stays the same), the quantity demanded (Q^D) will decrease. [cite: 84, 85] This is why the demand curve is downward sloping. [cite: 103, 104, 105]
- **Effect of Income (Y):** If aggregate income (Y) increases (and price P stays the same), the quantity demanded (Q^D) will likely increase, as more people can afford cars. [cite: 86, 69, 70] This causes a shift in the demand curve. [cite: 122]

3.4 Supply of Cars

The **supply function** shows the relationship between the quantity of cars supplied and the factors that influence it: $Q^S = S(P, P_s)$ This general form states that the quantity supplied (Q^S) is a function of the price of cars (P) and the price of steel (P_s), an input cost. [cite: 112]

- **Effect of Price (P):** If the price of cars (P) increases (and input costs like P_s stay the same), producers are willing to supply more cars (Q^S). [cite: 109] This is why the supply curve is upward sloping. [cite: 108, 109]

- **Effect of Input Prices (P_s):** If the price of steel (P_s) (or other input costs like labor [cite: 76, 77]) increases (and the price of cars P stays the same), the quantity of cars supplied (Q^S) will decrease because it's more costly to produce them. [cite: 113, 114, 115] This causes a shift in the supply curve. [cite: 133]

3.5 Equilibrium

Equilibrium in the car market occurs at the price (P^*) and quantity (Q^*) where the quantity demanded equals the quantity supplied ($Q^D = Q^S$). [cite: 56, 116] This is where the demand and supply curves intersect. [cite: 117] At this equilibrium, the market is said to be **market clearing**.

3.6 Effects of Changes in Exogenous Variables (Shifts in Curves)

We can use this model to analyze how changes in exogenous variables affect the endogenous variables (price and quantity of cars). [cite: 119, 120]

- **An Increase in Aggregate Income (Y):**
 - If aggregate income (Y) rises (a boom in the economy), people have more money and are more willing to buy new cars. [cite: 121]
 - The demand curve shifts to the right (outward). [cite: 122]
 - **Result:** Both the equilibrium price of cars (P^*) and the equilibrium quantity of cars sold (Q^*) increase. [cite: 123] Dealerships sell more cars at higher prices. [cite: 129, 130]
- **An Increase in the Price of Steel (P_s):**
 - If the price of steel (P_s) (an input cost) rises, it becomes more expensive to produce cars. [cite: 131, 133, 135]
 - The supply curve shifts to the left (inward). [cite: 133, 134]
 - **Result:** The equilibrium price of cars (P^*) increases, and the equilibrium quantity of cars sold (Q^*) decreases. [cite: 134, 136] Fewer cars are sold, and those that are sold are at higher prices. [cite: 141]

(Practice Problem: Using the car market model, what would you predict would happen to the equilibrium price and quantity of cars if there was a significant technological breakthrough that lowered the cost of producing car engines (an input)? Explain which curve shifts and why.) [cite: 365]

Section 4: Price Flexibility – Sticky vs. Flexible Prices

A key feature distinguishing macroeconomic models is their assumption about how quickly prices adjust to changes in supply or demand. [cite: 185]

- **Flexible Prices:** In models with flexible prices, prices adjust quickly to equilibrate supply and demand. This means markets are always, or nearly always, in equilibrium (market clearing). [cite: 202, 203] Economists generally believe models with flexible prices describe the economy well in the **long run**. [cite: 207, 208, 217, 222, 223] In the long run, most prices and wages have time to adjust to economic changes. [cite: 209, 211]
- **Sticky Prices:** In models with sticky prices, prices (and wages) adjust slowly to changes in economic conditions. [cite: 185, 186, 187, 195, 196, 198] Examples include restaurant menus that don't change daily or annual wage contracts. [cite: 186, 197, 199]
 - When prices are sticky, markets may not clear immediately, leading to situations like:
 - **Excess supply:** Firms may not be able to sell all they want at the current price (e.g., unsold goods, unemployment if wages are too high). [cite: 212, 213, 214, 215]
 - **Excess demand:** Buyers may not be able to obtain all they want at the current price.
 - Economists generally believe models with sticky prices offer a better description of the economy in the **short run**. [cite: 204, 208, 212]

(Elaboration Prompt: Explain why the distinction between the short run and the long run is important when considering whether prices are sticky or flexible.) [cite: 324]

Section 5: Microeconomic Foundations of Macroeconomics

Microeconomics is the study of how individual households and firms make decisions and how they interact in markets. Macroeconomic phenomena arise from the aggregation of many microeconomic decisions. [cite: 31] Therefore, all macroeconomic models, even if their microeconomic underpinnings are implicit, must ultimately be consistent with microeconomic principles. [cite: 31] We rely on microeconomic fundamentals (like the supply and demand model derived from individual choices) to explain macroeconomic events. [cite: 31, 32]

Chapter Summary [cite: 5]

Macroeconomics studies the economy in its entirety, focusing on income growth, price changes (inflation/deflation), and unemployment. Economists use simplified theories called models, where exogenous variables influence endogenous ones, to explain these phenomena and suggest policies. The choice of model depends on the question, with a key distinction being whether prices are assumed flexible (common for long-run analysis) or sticky (better for short-run analysis). All macroeconomic models are built upon microeconomic foundations, reflecting the idea that broad economic trends result from individual decisions and interactions.

Key Concepts Glossary [cite: 285]

This glossary provides definitions for key terms and notation used in this chapter. [cite: 264, 286]

- **Aggregate Income (Y):** The total income earned by all individuals in an economy; also referred to as output or Real GDP. [cite: 63, 64, 66, 67]
- **Deflation:** A sustained decrease in the overall price level.
- **Demand Function:** A mathematical expression showing the relationship between the quantity demanded of a good and the variables that influence it (e.g., $Q^D = D(P, Y)$). [cite: 82, 83]
- **Depression:** A severe and prolonged recession.
- **Endogenous Variables:** Variables that are determined within an economic model; these are the outcomes the model seeks to explain. [cite: 144, 145]
- **Equilibrium:** A state where economic forces are balanced, such as when quantity supplied equals quantity demanded. [cite: 116]
- **Exogenous Variables:** Variables that are taken as given in an economic model; their values are determined outside the model and serve as inputs. [cite: 148, 149]
- **Flexible Prices:** Prices that adjust quickly to bring supply and demand into balance. [cite: 185, 202] Assumed primarily in long-run models. [cite: 204]
- **Inflation:** A sustained increase in the overall price level. [cite: 11]
- **Macroeconomics:** The study of the economy as a whole, including topics like inflation, unemployment, and economic growth. [cite: 8]
- **Market Clearing:** A situation in a market where the price adjusts so that the quantity supplied equals the quantity demanded; no excess supply or demand. [cite: 56, 223]
- **Microeconomics:** The study of how households and firms make decisions and how they interact in markets.
- **Models:** Simplified representations of reality used to understand economic phenomena. [cite: 19, 25] They involve assumptions to focus on key relationships. [cite: 25, 26]
- **Price (P):** The amount of money exchanged for a good or service. In the car model, P refers to the average price of new cars. [cite: 57]
- **Price of Steel (P_s):** An example of an input price, treated as an exogenous variable in the car supply model. [cite: 75]
- **Quantity Demanded (Q^D):** The amount of a good that buyers are willing and able to purchase at a given price and other conditions. [cite: 54]
- **Quantity Supplied (Q^S):** The amount of a good that sellers are willing and able to offer for sale at a given price and other conditions. [cite: 55]
- **Real GDP (Gross Domestic Product):** A measure of the total income or output of an economy, adjusted for changes in the price level. Often represented by Y. [cite: 64]
- **Recession:** A period of declining real incomes and rising unemployment. [cite: 8]
- **Sticky Prices:** Prices that adjust slowly to changes in supply and demand. [cite: 185, 195] Assumed primarily in short-run models. [cite: 204]
- **Supply Function:** A mathematical expression showing the relationship between the quantity supplied of a good and the variables that influence it (e.g., $Q^S = S(P, P_s)$). [cite: 112]
- **Unemployment:** The state of being willing and able to work but unable to find a job.

Questions for Review and Deeper Understanding [cite: 313, 378]

1. Explain the difference between macroeconomics and microeconomics. How are these two fields related? [cite: 31]
2. Why do economists build models? What are the purposes of the assumptions made in these models? [cite: 19, 25, 26]
3. What is a market-clearing model? When is it appropriate to assume that markets clear (i.e., prices are flexible)? When might it be more appropriate to assume prices are sticky? [cite: 56, 185, 204, 217]
4. Using the car market model described in Section 3, explain step-by-step what happens if a new popular form of public transportation significantly reduces people's desire to own cars, assuming aggregate income and the price of steel remain unchanged. Which variable(s) and curve(s) are affected, and what is the impact on equilibrium price and quantity?
5. Think about a restaurant you frequent. Are its prices for menu items flexible or sticky? What factors might make them sticky? In what situations might the restaurant be forced to make its prices more flexible? [cite: 196, 197, 198, 199]

(Metacognitive Prompt: What was the most challenging concept for you in this chapter? What steps will you take to clarify your understanding of it?) [cite: 332, 333]

Study Guide: Chapter 2 - The Data of Macroeconomics

Introduction: Understanding the Economic Landscape

Welcome to the study of macroeconomic data. This chapter is foundational because understanding how key economic variables are measured is the first step toward analyzing economic performance, forecasting future trends, and making informed business and policy decisions. We will explore how economists quantify economic activity (Gross Domestic Product), the cost of living (Price Indexes), and joblessness (Unemployment Statistics). The focus will be on conceptual understanding: what these measures represent, how they are constructed, their limitations, and why they matter in a business context.

2-1 Measuring the Value of Economic Activity: Gross Domestic Product (GDP)

Core Concept: Gross Domestic Product (GDP) is the market value of all final goods and services produced within a country in a given period of time. It simultaneously measures the total income of everyone in the economy and the total expenditure on the economy's output of goods and services.

Income, Expenditure, and the Circular Flow

- **The Equivalence of Income and Expenditure:** For the economy as a whole, total income must equal total expenditure. Every transaction has a buyer and a seller. Every dollar of spending by a buyer is a dollar of income for a seller.
- **Circular Flow Diagram:** This model illustrates the transactions between households and firms in an economy. Households buy goods and services from firms (expenditure), and firms use the revenue to pay for factors of production like labor, land, and capital (income).
 - *Active Recall Prompt:* In your own words, explain why total income and total expenditure must be equal for an entire economy.

Rules for Computing GDP

To ensure GDP is a comprehensive and accurate measure, several rules are applied:

1. **Market Value:** GDP uses market prices to value goods and services because these prices reflect the value people place on them.
 2. **All Goods and Services:** GDP aims to be comprehensive, including all items produced and sold legally in markets. It also includes the imputed rental value of owner-occupied housing.
 3. **Final Goods Only:** GDP only includes the value of final goods and services. The value of intermediate goods (goods used in the production of other goods) is already incorporated in the price of the final good.
 - **Why this rule?** To avoid double counting.
 - **Value Added:** An alternative way to compute GDP is by summing the value added at each stage of production. Value added is the value of a firm's output minus the value of the intermediate goods it purchased.
 4. **Produced Within a Country:** GDP measures the value of production that occurs within a country's geographic borders, regardless of the nationality of the producer (e.g., a German-owned BMW plant in South Carolina contributes to U.S. GDP). This contrasts with Gross National Product (GNP), which measures income earned by a nation's residents regardless of where it's produced. GDP is generally preferred as a measure of domestic economic activity and living standards.
 5. **In a Given Period of Time:** GDP is usually measured for a year or a quarter.
- *Elaboration Prompt:* Consider a simple product like a wooden chair. Identify potential intermediate goods and explain how counting them separately would lead to an overestimation of GDP.

FYI: Stocks and Flows

- A **stock** is a quantity measured at a specific point in time (e.g., the amount of capital equipment a business owns).

- A **flow** is a quantity measured per unit of time (e.g., a business's annual investment in new equipment, or GDP itself).
 - *Active Recall Prompt:* Is a company's debt a stock or a flow? What about its profit?

Real GDP Versus Nominal GDP

- **Nominal GDP:** The value of goods and services produced in the economy measured at **current prices**. Nominal GDP can increase either because production increases or because prices increase (or both).
- **Real GDP:** The value of goods and services produced in the economy measured at **constant prices** (i.e., prices from a specific base year). Real GDP reflects changes in the actual quantity of goods and services produced, as it controls for inflation.
 - **Conceptual Insight:** Real GDP is a better gauge of economic well-being and productive capacity because it focuses on what the economy is actually producing, stripped of price changes. For instance, if you buy the same lunch for \$10 one year and \$18 the next due to inflation, nominal spending increased, but your real consumption (one meal) did not.

The GDP Deflator

The GDP deflator is a measure of the overall price level in the economy. It is calculated as:

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

- **Purpose:** The GDP deflator can be used to "deflate" nominal GDP to arrive at real GDP. It also allows for the calculation of an inflation rate, which is the percentage change in the GDP deflator from one period to the next.
 - *Active Recall Prompt:* If Nominal GDP rises by 5% in a year and Real GDP rises by 2%, what can you infer about the inflation rate as measured by the GDP deflator?

Chain-Weighted Measures of Real GDP

(Mentioned in textbook summary, but not elaborated in transcript. For conceptual understanding, it's important to know that base years used to calculate real GDP are updated periodically to reflect changing consumption patterns and relative prices, and chain-weighting is a method to do this more smoothly over time, providing a more accurate picture of real output growth.)

The Components of Expenditure (The National Income Accounts Identity)

GDP (denoted as Y) can be divided into four main components of expenditure:

$$Y = C + I + G + NX$$

This is a fundamental identity in macroeconomics.

1. **Consumption (C):** Spending by households on goods and services.

- Includes:
 - **Durable goods:** Goods that last for a relatively long time, such as cars and appliances. Purchases of durable goods can be a signal of consumer confidence.
 - **Non-durable goods:** Goods that are used up more quickly, such as food and clothing. These are often necessities.
 - **Services:** Intangible items such as healthcare, education, haircuts, and air travel. Services are a growing component of consumption in developed economies.
- **Household:** A group of individuals sharing consumption decisions.
- **MBA Application:** Consumption accounts for a large portion of GDP (around 70% in the US), making consumer behavior crucial for businesses to understand and forecast.

2. **Investment (I):** Spending on goods (called capital goods) that will be used in the future to produce more goods and services. It is NOT the purchase of financial assets like stocks and bonds.

- Includes:
 - **Business Fixed Investment (Capital Spending):** Purchases of new machinery, equipment, and structures by firms. Economists primarily refer to physical capital here, not financial capital.
 - **Residential Fixed Investment:** Purchases of new housing by households and landlords. The purchase of existing homes is NOT included in GDP as it was counted when new. The service provided by housing is captured through actual rent or "owner's equivalent rent" (the rent homeowners effectively pay to themselves).
 - **Inventory Investment:** The change in firms' inventories of goods. If inventories increase, this counts as positive investment. If they decrease, it's negative investment. This ensures that goods produced but not yet sold are counted in GDP in the period they are produced.
- **Special US Inclusion:** The US uniquely includes R&D spending on intellectual property as part of investment in its GDP calculations.
- **MBA Application:** Investment is a critical driver of economic growth and recessions. Businesses watch investment trends closely as indicators of future economic health and to make their own capital expenditure decisions.

3. **Government Purchases (G):** Spending on goods and services by local, state, and federal governments.

- Includes: Salaries of government workers, purchases of military equipment, and spending on infrastructure like roads and schools.

- **Excludes Transfer Payments:** Payments for which no good or service is exchanged, such as Social Security benefits, unemployment insurance, and Medicare. These are not counted because they do not represent production of new goods or services; they simply redistribute existing income.
 - **MBA Application:** Government spending levels and priorities can significantly impact specific industries and the overall economy.
4. **Net Exports (NX):** Spending on domestically produced goods by foreigners (exports) minus spending on foreign goods by domestic residents (imports).
- **Exports (X):** Goods and services produced domestically and sold abroad. These add to GDP.
 - **Imports (M):** Goods and services produced abroad and purchased by domestic consumers, businesses, or government. These are subtracted because they are already counted in C, I, or G, but do not represent domestic production.
 - **Trade Deficit:** If NX is negative (imports > exports), the country has a trade deficit.
 - **Conceptual Insight:** Imports do not inherently reduce GDP; their subtraction in the NX component merely corrects for their inclusion in C, I, or G, ensuring GDP reflects only domestic production.
 - **MBA Application:** Exchange rates, trade policies, and global economic conditions affecting NX are vital for international businesses.
- *Metacognitive Prompt:* Which component of GDP do you think is most volatile? Why might this be the case, and what implications does this have for businesses?

Other Measures of Income

(While the transcript focuses mainly on GDP, the textbook summary mentions "Other Measures of Income." These can include Gross National Product (GNP), Net National Product (NNP), National Income, Personal Income, and Disposable Personal Income. For conceptual understanding, it's key to know that GDP is just one measure, and others adjust for factors like depreciation or focus on income actually received by households.)

Seasonal Adjustment

(Many economic statistics, including GDP components, are seasonally adjusted to remove the effects of regular seasonal patterns, like increased retail spending before Christmas. This helps in identifying underlying economic trends. The transcript shows unadjusted data for men's labor force participation highlighting seasonal effects.)

2-2 Measuring the Cost of Living: The Consumer Price Index (CPI)

Core Concept: The Consumer Price Index (CPI) is a measure of the overall cost of a fixed basket of goods and services bought by a typical urban household. It is the most widely used measure of inflation.

The Price of a Basket of Goods

The Bureau of Labor Statistics (BLS) calculates the CPI through these steps:

1. **Fix the Basket:** Determine the goods and services a typical consumer buys and their relative importance (weights) in the household budget. Housing is the largest component.
 2. **Find the Prices:** Collect data on the prices of all the items in the basket each month.
 3. **Compute the Basket's Cost:** Use the price data to calculate the total cost of the basket at different times.
 4. **Choose a Base Year and Compute the Index:**
$$\text{CPI} = \frac{\text{Cost of Basket in Current Year}}{\text{Cost of Basket in Base Year}} \times 100$$
 5. **Compute the Inflation Rate:** The percentage change in the CPI from the preceding period.
- *Active Recall Prompt:* If the CPI was 150 last year and is 156 this year, what is the inflation rate?

How the CPI Compares with the GDP and PCE Deflators

While both CPI and the GDP deflator measure the overall price level, they differ in key ways:

1. Basket of Goods:

- **GDP Deflator:** Reflects the prices of all goods and services **produced domestically** (C, I, G, X). The basket changes automatically as the composition of GDP changes.
- **CPI:** Reflects the prices of a **fixed basket** of goods and services **bought by consumers**, including imported goods.

2. Scope of Goods:

- The GDP deflator includes prices of capital goods (investment) and goods purchased by the government, which are not part of the typical consumer's basket and thus not in the CPI.
- The CPI includes prices of imported consumer goods, while the GDP deflator only includes domestically produced goods.

Personal Consumption Expenditures (PCE) Deflator:

- Similar to the GDP deflator, but only for the consumption component of GDP.
- It includes imported consumer goods (like CPI) and allows the basket of goods to change over time as consumer habits change (unlike CPI, similar to GDP deflator).
- The Federal Reserve prefers the PCE deflator for gauging inflation, partly because it accounts for substitution effects.

Does the CPI Overstate Inflation?

The CPI is widely believed to overstate actual inflation due to several biases:

1. **Substitution Bias:** The CPI uses a fixed basket, so it doesn't account for consumers substituting towards goods that have become relatively cheaper. If steak prices rise and people buy more chicken, the CPI still assumes they buy the original amount of steak, overstating the increase in their cost of living.
 2. **Introduction of New Goods:** New goods increase consumer choice and welfare. Over time, the same amount of money buys access to a wider variety of products (e.g., streaming music vs. buying CDs). The CPI is slow to incorporate new goods, so it doesn't fully reflect this increase in the dollar's purchasing power.
 3. **Unmeasured Quality Change:** If the quality of a good improves while its price remains the same (or increases less than the quality improvement), the value of a dollar increases. The BLS tries to adjust for quality, but it's difficult to measure perfectly. For example, a \$1000 laptop today is vastly superior to a \$1000 laptop from 20 years ago. If quality improvements are understated, inflation is overstated.
- **Estimated Bias:** These biases are thought to make the CPI overstate inflation by perhaps less than 1 percentage point per year.
 - **MBA Application:** Understanding CPI biases is crucial when interpreting inflation data for wage negotiations (COLA clauses), investment strategies, and understanding real interest rates.

Headline vs. Core Inflation:

- **Headline Inflation:** Measures price changes for the entire basket of goods and services.
- **Core Inflation:** Excludes volatile food and energy prices from the basket. It's often seen as a better indicator of underlying, long-term inflation trends. However, critics argue it excludes necessities people must buy.

2-3 Measuring Joblessness: The Unemployment Rate

Core Concept: The unemployment rate is a key indicator of labor market health, representing the percentage of the labor force that is jobless but actively seeking work.

The Household Survey

The Bureau of Labor Statistics (BLS) conducts a monthly survey of households (Current Population Survey) to categorize the adult population (16 years and older) into three groups:

1. **Employed:** People who worked as paid employees, worked in their own business, or worked unpaid in a family member's business. Includes full-time and part-time workers, and those temporarily absent (e.g., vacation, illness).

2. **Unemployed:** People who were not employed, were available for work, and had actively looked for work during the previous four weeks. Also includes those waiting to be recalled to a job from which they had been laid off.
3. **Not in the Labor Force:** People who fit neither of the first two categories, such as full-time students (without jobs), homemakers, retirees, and discouraged workers (those who want a job but have given up looking).

From these categories, two key statistics are derived:

- **Labor Force:** The sum of the employed and the unemployed. $\text{Labor Force} = \text{Employed} + \text{Unemployed}$
- **Unemployment Rate:** The percentage of the labor force that is unemployed.
 $\text{Unemployment Rate} = \frac{\text{Labor Force Unemployed}}{\text{Labor Force}} \times 100$
- **Labor-Force Participation Rate:** The percentage of the adult population that is in the labor force.
 $\text{Labor-Force Participation Rate} = \frac{\text{Adult Population Labor Force}}{\text{Adult Population}} \times 100$
 - *Elaboration Prompt:* Why might the labor-force participation rate be a more informative statistic than the unemployment rate in certain economic conditions? Consider the concept of "discouraged workers."

The Establishment Survey (Payroll Survey)

The BLS also conducts the Establishment Survey, which surveys businesses to measure the number of workers on their payrolls. This provides another measure of employment, often focused on job creation. It differs from the household survey because, for example, a person with two jobs would be counted twice in the establishment survey but only once in the household survey.

- **MBA Application:** Labor market statistics are vital for businesses in human resource planning, wage setting, and forecasting consumer demand. High unemployment can signal weak demand, while low unemployment might mean labor shortages and wage pressures.

2-4 Conclusion: From Statistics to Models

The statistics discussed in this chapter—GDP, CPI, unemployment rate—provide a snapshot of the economy's health and are essential for tracking economic performance over time and across countries. They are the factual foundation upon which macroeconomic models are built. These models, in turn, help us understand the forces that shape the economy and how economic policies might influence these key indicators. For MBA students, a firm grasp of this data allows for a more nuanced understanding of the business environment, risk assessment, and strategic planning.

Key Terms Glossary

- **Gross Domestic Product (GDP):** The market value of all final goods and services produced within a country in a given period.
- **Final Goods:** Goods intended for the end user, not for further processing or resale.

- **Intermediate Goods:** Goods used as components or ingredients in the production of other goods.
- **Value Added:** The market value of a firm's output less the value of the intermediate goods the firm purchased.
- **Nominal GDP:** GDP valued at current market prices.
- **Real GDP:** GDP valued at constant (base-year) prices, adjusted for inflation.
- **GDP Deflator:** A measure of the price level calculated as $(\text{Nominal GDP} / \text{Real GDP}) \times 100$.
- **Consumption (C):** Household spending on goods and services.
- **Investment (I):** Spending on capital equipment, inventories, and structures, including new housing.
- **Government Purchases (G):** Government spending on goods and services (excluding transfer payments).
- **Net Exports (NX):** Exports minus imports.
- **Consumer Price Index (CPI):** A measure of the overall cost of a fixed basket of goods and services bought by a typical consumer.
- **Inflation Rate:** The percentage change in a price index from one period to the next.
- **PCE Deflator (Personal Consumption Expenditures Deflator):** A measure of the price level for consumption goods, preferred by the Fed.
- **Labor Force:** The total number of workers, including both the employed and the unemployed.
- **Unemployment Rate:** The percentage of the labor force that is unemployed.
- **Labor-Force Participation Rate:** The percentage of the adult population that is in the labor force.
- **Stock:** A quantity measured at a point in time.
- **Flow:** A quantity measured per unit of time.
- **Imputed Value:** An estimated value for goods or services that are not sold in the marketplace (e.g., owner-occupied housing services).
- **Seasonal Adjustment:** A statistical procedure to remove the effects of predictable seasonal fluctuations from time series data.

Conceptual Review Questions

1. Why is it important for GDP to only include the value of *final* goods and services? Explain the concept of "value added" in this context.
2. If a country's Nominal GDP increased by 7% but its Real GDP only increased by 3%, what does this imply about the country's inflation rate? Which GDP figure gives a better sense of whether living standards are improving?

Why?

3. Explain the three main biases that cause the CPI to potentially overstate inflation. For each bias, provide a brief example.
 4. How does the basket of goods used to calculate the GDP deflator differ from the basket used for the CPI? How does this difference affect what each index measures, particularly concerning imported goods and capital goods?
 5. Can the unemployment rate and the labor-force participation rate move in opposite directions? Explain a scenario where this might happen and what it would signify about the labor market.
 6. What is the difference between government purchases (G) and government transfer payments? Why are transfer payments excluded from GDP?
-

Prompts for Further Reflection & Application

- **For Your Industry:** How might a significant and sustained increase in the inflation rate (as measured by CPI or PCE deflator) affect strategic decisions in your current or target industry (e.g., pricing, investment, wage negotiations)?
- **Investment as a Driver:** The transcript emphasizes that investment (I) is a key driver of economic fluctuations. What factors do you think influence a business's decision to invest in new capital or R&D? How might macroeconomic data guide these decisions?
- **Data Limitations:** While GDP is a comprehensive measure, what aspects of economic well-being or societal progress might it fail to capture?
- *What concept from this chapter remains least clear to you, and what steps will you take to clarify it?*
- *Review these core concepts again in 3 days, and then again in one week, focusing on explaining them in your own words without looking at your notes.*

Chapter 3: National Income: How It Is Earned – Study Guide

This study guide focuses on the conceptual understanding of how national income is generated and distributed, drawing from the principles outlined in your course materials. It is formatted for ease of conversion to .epub.

Introduction: From Demand to Supply

In the previous chapter, the focus was on the demand side of the economy, represented by the equation $Y=C+I+G+NX$, which details who is buying goods and services. This chapter shifts to the **supply side**, exploring the production of these goods and services. Here, "Y" represents output or national income, and we delve into what determines this "Gross Domestic Product."

For initial simplicity, this chapter often assumes a **closed economy**, meaning net exports (NX) are zero. This assumption will be relaxed in later, more complex models.

3-1 What Determines the Total Production of Goods and Services?

The economy's total output of goods and services (real GDP, denoted as Y) is determined by two primary elements: the factors of production and the production technology.

The Factors of Production

These are the inputs used to produce goods and services. The two main factors considered are:

- **Capital (K):** The set of tools, machinery, and structures used in production. This includes physical items like equipment.
- **Labor (L):** The physical and mental effort of workers. This encompasses the time people spend working.

The Production Function

The available production technology determines how much output (Y) is produced from given amounts of capital (K) and labor (L). This relationship is expressed through a **production function**:

$$Y=F(K,L)$$

This function states that output is a function of the amount of capital and the amount of labor.

- **Technology:** Represented implicitly by the form of the function F, technology is the society's understanding of how best to produce goods and services. An improvement in technology allows an economy to produce more output from the same combination of inputs. Technology is not just computer chips but the overall know-how.
- **Impact of Inputs:** Generally, more capital or more labor leads to more output.

The Supply of Goods and Services

The factors of production and the production function together determine the quantity of goods and services supplied, which in turn equals the economy's output. For this chapter, we typically assume that the supplies of capital and labor, and the state of technology, are fixed. Therefore, output Y is also fixed at a level Y^* :

$$Y = F(K^-, L^-) = Y^-$$

Returns to Scale

Returns to scale describe how output responds to an increase in all factors of production by the same percentage.

- **Constant Returns to Scale (CRS):** If all inputs are increased by a certain percentage (e.g., $z\%$), output increases by the same percentage. $F(zK, zL) = zY$ This is a common assumption for the economy as a whole.
- **Increasing Returns to Scale (IRS):** If all inputs are increased by $z\%$, output increases by *more* than $z\%$.
 $F(zK, zL) > zY$
- **Decreasing Returns to Scale (DRS):** If all inputs are increased by $z\%$, output increases by *less* than $z\%$.
 $F(zK, zL) < zY$ Economically, decreasing returns to scale are often considered more likely for an economy as a whole, though individual businesses might experience constant or increasing returns. For simplicity in many models, constant returns to scale are assumed.

3-2 How Is National Income Distributed to the Factors of Production?

National income flows from firms to households through the payments firms make to the factors of production.

Factor Prices

Factor prices are the amounts paid to the factors of production.

- For labor (L), the factor price is the **wage (W)**.
- For capital (K), the factor price is the **rental rate (R)**.

These prices are determined by supply and demand in the factor markets. Assuming fixed supply for K and L, the demand for these factors becomes crucial.

Real vs. Nominal Factor Prices

- **Real Wage:** The payment to labor measured in units of output (W/P , where P is the price level). It reflects the purchasing power of the wage.
- **Real Rental Price of Capital:** The payment to capital measured in units of output (R/P). It reflects the purchasing power of the rental income.

Economists generally want to see real wages grow, indicating increasing wealth for society on average.

The Decisions Facing a Competitive Firm

A **competitive firm** is small relative to the markets in which it operates and therefore takes the prices of its output and inputs as given by market conditions. The firm's goal is to maximize **profit**, which is revenue minus costs.

$$\text{Profit} = \text{Revenue} - \text{Labor Costs} - \text{Capital Costs}$$

$$\text{Profit} = (P \times Y) - (W \times L) - (R \times K)$$

To maximize profit, the firm decides how much of each factor of production to employ.

The Firm's Demand for Factors

Firms hire factors up to the point where the additional benefit from an extra unit of the factor equals its cost.

Marginal Product of Labor (MPL)

The **Marginal Product of Labor (MPL)** is the extra amount of output the firm gets from one extra unit of labor, holding the amount of capital fixed.

$$\text{MPL} = F(K, L+1) - F(K, L)$$

Most production functions exhibit **diminishing marginal product**: holding capital fixed, the MPL decreases as the amount of labor increases. This is because with a fixed amount of capital, additional workers have less capital to work with, making them less productive.

The firm demands labor up to the point where the value of the marginal product of labor ($P \times \text{MPL}$) equals the nominal wage (W), or:

$$\text{MPL} = W/P \text{ (Real Wage)}$$

The MPL schedule is the firm's labor demand curve.

Marginal Product of Capital (MPK)

The **Marginal Product of Capital (MPK)** is the extra amount of output the firm gets from one extra unit of capital, holding the amount of labor fixed.

$$\text{MPK} = F(K+1, L) - F(K, L)$$

Like MPL, MPK also exhibits diminishing marginal product. The firm rents capital up to the point where:

$$\text{MPK} = R/P \text{ (Real Rental Price of Capital)}$$

The MPK schedule is the firm's capital demand curve.

In summary: A profit-maximizing competitive firm hires each factor of production until that factor's marginal product falls to equal its real factor price.

The Distribution of National Income

If all firms in the economy are competitive and profit-maximizing, then each factor of production is paid its marginal contribution to the production process.

- Total real wages paid to labor = $\text{MPL} \times L$
- Total real rental income paid to capital owners = $\text{MPK} \times K$

If the production function has constant returns to scale, then **economic profit** is zero. According to Euler's theorem, if each factor is paid its marginal product, the sum of these factor payments equals total output:

$$Y = (MPL \times L) + (MPK \times K)$$

Output is therefore divided between payments to labor and payments to capital, based on their marginal productivities. Accounting profit may still be positive due to how capital is treated (e.g., if capital owners also own the firm).

The Cobb–Douglas Production Function

A commonly used production function that exhibits constant factor shares and constant returns to scale (if the exponents sum to 1) is the **Cobb–Douglas production function**:

$$Y = AK\alpha L^{1-\alpha}$$

Where:

- A is a parameter greater than zero measuring the productivity of the available technology (total factor productivity).
- α is a constant between 0 and 1 that measures capital's share of income.
 - Capital income = $MPK \times K = \alpha Y$
 - Labor income = $MPL \times L = (1-\alpha)Y$

The marginal products for the Cobb-Douglas function are:

- $MPL = (1-\alpha)A(K/L)^\alpha = (1-\alpha)Y/L$
- $MPK = \alpha A(L/K)^{1-\alpha} = \alpha Y/K$

This function implies that the shares of income paid to capital and labor are constant, equal to α and $1-\alpha$ respectively, regardless of the levels of K and L or the state of technology A.

Productivity, specifically MPL, should be highly related to real wages. Historically, while productivity has risen, real wage growth for all segments of the labor force has not always kept pace, particularly for unskilled labor.

3-3 The Growing Gap Between Rich and Poor

In the U.S. and many other industrialized countries, income inequality has increased significantly over the past half-century. This suggests that the distribution of national income has been changing.

A Falling Labor Share / Rising Capital Share (α)

If the share of income going to capital (α) increases, then the share going to labor ($1-\alpha$) decreases. This means that as the economy grows, capital owners receive a larger slice of the expanding pie relative to labor. This trend has been observed in many industrialized countries and is likely driven by factors like technological advancements that enhance

the productive power of capital more than labor.

Explanations for Increased Inequality:

Several factors are proposed to explain the growing income gap:

1. The Race Between Education and Technology (Skill-Biased Technological Change):

- Technological advancements often increase the demand for skilled workers who can utilize new technologies effectively, while diminishing the demand for unskilled workers whose tasks might be automated or require less skill.
- If educational systems do not produce enough workers with the skills to match technological progress, the wage gap between skilled and unskilled workers widens. Highly skilled workers can leverage new technology to become much more productive, leading to higher wages for them.

2. Globalization:

- Increased international trade means domestic labor competes with foreign labor.
- Jobs that can be easily outsourced (e.g., some manufacturing, call centers) may see downward pressure on wages or job losses in high-wage countries.
- Jobs that are difficult to outsource (e.g., surgeons, plumbers, electricians) or high-skilled jobs that benefit from global markets may see wages rise.
- While globalization generally benefits an economy overall, it creates winners (often skilled labor and capital owners) and losers (often unskilled labor in import-competing industries).

3. The Evolving Role of Marriage (Assortative Mating):

- **Assortative mating** is the tendency for people with similar characteristics, including education and income potential, to marry each other.
- If high-income individuals marry other high-income individuals, their combined household income is significantly higher than that of households formed by lower-income individuals.
- Changes in marriage and divorce rates, particularly if they differ by income and education level, can also affect household income inequality. Higher-income individuals tend to have higher marriage rates and lower divorce rates compared to lower-income individuals. This can lead to a concentration of dual-income high-earning households and more single-parent or single-individual low-earning households, widening the inequality gap.

4. Changes in Market Power:

- A decrease in worker power (e.g., declining unionization rates) and an increase in firm market power (e.g., due to industry consolidation or globalization allowing firms to relocate production) can shift the balance of income distribution away from labor and towards capital.

The Policy Questions

Understanding the causes of rising inequality is crucial for formulating effective policy responses, though specific policies are not detailed in this chapter's core focus on income determination and distribution.

3-4 Conclusion

This chapter has outlined the neoclassical theory of how national income is produced and distributed. Key takeaways include:

- The economy's output is determined by its factors of production (capital and labor) and its production technology.
- Under competitive, profit-maximizing conditions, each factor of production is paid its marginal product.
- If the production function has constant returns to scale, total factor payments exhaust total output.
- The Cobb-Douglas production function provides a useful framework where factor shares are constant.
- Growing income inequality in many developed nations is a complex issue with multiple contributing factors related to technology, globalization, education, and societal trends.

Key Concepts

- **Factors of production:** Inputs used to produce goods and services (e.g., capital K , labor L).
- **Production function:** A mathematical relationship showing how inputs are transformed into output ($Y=F(K,L)$).
- **Constant returns to scale:** A property of a production function where a proportional increase in all inputs results in an increase in output by the same proportion.
- **Factor prices:** The prices per unit that firms pay for the factors of production (e.g., wage W for labor, rental rate R for capital).
- **Competitive firm:** A firm that is a price taker for both its inputs and its output.
- **Profit:** A firm's total revenue minus its total costs.
- **Marginal product of labor (MPL):** The additional output produced from one additional unit of labor, holding other inputs constant.
- **Diminishing marginal product:** A property whereby the marginal product of an input declines as the quantity of the input increases, holding other inputs constant.
- **Real wage:** The payment to labor measured in units of output (W/P); the purchasing power of the nominal wage.
- **Marginal product of capital (MPK):** The additional output produced from one additional unit of capital, holding other inputs constant.
- **Real rental price of capital:** The payment to capital measured in units of output (R/P); the purchasing power of the nominal rental rate.
- **Economic profit versus accounting profit:** Economic profit is revenue minus all costs, including the opportunity costs of all inputs. If the production function has constant returns to scale and factors are paid their marginal products, economic profit is zero. Accounting profit may differ based on how costs, particularly for capital, are measured.
- **Cobb–Douglas production function:** A specific production function of the form $Y=AK\alpha L^{1-\alpha}$, which often exhibits constant factor shares.

Questions for Review

1. What determines the amount of output an economy produces?
2. Explain how a competitive, profit-maximizing firm decides how much of each factor of production to demand.

3. What is the role of constant returns to scale in the distribution of income?
4. Write a Cobb–Douglas production function describing an economy in which capital earns one-fourth of total income.
5. List three possible explanations for the increase in U.S. income inequality over the past several decades.

Chapter 4: National Income: How It Is Spent – Study Guide

This study guide focuses on the conceptual understanding of how national income is spent, the components of aggregate demand, and the mechanisms that bring supply and demand into equilibrium, particularly through the market for loanable funds. It is formatted for ease of conversion to .epub.

Introduction: The Demand Side of the Economy

This chapter revisits and expands on the components of the demand side of the economy: Consumption (C), Investment (I), and Government Spending (G). The primary goal is to develop an understanding of the **market for loanable funds**, a crucial model in economics. We will initially assume a **closed economy**, meaning net exports (NX) are zero, to simplify the model. This assumption will be relaxed in later studies.

4-1 What Determines the Demand for Goods and Services?

In a closed economy, the demand for goods and services (Y) comes from three sources:

$$Y=C+I+G$$

Let's break down each component:

Consumption (C)

Household income can be allocated to three "buckets":

1. **Taxes (T)**: Payments to the government.
2. **Consumption (C)**: Spending on goods and services.
3. **Saving (S)**: Income not spent on taxes or consumption.

Disposable Income (YD)

This is the income households have left after paying taxes:

$$YD=Y-T$$

The Consumption Function

Consumption is primarily determined by disposable income. The consumption function expresses this relationship:

$$C=C(Y-T)$$

Key features of the consumption function:

- **Marginal Propensity to Consume (MPC):** The amount by which consumption changes when disposable income increases by one dollar. It is the slope of the consumption function.
 - The MPC is between 0 and 1. For example, if MPC is 0.8, households spend 80 cents of each additional dollar of disposable income and save 20 cents.
 - In the U.S., the aggregate MPC is estimated to be relatively low (around 1/3) because higher-income individuals, who have a lower MPC, account for a larger share of total income (dollars are "votes" in determining the aggregate MPC). Poorer individuals tend to have a much higher MPC, often close to 1.
- **Autonomous Consumption:** This is the intercept of the consumption function, representing the amount of consumption that occurs even if disposable income is zero. This includes essential spending like rent, basic food, and utilities, which households try to maintain regardless of short-term income fluctuations.

Investment (I)

Investment refers to spending by businesses on capital (equipment, machinery, structures) and spending by households on new houses. Investment is determined by the **real interest rate (r)**.

- **Nominal Interest Rate (i):** The interest rate as usually reported, without a correction for inflation.
- **Real Interest Rate (r):** The nominal interest rate corrected for the effects of inflation (π): $r=i-\pi$. The real interest rate measures the true cost of borrowing and the true return to lending.

Investment Function

Investment is negatively related to the real interest rate:

$$I=I(r)$$

- When the real interest rate is high, borrowing is expensive, and the opportunity cost of using one's own funds for investment is high (as those funds could earn a high return elsewhere, e.g., in bonds). Thus, firms and households undertake fewer investment projects.
- When the real interest rate is low, borrowing is cheaper, and the return on alternative financial assets is lower, making more investment projects profitable.

Residential real estate investment (new home purchases) is also sensitive to the real interest rate, as most home purchases are financed with mortgages.

Government Purchases (G)

Government purchases include spending on goods and services by federal, state, and local governments (e.g., infrastructure, military, salaries of government employees).

- **Exclusion of Transfer Payments:** Transfer payments (e.g., Social Security, unemployment benefits) are not included in G because they reallocate existing income rather than representing a direct purchase of goods or services. Taxes (T) are considered net of transfer payments.
- **Exogenous Variables:** For modeling purposes, government purchases (G) and taxes (T) are typically treated as **exogenous variables**. This means they are taken as given, determined by political decisions outside the economic model.
 - $G = G^-$
 - $T = T^-$

Budget Surplus/Deficit:

- If $T > G$, the government runs a **budget surplus** (positive public saving).
- If $T < G$, the government runs a **budget deficit** (negative public saving), which must be financed by borrowing (issuing Treasury bonds).
- If $T = G$, the budget is balanced. Most countries, including the U.S., typically run budget deficits.

4-2 What Brings the Supply and Demand for Goods and Services into Equilibrium?

The real interest rate is the key variable that adjusts to ensure the demand for goods and services equals the supply.

Equilibrium in the Market for Goods and Services

The supply of output is fixed by the factors of production and the production function:

$$Y = F(K^-, L^-) = Y^-$$

The demand for output comes from C, I, and G:

$$Y = C(Y - T) + I(r) + G$$

Substituting the fixed values and functions:

$$Y^- = C(Y^- - T^-) + I(r) + G^-$$

In this equation, Y^- , G^- , and T^- are fixed. The consumption function $C(Y^- - T^-)$ is also fixed once disposable income is determined. Therefore, the only variable that can adjust to ensure the equation holds is the **real interest rate (r)**, which affects investment $I(r)$.

Equilibrium in the Financial Markets: The Supply of and Demand for Loanable Funds

The financial markets are where saving (supply of loanable funds) meets investment (demand for loanable funds).

National Saving (S)

National saving is the total income in the economy that remains after paying for consumption and government purchases.

$$S=Y-C-G$$

National saving can be broken down into:

- **Private Saving (S_{private}):** Disposable income minus consumption. $S_{private}=Y-T-C$
- **Public Saving (S_{public}):** Tax revenue minus government spending. $S_{public}=T-G$

Therefore, National Saving $S=S_{private}+S_{public}$.

Substituting the components of demand ($Y=C+I+G$) into the national income accounts identity and rearranging for investment:

$$I=Y-C-G$$

Since $S=Y-C-G$, it follows that in a closed economy:

$$S=I$$

This identity states that saving must equal investment. The market for loanable funds ensures this.

The Loanable Funds Market

- **Supply of Loanable Funds:** Comes from national saving (S). Initially, under the "theory of liquidity preferences" (a simplifying assumption), saving might be considered independent of the interest rate, making the supply curve vertical. However, a more general view is that higher real interest rates encourage more saving, making the supply curve upward sloping. $S(r)=Y-C(Y-T)-G$
- **Demand for Loanable Funds:** Comes from investment (I). Firms and households borrow to finance investment projects. The demand for loanable funds is negatively related to the real interest rate, so the demand curve is downward sloping. $I=I(r)$

The **real interest rate (r)** adjusts to bring the supply of loanable funds (saving) and the demand for loanable funds (investment) into equilibrium. At the equilibrium interest rate, households' desire to save balances firms' desire to invest, and the quantity of loanable funds supplied equals the quantity demanded.

Changes in Saving: The Effects of Fiscal Policy

Fiscal policy (changes in G or T) can affect national saving and thus shift the supply of loanable funds.

- **Increase in Government Purchases ($\Delta G > 0$):**

- Directly increases demand for goods and services.
- Reduces public saving ($T-G$) and thus national saving ($Y-C-G$).
- The supply of loanable funds shifts to the left.
- This leads to a higher equilibrium real interest rate and lower equilibrium investment.
- The reduction in investment due to government borrowing is called **crowding out**. Higher government spending "crowds out" private investment by raising interest rates.
- **Decrease in Taxes ($\Delta T < 0$):**
 - Increases disposable income ($Y-T$) and thus stimulates consumption.
 - The increase in consumption is $\Delta C = MPC \times (-\Delta T)$.
 - National saving $S = Y - C - G$ changes by $-\Delta C$. Since $MPC < 1$, the reduction in saving is less than the tax cut.
 - The supply of loanable funds shifts to the left (though typically by less than a G increase of the same magnitude).
 - This also leads to a higher equilibrium real interest rate and lower investment (crowding out).

Changes in Investment Demand

Shifts in the investment demand curve can also alter the equilibrium in the loanable funds market.

- **Increase in Investment Demand:** This can be caused by:
 - **Technological innovation:** New technologies can make investment projects more profitable.
 - **Government tax incentives:** Policies like investment tax credits or research and development (R&D) tax credits can encourage firms to invest more at any given interest rate.
- **Effect:**
 - The investment demand curve (demand for loanable funds) shifts to the right.
 - This leads to a higher equilibrium real interest rate.
 - If the saving supply curve is vertical (savings unresponsive to r), the quantity of investment remains unchanged, but the interest rate rises.
 - If the saving supply curve is upward sloping (savings responsive to r), then both the equilibrium interest rate and the equilibrium quantity of saving and investment will increase.

Factors Influencing Saving (Shifting the Savings Curve):

- **Public Savings:** Changes in G or T .
- **Private Savings:**
 - Preferences for saving (MPC , autonomous consumption). For example, rising housing costs might increase autonomous consumption, reducing household savings.
 - Tax laws affecting saving incentives (e.g., 401(k)s, IRAs, Health Savings Accounts (HSAs)). Traditional accounts offer upfront tax benefits, while Roth accounts offer backend benefits. Changes to these can alter saving behavior.
 - Consumption taxes (like sales taxes or Value Added Taxes - VATs) vs. income taxes. Higher consumption taxes tend to encourage saving and reduce spending, as people try to avoid the tax by consuming less.

4-3 Conclusion

This chapter explored the components of aggregate demand in a closed economy and how the real interest rate balances the supply and demand for goods and services, or equivalently, the supply and demand for loanable funds.

- Consumption depends on disposable income.
- Investment depends negatively on the real interest rate.
- Government purchases and taxes are exogenous fiscal policy variables.
- The real interest rate adjusts to equilibrate saving and investment.
- Fiscal policy changes can "crowd out" investment by affecting national saving and raising the interest rate.
- Shifts in investment demand also affect the interest rate and the quantity of investment. The loanable funds market is a powerful tool for analyzing how these macroeconomic variables interact.

Key Concepts

- **Disposable income (YD):** Income remaining after payment of taxes ($Y-T$).
- **Consumption function ($C(Y-T)$):** The relationship between consumption and disposable income.
- **Marginal propensity to consume (MPC):** The fraction of an extra dollar of disposable income that is spent on consumption.
- **Interest rate:** The price of borrowing or the return to lending.
- **Nominal interest rate (i):** The interest rate not adjusted for inflation.
- **Real interest rate (r):** The nominal interest rate adjusted for inflation ($r=i-\pi$).
- **National saving (S) (or Saving):** The economy's total income minus consumption and government purchases ($Y-C-G$).
- **Private saving ($S_{private}$):** Disposable income minus consumption ($Y-T-C$).
- **Public saving (S_{public}):** Tax revenue minus government purchases ($T-G$).
- **Loanable funds:** The flow of resources available to fund private investment. In a closed economy, this is national saving.
- **Crowding out:** The reduction in investment that results when expansionary fiscal policy (e.g., increased government spending or tax cuts) raises the interest rate.

Questions for Review

1. What determines consumption and investment?
2. Explain the difference between government purchases and transfer payments. Give two examples of each.
3. What makes the demand for the economy's output of goods and services equal the supply?
4. Explain what happens to consumption, investment, and the interest rate when the government increases taxes.

Chapter 5: A First Look at the Monetary System – Study

Guide

This study guide delves into the concept of money, its functions, types, how its quantity is measured, and how it is controlled, primarily focusing on the role of central banks like the Federal Reserve. It is formatted for ease of conversion to .epub.

Introduction

This chapter is divided into two main parts: understanding what money is, and then exploring how the money supply is controlled within an economy.

5-1 What Is Money?

Money is more than just the paper currency and coins we use daily. It can take various forms, from the familiar dollar bills and euros to more exotic examples like the giant stone discs used on the Island of Yap or cigarettes in POW camps.

Historically, gold and silver were common forms of money.

To be considered **money**, an asset must fulfill three crucial functions:

1. Medium of Exchange:

- This is the primary function of money. It means that people are willing to accept the item as payment for goods and services. [cite: 23, 24]
- The acceptability of an item as a medium of exchange can be geographically dependent. For example, U.S. dollars might not be accepted in all foreign countries, though in some, like the Bahamas, they circulate alongside local currency. [cite: 27, 28, 29, 30] A giant stone disc from Yap would likely not be accepted as payment for a house outside of Yap. [cite: 34, 35]

2. Store of Value:

- Money must be able to transfer purchasing power from the present into the future. [cite: 37, 39]
- A \$20 bill today should still be able to purchase goods next week (though inflation can erode its value over longer periods). [cite: 41, 42]
- Commodities like gold serve as good stores of value because they don't rust, tarnish, or easily degrade. [cite: 48, 49, 51] Stone discs on Yap also retain their physical form. [cite: 47]

3. Unit of Account:

- Money provides a common measure for the value of goods and services, acting as a yardstick. [cite: 52, 53, 54]
- When we price items in dollars, we are using the dollar as the unit of account. [cite: 55]
- An interesting example is how zoos, which often cannot buy or sell animals, use the "Gentoo penguin" as a unit of account to value other animals for trade. For an item to be money, it must perform all three

functions. [cite: 61, 62, 63, 64, 68]

Money can be thought of as a technology that works because of collective belief. [cite: 69, 70]

The Types of Money

1. Fiat Money:

- Fiat money has no intrinsic value; it is not backed by a physical commodity. [cite: 71, 72] Examples include paper currency like U.S. dollars. [cite: 72]
- Its value derives solely from government decree ("fiat") and the collective belief that it will be accepted by others as payment. [cite: 73, 79] This is sometimes referred to as the "Tinkerbelle effect": it has value because people believe it does. [cite: 148, 168, 169]
- U.S. paper money, despite being potentially unhygienic (with studies showing residue or bodily fluids on bills), is valued and accepted because of this collective belief. [cite: 125, 130, 134, 137, 138]

2. Commodity Money:

- Commodity money has intrinsic value; the item would have value even if it were not used as money. [cite: 80]
- Examples include gold coins (gold has industrial and jewelry uses) or cigarettes (they can be smoked). [cite: 81, 82, 86]
- Some U.S. coins, like pennies minted before 1982 (primarily copper) and older nickels containing silver, have a metal content value that can exceed their face value, making them akin to commodity money. [cite: 92, 96, 97, 100, 101] Coinflation is a website that tracks this. [cite: 92] However, melting U.S. currency is illegal. [cite: 102]

Other Financial Instruments and Assets

- **Demand Deposits:** Funds in checking accounts are considered money. [cite: 170, 173] They serve as a unit of account, a store of value, and can be easily accessed for transactions via debit cards or checks, making them a medium of exchange. [cite: 173, 174, 175, 176] Checks themselves are not money but represent access to the funds in these accounts, similar to how the ownership registry of Yap stones (even one at the bottom of the ocean) represents value. [cite: 179, 189, 190, 201, 203, 205, 206]
- **Certificates of Deposit (CDs) / Time Deposits:** These are less liquid than demand deposits. [cite: 208, 209] While they are a good store of value (often earning interest) and a unit of account, they are not a great medium of exchange because accessing the funds typically requires a formal process. [cite: 209, 210, 211, 214, 215, 216, 217]
- **Credit Cards:** Credit cards are not money. [cite: 218] They are a means of deferring payment, essentially creating a short-term loan (an IOU) from the credit card company. [cite: 219, 220, 222]
- **Bitcoin and Cryptocurrencies:** Bitcoin is generally not considered fiat or commodity money. [cite: 224] Its utility as a unit of account is limited as prices aren't consistently denominated in Bitcoin. [cite: 224, 226, 227, 228] Its store of value function is questionable due to high volatility. [cite: 230] It's often compared to a collectible item, like rare coins or trading cards (e.g., a "Black Lotus" Magic: The Gathering card), whose value is driven by demand from collectors rather than its utility as money. [cite: 232, 233, 248, 250, 264]

5-2 How Is the Quantity of Money Measured?

The **money supply** is the quantity of money available in the economy, specifically assets readily used as a medium of exchange. [cite: 279, 280] Measuring this in a complex economy can be challenging due to the variety of assets used.

Liquidity refers to the ease with which an asset can be converted into the economy's medium of exchange. [cite: 300, 301] Cash is the most liquid asset. [cite: 306, 311] Other assets have varying degrees of liquidity. [cite: 312]

Different measures of the money supply capture assets with different levels of liquidity, often described as "Russian nesting dolls" where broader measures include narrower ones:

- **M0:** The narrowest definition, essentially representing physical currency (cash). [cite: 314, 316]
- **M1:** Includes M0 (cash) plus assets that are almost as liquid as cash. [cite: 317, 318] This includes:
 - Demand deposits (checking accounts). [cite: 319]
 - Traveler's checks. [cite: 320]
 - Other checkable deposits. [cite: 321]
- **M2:** Includes all of M1 plus some less liquid assets. [cite: 322, 323] This includes:
 - Money market mutual fund balances. [cite: 324]
 - Savings deposits. [cite: 326] (Savings accounts became less distinct from checking accounts when interest rates on them fell to near zero). [cite: 332, 333, 334]

5-3 How Is the Quantity of Money Controlled?

Monetary policy refers to the decisions made by a central bank concerning the money supply. [cite: 283]

The Federal Reserve (The Fed)

- In the United States, the **Federal Reserve (Fed)** is the central bank. [cite: 284] Other countries have their own central banks (e.g., European Central Bank, Bank of England, Bank of Japan). [cite: 285, 286, 287]
- The Fed was created in 1913, largely to act as a **lender of last resort** following a financial crisis that was averted by J.P. Morgan personally guaranteeing deposits. [cite: 337, 338, 339, 341]
- The **Federal Open Market Committee (FOMC)** is the body within the Fed that decides monetary policy. [cite: 343] It meets approximately every six weeks and includes the Board of Governors and the Fed Chair. [cite: 343, 344] The Fed Chair is appointed by the President for a four-year term and has significant influence. [cite: 346, 347, 351, 353]
- The Fed operates with considerable independence from direct political oversight in the U.S. [cite: 292, 293]
- **Dual Mandate:** The Fed has two main congressionally mandated goals:
 1. **Stable Prices:** Typically interpreted as keeping inflation around 2%. [cite: 354, 356, 357]

2. **Sustainable Employment:** Keeping unemployment low. [cite: 354, 358] These goals can sometimes conflict, requiring trade-offs. For instance, during the COVID-19 pandemic, the Fed prioritized supporting employment and financial stability, even if actions taken were inflationary. [cite: 355, 360, 361, 362]

How Central Banks Can Influence the Money Supply

Central banks have several tools to influence the money supply:

1. Open-Market Operations (OMOs):

- This is the primary tool used by the Fed to change the money supply. [cite: 368] It involves the buying and selling of U.S. government bonds in the open market, conducted by the New York Fed branch. [cite: 371, 372, 374]
- **To increase the money supply:** The Fed buys government bonds from the public. [cite: 376] This injects cash (liquidity) into the banking system as the Fed pays for these bonds. [cite: 376, 379, 380, 381]
- **To decrease the money supply:** The Fed sells government bonds to the public. [cite: 382] More commonly, the Fed allows existing bonds it holds to mature without reinvesting the proceeds. [cite: 383, 384, 388, 389] When the Treasury Department pays back the Fed for maturing bonds, and the Fed doesn't buy new ones, the Treasury must issue new bonds to the financial system, taking cash out of the system. [cite: 390, 391, 392, 393]

2. Lending to Banks (Discount Rate):

- The Fed can lend money to banks, acting as a lender of last resort. [cite: 397] The interest rate on these loans is called the **discount rate**. [cite: 398]
- A lower discount rate encourages banks to borrow more reserves from the Fed, potentially increasing their lending and thus the money supply. It signals that liquidity is available cheaply. [cite: 400, 401]
- A higher discount rate discourages bank borrowing from the Fed, potentially reducing lending. It signals that the Fed wants banks to be more cautious. [cite: 402, 403, 404]

3. Regulating Banks:

- The Fed plays a role in regulating banks and the overall banking system. [cite: 364] For example, FDIC insurance, which protects depositors, is part of the Federal Reserve system. [cite: 365, 366, 367] Regulatory actions can influence bank lending and stability. During the COVID pandemic, the Fed took numerous regulatory actions and created credit lines to ensure financial system liquidity and prevent collapse. [cite: 410, 413, 414]

5-4 Conclusion

Money is fundamental to modern economies, serving as a store of value, unit of account, and medium of exchange. It can be commodity-based or fiat-based, with fiat money's value resting on collective trust. The quantity of money is measured in various ways (M0, M1, M2) reflecting different degrees of liquidity. Central banks, like the Federal Reserve, manage the money supply through tools such as open-market operations and setting key interest rates, aiming to achieve macroeconomic goals like price stability and full employment.

Key Concepts

- **Money:** The stock of assets used for transactions.
- **Store of value:** An item's ability to transfer purchasing power from the present to the future.
- **Unit of account:** The yardstick people use to post prices and record debts.
- **Medium of exchange:** An item that buyers give to sellers when they want to purchase goods and services.
- **Fiat money:** Money without intrinsic value that is used as money because of government decree.
- **Commodity money:** Money that takes the form of a commodity with intrinsic value.
- **Gold standard:** A monetary system in which currency is directly convertible into gold.
- **Currency:** The paper bills and coins in the hands of the public.
- **Demand deposits:** Balances in bank accounts that depositors can access on demand by writing a check or using a debit card.
- **Money supply:** The quantity of money available in the economy.
- **Monetary policy:** The setting of the money supply by policymakers in the central bank.
- **Central bank:** An institution designed to oversee the banking system and regulate the quantity of money in the economy.
- **Federal Reserve (Fed):** The central bank of the United States.
- **Open-market operations:** The purchase and sale of U.S. government bonds by the Fed.

Questions for Review

1. Describe the functions of money.
2. What is fiat money? What is commodity money?
3. Name two assets included in the measured quantity of money. Name two assets that are excluded from it.
4. What are open-market operations, and how do they influence the money supply?

Chapter 6: Inflation: Its Causes, Effects, and Social Costs – Study Guide

This study guide provides a conceptual overview of inflation, its determinants based on the quantity theory of money, its relationship with interest rates, its social costs, the phenomenon of hyperinflation, and the classical dichotomy. It is formatted for ease of conversion to .epub.

Introduction

This chapter explores the critical macroeconomic issue of inflation. We will break down its causes, primarily through the lens of the quantity theory of money, its effects on interest rates and the economy, and the various social costs it imposes.

6-1 The Quantity Theory of Money

The **quantity theory of money** posits that, over long periods, the inflation rate is approximately equal to the money supply growth rate. The core idea is that if a large amount of money is printed, it becomes less scarce, and its individual value decreases.

Transactions and the Quantity Equation

Velocity of Money (V): This represents the rate at which money circulates in the economy – the number of times an average dollar bill changes hands in a given period. For example, if there are \$500 billion in transactions in a year and the money supply is \$100 billion, the average dollar must have been transacted 5 times ($V=5$). [cite: 16, 17, 18] If money trades hands quickly (high velocity), a smaller money supply can support a given level of transactions. [cite: 19] If money sits idle (low velocity), more money might be needed for transactions. [cite: 20, 21] The professor anecdotally described cashiers in Italy (pre-COVID) being reluctant to make change, especially with 1 and 2 euro coins, suggesting an insufficient supply or low velocity of those specific denominations. [cite: 26, 27, 31, 34, 36, 37, 38, 39]

Mathematically, velocity (V) is: $V = T/M$ Where:

- T = Total value of transactions during a period.
- M = Quantity of money (money supply).

This can be rewritten as the **quantity equation**: $M \times V = T$ [cite: 57]

From Transactions to Income

Because accurately measuring all transactions (T) is difficult, economists often use nominal GDP as a proxy. Nominal GDP represents the total value of all goods and services produced and sold in a country in a given period, effectively covering most transactions. [cite: 42, 43, 44] The quantity equation then becomes: $M \times V = P \times Y$ [cite: 57]

Where:

- M = Money supply
- V = **Income velocity of money** (number of times a dollar bill enters someone's income in a given period)
- P = Price level (e.g., GDP deflator, a measure of inflation) [cite: 48, 49, 52]
- Y = Real GDP (actual productive capacity of the economy) [cite: 46, 51] $P \times Y$ represents nominal GDP. [cite: 47] This equation $M \times V = P \times Y$ is an **identity**; it must hold true by the definition of the variables. [cite: 53, 54, 55]

The Money Demand Function and the Quantity Equation

Real Money Balances (M/P): This measures the purchasing power of the existing money supply. [cite: 60, 64] For example, if a town has 100 "Canuck bucks" and the cheapest item is 20 Canuck bucks, the real money supply's purchasing power is low. [cite: 65, 66, 67, 68]

Let $k = 1/V$. Here, k represents how much money people wish to hold for every dollar of income. If velocity (V) is high, k is small (people hold little money relative to income). If V is low, k is large (people hold a lot of money relative to income). The demand for real money balances can be expressed as: $(M/P)^d = kY$ [cite: 70, 71, 80] This is a simple **money demand function**, stating that the demand for real money balances is proportional to real income (Y). [cite: 80] Equilibrium requires money supply (M/P) to equal money demand ($(M/P)^d$), so $M/P = kY$, which rearranges to $M(1/k) = PY$, or $MV = PY$.

The amount of cash people want to hold (k) is exogenous and depends on individual preferences. [cite: 78, 79] Wealthier individuals, having more "dollar votes," have a greater influence on the aggregate k and thus on velocity. [cite: 86, 87, 88]

The Assumption of Constant Velocity

Historically, for certain periods (e.g., 1960-1990 in the U.S.), the velocity of money appeared relatively constant. [cite: 100, 101, 114] Even during the high inflation of the 1970s, velocity didn't change drastically. [cite: 102, 103, 104, 105] If velocity (V) is assumed constant ($\bar{V}$), the quantity equation becomes: $M \times \bar{V} = P \times Y$ This implies that the money supply (M) determines nominal GDP ($P \times Y$). [cite: 116]

Money, Prices, and Inflation

From the quantity theory with constant velocity:

1. Real GDP (Y) is determined by factor supplies (K, L) and the production function (technology). Printing money does not change K, L , or technology, so it doesn't change real GDP. [cite: 119, 120, 121, 122]
2. Since Y is fixed by factor supplies and technology, and V is assumed constant, any change in the money supply (M) must lead to a proportional change in the price level (P). [cite: 122] $M \times \bar{V} = P \times Y$

In terms of growth rates (approximated by percentage changes): $\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$ [cite: 124] If V is constant, $\% \Delta V = 0$. The inflation rate (π) is $\% \Delta P$. So, $\% \Delta M = \pi + \% \Delta Y$ Or, $\pi = \% \Delta M - \% \Delta Y$ [cite: 131] This implies that the inflation rate is the growth rate of the money supply minus the growth rate of real GDP. [cite: 131] If output growth ($\% \Delta Y$) is determined by factors outside the monetary system, then money supply growth ($\% \Delta M$) is the primary determinant of inflation over the long term. [cite: 151] Countries with high money supply growth should exhibit high inflation over longer periods. [cite: 152, 153] Data generally supports this, showing an upward-sloping relationship between money supply growth and inflation. [cite: 157, 158] Low money supply growth tends to correlate with low and more predictable inflation, while high money supply growth correlates with higher and more volatile/unpredictable inflation. [cite: 164, 165, 166, 167, 168, 169]

Milton Friedman's Monetary Policy Rule: Based on this theory, Milton Friedman proposed a rule that the money supply should grow at a constant rate (e.g., 8%). [cite: 132, 133, 134] The idea was that if economic growth was high (e.g., 5%), inflation would be moderate (3%). [cite: 135, 136] If the economy stagnated (0% growth), inflation would be 8%, which

could help inflate asset prices and make debt easier to pay off if incomes also rose with inflation. [cite: 137, 138, 140, 141, 142, 143, 144, 145, 146]

However, data shows velocity has not been constant since the 1990s, generally declining. [cite: 110, 111, 173] If velocity is not constant, this simple relationship becomes more complex. [cite: 174]

6-2 Seigniorage: The Revenue from Creating Money

Seigniorage is the revenue a government raises by printing money. [cite: 178, 179] When the government prints money and spends it, it increases the money supply, which can lead to inflation. [cite: 180, 181] This inflation acts like a tax on holding money, often called the **inflation tax**. [cite: 195] People who hold cash see the real value of their money decrease due to rising prices. [cite: 196]

- The Federal Reserve in the U.S. funds its operations through seigniorage (e.g., interest earned on bonds it buys by creating money). [cite: 183, 184, 186, 187] Any profit the Fed makes must be turned over to the Treasury Department. [cite: 188, 189]
- Those who are "unbanked" (about 20% of the U.S. population, who don't have bank accounts and primarily use cash) are particularly vulnerable to the inflation tax. [cite: 199, 200, 201, 203, 204] They often use services like check cashing at Walmart or prepaid cash cards. [cite: 204, 205, 208]

People can avoid the inflation tax by holding their assets in interest-bearing accounts or other assets (stocks, real estate, gold) that may appreciate with inflation. [cite: 197, 213]

6-3 Inflation and Interest Rates

Two Interest Rates: Real and Nominal

- **Nominal Interest Rate (i)**: The interest rate reported by banks, not adjusted for inflation. [cite: 214]
- **Real Interest Rate (r)**: The nominal interest rate corrected for inflation (π). $r = i - \pi$ [cite: 215]

The Fisher Effect

The **Fisher equation** is $i = r + E\pi$, where $E\pi$ is expected inflation. The **Fisher effect** suggests that the nominal interest rate (i) moves one-for-one with expected inflation ($E\pi$). [cite: 219, 223] This assumes the real interest rate (r) is determined by equilibrium in the market for goods and services (or loanable funds) and is thus relatively stable or exogenous to monetary phenomena. [cite: 221] If inflation (and thus expected inflation) rises by 1%, the nominal interest rate should also rise by 1%. [cite: 222] Data generally supports this, especially over longer periods: countries with higher inflation tend to have higher nominal interest rates. [cite: 225, 226, 227]

Two Real Interest Rates: Ex Ante and Ex Post

- **Ex Ante Real Interest Rate:** The real interest rate that borrowers and lenders expect when a loan is made ($i - E\pi$).
- **Ex Post Real Interest Rate:** The real interest rate that is actually realized ($i - \pi$). Expected inflation ($E\pi$) is more predictable when actual inflation (π) is low and stable. [cite: 248, 249]

6-4 The Nominal Interest Rate and the Demand for Money

The Cost of Holding Money

The **opportunity cost of holding money** (e.g., cash, non-interest-bearing checking accounts) is the nominal interest rate (i) foregone by not holding interest-bearing assets (like bonds). [cite: 233] Therefore, the demand for money is likely negatively related to the nominal interest rate. [cite: 234] When nominal interest rates are high, it's costly to hold cash, so people hold less. [cite: 235, 236]

Future Money and Current Prices

The money demand function can be rewritten to include the nominal interest rate: $(M/P)^d = L(i, Y)$ [cite: 237, 238] Where L denotes liquidity preference. Demand for real money balances is negatively related to i and positively related to real income Y . [cite: 240, 241] Since $i = r + E\pi$, this becomes: $(M/P)^d = L(r + E\pi, Y)$ [cite: 244]

For the money market to be in equilibrium, supply must equal demand: $M/P = L(r + E\pi, Y)$ [cite: 260, 261] Given:

- M is set by the central bank (e.g., the Fed). [cite: 263]
- r adjusts to equilibrate saving and investment (or is set by the Fed through liquidity preferences). [cite: 264, 265]
- Y is determined by factors of production and technology. [cite: 266]
- $E\pi$ is individuals' expectation of future inflation. The **price level (P)** adjusts to ensure this equation holds. [cite: 267, 300] If many dollar bills are chasing few goods, prices will rise. [cite: 301, 304]

Changes in expected inflation ($E\pi$) can alter the current demand for money and thus the current price level. [cite: 269]

If people expect future money creation and thus higher future inflation, they will demand less money now (velocity increases), leading to a higher price level even before the money supply actually increases.

Modern Trends in Velocity: The observed decline in velocity since the late 1990s can be attributed to:

- **Recessions:** During recessions, people tend to hold onto cash, reducing velocity. [cite: 278, 279, 280, 281] This is particularly true for the unbanked population who hold most assets in cash. [cite: 282, 283, 285]
- **Prevalence of Credit/Debit Cards:** Increased use of electronic payments reduces the need to hold cash for transactions, particularly for those with higher incomes who have more "votes" in determining aggregate velocity. [cite: 286, 287, 292, 293, 294, 295, 296, 297]

When inflation is high and volatile, individuals may seek inflation-protected assets like Treasury Inflation-Protected Securities (TIPS), whose returns are tied to the actual inflation rate. [cite: 309, 310, 311, 312] Owning such bonds means giving up liquidity. [cite: 316, 317]

6-5 The Social Costs of Inflation

The Layperson's View and the Classical Response

Many laypeople believe inflation erodes real wages. However, classical theory suggests that if all prices and nominal wages rise proportionally, real wages ((W/P)) remain unaffected.

The Costs of Expected Inflation

Even when inflation is anticipated, it can impose costs:

1. **Shoeleather Costs:** The resources wasted when inflation encourages people to reduce their money holdings. [cite: 327] This involves more frequent trips to the bank (wearing out "shoe leather") to withdraw smaller amounts of cash to avoid the inflation tax. [cite: 338, 341] Example: During rapid home price appreciation, people might rush to buy houses, potentially waiving inspections, to avoid future higher prices. [cite: 343, 344, 345, 346]
2. **Menu Costs:** The costs firms incur when they have to change their posted prices. [cite: 350] This includes not just printing new menus but also the managerial time spent deciding on new prices and the potential loss of customer goodwill. [cite: 356, 357, 359, 371] Example: Gas station coffee prices remaining at \$1 for a long time, versus restaurants that frequently issue "new menus" with higher prices. [cite: 362, 363, 368, 354]
3. **Relative Price Variability:** When firms change prices infrequently, inflation causes relative prices to vary more than they would otherwise. [cite: 375] If some firms adjust prices quickly and others slowly, it distorts resource allocation because market prices may not accurately reflect true scarcity. [cite: 389] Example: Different ice cream shops on a boardwalk having different prices simply because one updated prices more recently than another. [cite: 377, 380, 381, 382] This can lead to misallocation of investment. [cite: 397]
4. **Tax Distortions:** Inflation can alter tax liabilities in ways not intended by lawmakers because many tax laws do not account for inflation. [cite: 400] For example, capital gains taxes are typically levied on nominal gains. If an asset's price rises due to inflation but its real value doesn't change, the holder still pays tax on the nominal gain, effectively taxing non-existent real income. [cite: 401, 402, 403] This is a significant issue in housing markets, where large nominal gains can lead to substantial capital gains taxes, discouraging homeowners from selling even if their current home no longer suits their needs (the "lock-in effect"). [cite: 407, 411, 412, 418, 431, 432, 433, 434, 435, 438]
5. **General Inconvenience:** Living in a world with a changing price level makes financial planning difficult. [cite: 440] It's harder to compare values over time and plan for long-term expenses like retirement or college education when the future value of money is uncertain due to inflation. [cite: 441, 443, 444, 445, 446, 450, 451]

The Costs of Unexpected Inflation

Unexpected inflation has an additional effect: it arbitrarily redistributes wealth.

- **Debtors vs. Creditors:** If inflation is higher than expected, debtors benefit because they repay loans with money that is worth less than anticipated. [cite: 462, 467] Creditors lose. [cite: 468] If inflation is lower than expected, creditors benefit, and debtors lose. [cite: 469, 470, 476]
- **Increased Uncertainty:** High and volatile inflation increases uncertainty for everyone, making planning difficult. [cite: 478] Risk-averse individuals and institutions (like banks) may become more cautious. [cite: 479] Banks might charge even higher nominal interest rates to compensate for inflation risk, potentially increasing the real interest rate demanded. [cite: 480, 481, 484, 487, 488, 489]

Two Benefits of Inflation

1. **Improved Labor Market Functioning:** Moderate inflation can help labor markets adjust. Nominal wages are often "sticky" downwards (resistant to cuts). [cite: 492] Inflation allows real wages to fall even if nominal wages don't, which can help businesses, especially struggling ones, maintain employment during economic downturns. [cite: 494, 495, 496, 497, 501] Without inflation, achieving necessary real wage cuts might require nominal wage cuts, which are difficult, or lead to layoffs. [cite: 498, 499, 500]
2. **Possibility of Negative Real Interest Rates:** If inflation is sufficiently high, central banks can achieve negative real interest rates even if nominal rates are at or near zero. This can be a tool to stimulate investment during severe recessions.

6-6 Hyperinflation

Hyperinflation is generally defined as inflation exceeding 50% per month. [cite: 517] During hyperinflation:

- The costs of inflation become extreme. [cite: 518]
- Money often loses its function as a store of value, and may even cease to be a reliable unit of account or medium of exchange. [cite: 519, 521] People may resort to barter or using foreign currencies (e.g., U.S. dollars in Zimbabwe). [cite: 522, 523, 524, 536]
- The professor showed a \$10 billion Zimbabwean dollar bill as an example of currency from a hyperinflationary period. [cite: 529, 530, 533] Zimbabwe eventually saw even \$10 trillion bills (though not for general circulation). [cite: 532]

The Causes of Hyperinflation

Hyperinflations typically occur when governments have large budget deficits and cannot finance them through borrowing or conventional taxation, so they resort to printing money (seigniorage) extensively. [cite: 538, 539] They generally end when fiscal reforms eliminate the need for excessive money creation.

Destroying an economy via hyperinflation is effectively achieved by continually adding zeros to the currency. [cite: 540, 542, 543]

6-7 Conclusion: The Classical Dichotomy

- **Real Variables:** Measured in physical units (e.g., quantities of goods, hours of labor, real GDP, real wage, real interest rate). [cite: 547, 548, 549, 551, 554]

- **Nominal Variables:** Measured in terms of money (e.g., nominal wage, nominal interest rate, price level). [cite: 558, 559, 560, 564, 566]

Monetary Neutrality: The proposition that changes in the money supply do not affect real variables in the long run. [cite: 568, 569, 572] The central bank, by changing the money supply, can influence nominal variables (like the price level and nominal wages) but not real variables like the size of the labor force, its productivity, or the quantity of goods produced. [cite: 569, 570, 571, 573]

The **Classical Dichotomy** is the theoretical separation of real and nominal variables. [cite: 574] It implies that real variables can be studied and determined without reference to nominal variables or the money supply. The money market then determines the price level and other nominal variables. This means that for long-run economic growth (increasing labor supply, capital formation, technological improvements), policies must look beyond merely manipulating the money supply. [cite: 574, 575]

The transcript concludes with a reflection that financial activities like day trading stocks or crypto, while potentially increasing nominal wealth for individuals, may not contribute to long-run real economic growth if they don't result in the creation of real goods and services that society values (like housing, medical care, food, etc.). [cite: 578, 579, 580, 581, 584, 587, 588, 590, 591, 592, 593, 594, 595]

Key Concepts

- **Inflation:** A sustained increase in the overall level of prices.
- **Hyperinflation:** Extraordinarily high rates of inflation (e.g., exceeding 50% per month).
- **Quantity equation:** $M \times V = P \times Y$, which relates the quantity of money, the velocity of money, and the dollar value of the economy's output of goods and services.
- **Transactions velocity of money:** The rate at which money changes hands in transactions.
- **Income velocity of money:** The number of times an average dollar bill enters someone's income in a given period.
- **Real money balances (M/P) :** The quantity of money expressed in terms of the quantity of goods and services it can buy.
- **Money demand function:** A function showing the determinants of the demand for real money balances, often $(M/P)^d = L(i, Y)$ or $(M/P)^d = kY$.
- **Quantity theory of money:** The theory that the price level is proportional to the money supply, often based on the assumption of constant velocity.
- **Seigniorage:** The revenue raised by the government through the creation of money.
- **Nominal interest rate (i):** The interest rate as usually reported, without a correction for the effects of inflation.
- **Real interest rate (r):** The nominal interest rate corrected for the effects of inflation $(r = i - \pi)$.
- **Fisher equation:** $i = r + E\pi$, stating that the nominal interest rate is the sum of the real interest rate and expected inflation.
- **Fisher effect:** The one-for-one adjustment of the nominal interest rate to the expected inflation rate.
- **Ex ante real interest rate:** The real interest rate expected when a loan is made $(i - E\pi)$.
- **Ex post real interest rate:** The real interest rate actually realized $(i - \pi)$.
- **Shoeleather costs:** The resources wasted when inflation induces people to reduce their money holdings.
- **Menu costs:** The costs of changing prices.

- **Real variables:** Variables measured in physical units, such as quantities and relative prices.
- **Nominal variables:** Variables measured in terms of money.
- **Classical dichotomy:** The theoretical separation of real and nominal variables.
- **Monetary neutrality:** The proposition that changes in the money supply do not affect real variables in the long run.

Questions for Review

1. Write the quantity equation and explain it.
2. What does the assumption of constant velocity imply?
3. Who pays the inflation tax?
4. If inflation rises from 6 percent to 8 percent, what happens to real and nominal interest rates, according to the Fisher effect?
5. List all the costs of inflation you can think of and rank them according to how important you think they are.
6. Explain the roles of monetary policy and fiscal policy in causing and ending hyperinflations.
7. Define the terms real variable and nominal variable and give an example of each.

Chapter 7: The Open Economy – Study Guide

This study guide explores the macroeconomics of open economies, focusing on international flows of capital and goods, the determination of trade balances, and the role of exchange rates. It is formatted for ease of conversion to .epub.

Introduction

Previous chapters largely assumed a **closed economy**, where countries do not trade or exchange capital with each other. This chapter opens up the economy to international interactions. In an open economy:

- A country's spending need not equal its production of goods and services. It can import or export the difference.
- A country's saving need not equal its investment. Money can flow across borders to finance investment or to find higher returns.

We will start by incorporating these international flows into our existing framework and then analyze models for small and large open economies, including the determination of real and nominal exchange rates.

7-1 The International Flows of Capital and Goods

The Role of Net Exports

In an open economy, the national income accounts identity is:

$$Y=C+I+G+NX$$

Where:

- Y = Output (Real GDP)
- C = Consumption
- I = Investment
- G = Government Purchases
- NX = **Net Exports**

Net exports can be expressed as:

$$NX=Y-(C+I+G)$$

This equation shows that net exports are the difference between what a country produces (Y) and its domestic spending ($C+I+G$).

Simply defined, net exports are also:

$$NX=\text{Exports}-\text{Imports}$$

- **Trade Surplus:** If $NX>0$ (Exports > Imports), the country produces more than it spends domestically.
- **Trade Deficit:** If $NX<0$ (Imports > Exports), the country spends more than it produces domestically. The United States typically runs a trade deficit.
- **Balanced Trade:** If $NX=0$ (Exports = Imports), domestic spending equals domestic production.

International Capital Flows and the Trade Balance

$$\text{Net Capital Outflow (S - I)}$$

Net capital outflow represents the net flow of funds being invested abroad. It is defined as the amount that domestic residents are lending abroad minus the amount that foreigners are lending to the domestic country. It can also be seen as the difference between domestic saving (S) and domestic investment (I):

$$\text{Net Capital Outflow} = S - I$$

- If $S>I$, the country is a net lender to the rest of the world; there is a net outflow of capital.
- If $S<I$, the country is a net borrower from the rest of the world; there is a net inflow of capital. The U.S. is a net borrower.

Foreigners invest in a country by buying stocks, bonds, real estate, or through foreign direct investment (e.g., Volvo building a plant in Charleston).

The Link Between Trade and Capital Flows

The national income accounts identity can be rearranged:

$$Y - C - G = I + NX$$

Since national saving $S = Y - C - G$, we have:

$$S = I + NX$$

$$S - I = NX$$

This crucial identity shows that **net capital outflow (S-I) always equals the trade balance (NX)**. This is not a theory but a mathematical fact stemming from the definitions.

- Countries with a trade surplus ($NX > 0$) must be net lenders ($S > I$). This might indicate poor domestic investment opportunities.
- Countries with a trade deficit ($NX < 0$) must be net borrowers ($S < I$). This could be due to attractive domestic investment opportunities drawing foreign capital.

7-2 Saving and Investment in a Small Open Economy

A **small open economy** is one that is a small part of the world market and thus has a negligible effect on the world interest rate. Examples might include the Bahamas (which is open but small compared to the US) or many countries in Central America, Africa, or Southeast Asia.

Capital Mobility and the World Interest Rate

Key assumptions for a small open economy model:

1. **Perfect Capital Mobility:** Residents of the country have full access to world financial markets, and foreigners have full access to domestic financial markets. Money and goods can move easily.
2. **The economy takes the world interest rate (r^*) as given.** It cannot influence r^* . So, the domestic real interest rate r equals the world real interest rate r^* . $r = r^*$ In reality, there might be a risk premium (θ) for smaller economies, so $r = r^* + \theta$. For simplicity, we often assume $\theta = 0$.

Large open economies like the U.S., E.U., Japan, and China can influence world interest rates. The U.S. interest rate particularly impacts global rates.

The Model

The model components are:

- Output $Y=Y^*=F(K^*,L^*)$ (fixed by domestic factors)
- Consumption $C=C(Y-T)$ (depends on disposable income)
- Investment $I=I(r)$ (depends on the interest rate)
- Government Purchases $G=G^*$, Taxes $T=T^*$ (exogenous)

Since $r=r^*$, investment becomes $I(r^*)$.

National saving $S=Y^*-C(Y^*-T^*)-G^*=S^*$ (fixed because Y , T , G , C are fixed or determined by fixed variables).

The trade balance is then determined by the difference between fixed national saving and investment at the world interest rate:

$$NX=S^*-I(r^*)$$

- If r^* is high, $I(r^*)$ is low, and $S^*-I(r^*)$ is likely positive, leading to a **trade surplus**.
- If r^* is low, $I(r^*)$ is high, and $S^*-I(r^*)$ is likely negative, leading to a **trade deficit**.

The trade balance (or net capital outflow) in a small open economy is determined by factors that influence saving and investment at the given world interest rate.

How Policies Influence the Trade Balance

1. Fiscal Policy at Home (Small Open Economy):

- An increase in government spending ($\Delta G > 0$) or a decrease in taxes ($\Delta T < 0$) reduces public saving and thus national saving (S^*).
- The S^* curve shifts to the left.
- Since $I(r^*)$ is unchanged (as r^* is fixed), $NX=S^*-I(r^*)$ decreases, leading to a trade deficit or a smaller surplus. Fiscal stimulus in a small open economy can create a trade deficit.
- Fiscal austerity (decreasing G , increasing T) would have the opposite effect, improving the trade balance.

2. Fiscal Policy Abroad (e.g., in a Large Economy like the U.S.):

- If a large foreign country (like the U.S.) engages in fiscal stimulus ($\uparrow G$ or $\downarrow T$), its national saving decreases.
- This reduces the worldwide supply of loanable funds, causing the world interest rate (r^*) to rise.
- For the small open economy, this higher r^* reduces its domestic investment $I(r^*)$.
- With S^* unchanged in the small economy, $NX=S^*-I(r^*)$ increases, leading to a trade surplus or a smaller deficit. Intuitively, if the U.S. goes on a buying spree, the small economy sells more to the U.S.

3. Changes in Investment Demand (Small Open Economy):

- An increase in domestic investment demand (e.g., due to regulatory changes, improved property rights, better education/human capital) shifts the $I(r)$ curve to the right.
- At the given r^* , investment $I(r^*)$ increases.
- With S^- unchanged, $NX = S^- - I(r^*)$ decreases, leading to a trade deficit or smaller surplus. This often involves importing capital goods (machinery, equipment) from other countries.

7-3 Exchange Rates

Nominal and Real Exchange Rates

- **Nominal Exchange Rate (e):** The relative price of the currency of two countries. It's how much of one currency you can trade for another (e.g., yen per dollar). Nominal exchange rates are volatile and change constantly.
 - **Appreciation:** If e rises (from the U.S. perspective), the dollar appreciates; \$1 buys more foreign currency (e.g., more yen).
 - **Depreciation:** If e falls, the dollar depreciates; 1 buys less foreign currency.
- [cite:242]*****Real Exchange Rate (ϵ):** The relative price of the goods of two countries; the rate at which one can trade the goods of one country for the goods of another. It's like a cost of living comparison between countries. $\epsilon = e \times (P/P^*)$ Where:
 - e = nominal exchange rate (foreign currency per unit of domestic currency)
 - P = price level of domestic goods (e.g., in USD)
 - P^* = price level of foreign goods (e.g., in yen) Example: If a U.S. McDougle costs \$2.50 (P), a Japanese McDougle costs 200 yen (P^*), and $e = 120$ yen/USD. $\epsilon = (120 \text{ yen/USD}) \times (\$2.50 / 200 \text{ yen}) = 1.5$ This means a U.S. McDougle trades for 1.5 Japanese McDoubles; U.S. goods are relatively more expensive, or it costs 50% more to buy the same McDougle in Japan (after converting currency).

The Real Exchange Rate and the Trade Balance

Net exports (NX) depend on the real exchange rate (ϵ): $NX = NX(\epsilon)$.

- If ϵ is high (domestic goods are expensive relative to foreign goods):
 - Exports (EX) decrease (foreigners find domestic goods expensive).
 - Imports (IM) increase (domestic residents find foreign goods cheap).
 - Thus, NX decreases (trade balance moves towards deficit).
- If ϵ is low (domestic goods are cheap relative to foreign goods):

- EX increase, IM decrease, so NX increases (trade balance moves towards surplus).

The $NX(\epsilon)$ curve is downward sloping.

The Determinants of the Real Exchange Rate (Large Open Economy)

In a large open economy, the real exchange rate ϵ adjusts to ensure that net exports equal net capital outflow ($S-I$).

$$NX(\epsilon) = S - I(r)$$

Here, S depends on domestic factors (Y, C, G, T) and I depends on the domestic real interest rate r (which the large economy influences).

The $S-I$ curve is vertical with respect to ϵ because S and I do not directly depend on ϵ .

The intersection of the downward-sloping $NX(\epsilon)$ curve and the vertical $S-I$ curve determines the equilibrium real exchange rate ϵ .

The nominal exchange rate (e) is highly volatile and adjusts rapidly in forex markets to ensure this equilibrium, thereby influencing ϵ . The demand for domestic currency (e.g., USD for buying Boeing jets) and the supply of domestic currency (e.g., USD being exchanged for foreign currency to buy foreign assets) meet in the forex market to determine e .

How Policies Influence the Real Exchange Rate

1. Domestic Fiscal Expansion (Large Open Economy, e.g., $\uparrow G$ or $\downarrow T$):

- Reduces national saving (S), shifting the $S-I$ curve to the left.
- NX must decrease to equal the new, lower $S-I$.
- For NX to decrease, ϵ must rise (appreciate). This leads to the "twin deficits" phenomenon: a government budget deficit often accompanies a trade deficit. In the long run, this could be due to higher domestic prices (inflation).

2. Fiscal Policy Abroad (e.g., EU stimulus):

- Foreign fiscal stimulus increases demand for loanable funds globally, potentially raising world interest rates (r^*).
- This might reduce investment (I) in the large domestic economy if capital flows to the stimulating foreign economy, or if its own r rises.
- If $S-I$ increases (e.g., because I falls), NX increases.
- For NX to increase, ϵ must fall (depreciate).

3. Increase in Domestic Investment Demand (Large Open Economy):

- Shifts the I component of S-I, so S-I decreases (shifts left).
- NX must decrease.
- For NX to decrease, € must rise (appreciate).

4. Trade Policies (e.g., import restrictions/tariffs):

- An import restriction (like a tariff) aims to reduce imports, shifting the $NX(\epsilon)$ curve outward (to the right) because for any given €, NX would be higher.
- However, S-I (net capital outflow) is not affected by such trade policies.
- Therefore, the equilibrium level of NX (which must equal S-I) does not change.
- Instead, the real exchange rate € appreciates to bring NX back to the unchanged S-I level. The higher € makes exports more expensive and imports cheaper, offsetting the initial effect of the tariff. So, imports decrease, but exports also decrease due to the appreciated €. Retaliatory tariffs by other countries can also occur.
- To change NX, policies must affect S or I. For instance, reducing a government deficit (increasing S) would increase NX.

The Determinants of the Nominal Exchange Rate

The nominal exchange rate (e) can be expressed from the real exchange rate formula:

$$e = \epsilon \times (P^*/P)$$

In terms of percentage changes (log-linearized):

$$\% \Delta e = \% \Delta \epsilon + \% \Delta P^* - \% \Delta P$$

$$\% \Delta e = \% \Delta \epsilon + (\pi^* - \pi)$$

Where π^* is foreign inflation and π is domestic inflation.

This means a country with high domestic inflation (π) relative to foreign inflation (π^*) will see its nominal currency depreciate ($\% \Delta e$ is negative), assuming $\% \Delta \epsilon$ is small. Conversely, low domestic inflation tends to lead to appreciation.

Data supports this over long periods (decades).

The Special Case of Purchasing-Power Parity (PPP)

Purchasing-Power Parity (PPP) is a theory stating that a unit of any given currency should be able to buy the same quantity of goods in all countries, implying that the real exchange rate (ϵ) is equal to 1. This means that the nominal exchange rate will adjust perfectly to reflect differences in price levels:

$$\text{If } \epsilon = 1, \text{ then } e \times P = P^*, \text{ or } e = P^*/P.$$

Under PPP, the $NX(\epsilon)$ curve is perfectly elastic (horizontal) at $\epsilon=1$. This implies that $S-I$ determines the net capital outflow, but has no impact on ϵ (which is fixed at 1) or e (which is fixed by P^*/P).

Limitations of PPP:

PPP often does not hold perfectly in reality because:

1. **Not all goods are easily traded:** (e.g., services like haircuts, perishable goods). Arbitrage doesn't work for these. Labor is also not perfectly mobile.
 2. **Tradable goods are not always perfect substitutes:** Consumer preferences differ (e.g., different car models from different countries).
 3. **Transaction costs, tariffs, and regulations:** These create barriers to arbitrage. (e.g., past U.S. oil export ban)
- Despite these limitations, PPP is a useful theory for long-run exchange rate movements (over decades), as it suggests that nominal exchange rates tend to move towards levels that would equalize prices.

7-4 Conclusion: The United States as a Large Open Economy

The U.S. is a large open economy. It exhibits characteristics of both closed and small open economy models.

- Like a closed economy, its large size means domestic policies (like fiscal expansion causing rising interest rates) have significant global impacts, rather than just taking world variables as given.
- Like an open economy, it engages in international trade and capital flows, running a persistent trade deficit financed by net capital inflows. It relies on foreign capital to sustain its investment levels, as domestic saving is insufficient.

A fiscal expansion in:

- A **closed economy**: Interest rates rise, investment falls, no change in NX (as $NX=0$).
- A **small open economy**: No change in world interest rates or investment; NX falls.
- A **large open economy (like the U.S.)**: Interest rates rise, investment falls (though perhaps by less than in a closed economy), and NX falls. It's a blend of the two extremes.

Key Concepts

- **Net exports (NX)**: Exports minus imports; also $Y-(C+I+G)$.
- **Trade balance**: Another term for net exports.
- **Net capital outflow (S-I)**: Domestic saving minus domestic investment; the net flow of funds being invested abroad.
- **Trade surplus**: When exports exceed imports ($NX>0$).

- **Trade deficit:** When imports exceed exports ($NX < 0$).
- **Balanced trade:** When exports equal imports ($NX = 0$).
- **Small open economy:** An economy that is a price taker in world markets, especially for the interest rate.
- **World interest rate (r^*):** The real interest rate prevailing in world financial markets.
- **Nominal exchange rate (e):** The rate at which the currency of one country trades for the currency of another.
- **Real exchange rate (ϵ):** The rate at which the goods and services of one country trade for the goods and services of another; $\epsilon = e \times (P/P^*)$.
- **Purchasing-power parity (PPP):** A theory of exchange rates whereby a unit of any given currency should be able to buy the same quantity of goods in all countries, implying $\epsilon = 1$.

Questions for Review

1. Define net capital outflow and trade balance. Explain how they are related.
2. Define nominal exchange rate and real exchange rate.
3. If a small open economy cuts defense spending, what happens to saving, investment, the trade balance, the interest rate, and the exchange rate?
4. If a small open economy bans the import of Japanese video game systems, what happens to saving, investment, the trade balance, the interest rate, and the exchange rate?
5. According to the theory of purchasing-power parity, if Japan has low inflation and Mexico has high inflation, what will happen to the exchange rate between the Japanese yen and the Mexican peso?

Chapter 12: Introduction to Economic Fluctuations – Study Guide

This study guide provides a conceptual overview of economic fluctuations, the aggregate demand-aggregate supply model, and stabilization policy. It is formatted for ease of conversion to .epub.

Introduction

This chapter introduces one of the most fundamental models in macroeconomics: **aggregate demand (AD)** and **aggregate supply (AS)**. This model helps us understand short-run economic fluctuations, often referred to as the business cycle.

12-1 The Facts About the Business Cycle

The **business cycle** refers to the periodic booms and busts in economic activity.

- An economic variable is considered **cyclical** if it moves in tandem with the overall economy: rising during expansions and falling during recessions.
- GDP growth in the U.S. averages about 3% annually over the long term.
 - Smaller countries might have higher but more volatile growth rates.
 - Developed countries in Europe and Japan often have lower (1-2%) but less volatile growth.

GDP and Its Components

- **Consumption (C)** and **Investment (I)** fluctuate with GDP.
 - Investment is particularly sensitive; increases in investment often signal economic growth, while declines signal recession.
 - Consumption growth (around 2-2.5% annually in the U.S.) is typically lower during recessions and higher during booms.

Unemployment and Okun's Law

- Unemployment generally rises during recessions and falls during expansions.
- **Okun's Law** describes the empirical negative relationship between changes in real GDP and changes in the unemployment rate.
 - Over decades, a GDP growth rate of about 3% tends to keep the unemployment rate stable.
 - Higher GDP growth is associated with falling unemployment ("hitting birdies").
 - Lower GDP growth or contraction is associated with rising unemployment ("hitting bogeys").
 - The relationship may not hold perfectly year-to-year due to factors like supply shocks (e.g., the 1971 Arab oil embargo caused unemployment to rise despite GDP growth).

Leading Economic Indicators

Economists use **leading economic indicators** to forecast short-run economic fluctuations. The Conference Board publishes an index of these indicators. Interpreting these involves both science and art, as different indicators may be relevant at different times. Key indicators include:

- **Average weekly hours in manufacturing:** Overtime pay is expensive, so increased hours suggest booming business.
- **Average weekly initial claims for unemployment insurance:** Often viewed as a four-week moving average to smooth out firm-specific layoff events. More claims suggest a weakening economy.

- **Manufacturers' new orders for consumer goods and materials:** Orders for durable goods (lasting 2+ years, e.g., sofas, appliances) are particularly watched.
- **Manufacturers' new orders for nondefense capital goods (excluding aircraft):** Aircraft orders are too volatile. Increases in capital goods orders signal strong investment.
- **ISM New Orders Index:** From the Institute of Supply Management, another manufacturing indicator.
- **Building permits for new private housing units:** New housing is a component of investment; increases often signal broader economic strength as new home purchases spur other durable goods purchases.
- **Stock prices (e.g., S&P 500):** Can be influenced by "animal spirits" (emotions and sentiment) and regulatory effects (like Sarbanes-Oxley affecting the number of publicly traded companies), making them a fuzzy indicator.
- **Leading Credit Index:** Reflects lending activity, especially by small and regional banks involved in commercial lending.
- **Interest rate spread (e.g., 10-year Treasury yield minus 3-month Treasury yield or 2-year Treasury yield):** Normally, this spread is positive. An **inverted yield curve** (negative spread) has preceded every U.S. recession, making it a necessary but not sufficient condition (it has predicted more recessions than have occurred).
- **Average consumer expectations for business and economic conditions:** Consumer sentiment is volatile and influenced by non-economic factors ("animal spirits").

12-2 Time Horizons in Macroeconomics

How the Short Run and the Long Run Differ

The primary difference between the short run and the long run in macroeconomics lies in **price flexibility**:

- **Long Run:** Prices are flexible and can adjust to changes in supply or demand. Firms can also adjust capital stock and other inputs.
- **Short Run:** Many prices are "sticky" at some predetermined level. Firms cannot easily change prices or capital stock.

The economy behaves differently depending on whether prices are sticky or flexible.

The Model of Aggregate Supply and Aggregate Demand

The AD-AS model is a workhorse for analyzing economic fluctuations and the impact of policies over different time horizons. It helps predict the effects of shocks on the price level (inflation) and real GDP (aggregate output).

12-3 Aggregate Demand (AD)

The **aggregate demand (AD) curve** shows the relationship between the overall price level (P) and the quantity of goods and services demanded (Y).

The Quantity Equation as Aggregate Demand

The quantity theory of money ($M \times V = P \times Y$) is embedded in the AD model. This equation can be rearranged to show a relationship between P and Y for given M and V.

Why the Aggregate Demand Curve Slopes Downward

The AD curve is downward sloping. A primary reason is the **real money balances effect**:

- If the price level (P) increases, the real value of money (M/P) decreases.
- With lower real money balances, people have less purchasing power and thus demand a smaller quantity of goods and services (Y).
- Conversely, a decrease in P increases real money balances and the quantity of goods and services demanded. Other effects (interest rate effect, exchange rate effect) also contribute to the downward slope but are simplified here.

Shifts in the Aggregate Demand Curve

The AD curve shifts when any component of aggregate expenditure (C,I,G,NX) changes for reasons other than a change in P, or when the money supply (M) changes.

- **Shifts Inward (Decrease in AD):**
 - Reduction in money supply (M): Leads to higher interest rates, reducing C and I.
 - Government austerity (decreased G or increased T).
 - Decline in net exports (NX) (e.g., foreigners buy fewer domestic goods).
 - Decreased consumer willingness to spend or business willingness to invest.
- **Shifts Outward (Increase in AD):**
 - Increase in money supply (M) or lower interest rates.
 - Increased C,I,G, or NX. For example, a new technology spurring investment.

12-4 Aggregate Supply (AS)

The **aggregate supply (AS) curve** shows the relationship between the price level (P) and the quantity of goods and services firms choose to produce and sell (Y). There are two AS curves: long-run and short-run.

The Long Run: The Vertical Aggregate Supply Curve (LRAS)

- In the long run, output (Y) is determined by the economy's supplies of capital (K), labor (L), technology, and human capital (education, training, experience). This is essentially determined by the **production function**.
- This level of output is called the **natural rate of output** (Y^*) or full-employment output. Full employment means the unemployment rate is at its natural rate, where economic growth keeps unemployment stable, not necessarily zero. The U.S. natural rate of output corresponds to about 3% GDP growth historically, though this may change.
- The LRAS curve is vertical at Y^* because, in the long run, the price level does not affect the underlying determinants of output (K , L , technology).
- Changes to K , L , technology, or human capital will shift the LRAS curve.

The Short Run: The Horizontal Aggregate Supply Curve (SRAS)

- In the very short run, many prices are **sticky** – they are fixed at predetermined levels. While commodity prices (like gasoline) can change quickly, most other prices adjust slowly.
- Assuming all prices are sticky, the SRAS curve is horizontal at a given price level (P^*).
- This means firms are willing to supply whatever quantity of output is demanded at that price level, by adjusting labor (e.g., overtime, adding shifts) or capacity utilization. (Most businesses don't operate 24/7 but could increase output if demand rose.)

From the Short Run to the Long Run

The economy transitions from the short run to the long run as prices adjust.

- If output (Y) is **above** the natural rate (Y^*), the economy is "overheating." High demand puts upward pressure on prices and wages. As prices rise, the economy moves along the AD curve, and SRAS shifts upward, until output returns to Y^* at a higher price level.
- If output (Y) is **below** the natural rate (Y^*), the economy is in a recession. Low demand puts downward pressure on prices and wages. As prices fall, the economy moves along the AD curve, and SRAS shifts downward, until output returns to Y^* at a lower price level.
- If output (Y) is **at** the natural rate (Y^*), prices are stable, and the economy is in long-run equilibrium.

12-5 Stabilization Policy

Governments and central banks may use **stabilization policy** to mitigate the effects of economic shocks.

Shocks to Aggregate Demand

A **demand shock** is an event that shifts the AD curve.

- Example: An exogenous decrease in the velocity of money (people hold onto cash and don't spend) would reduce aggregate demand, shifting AD inward.
- The central bank (e.g., the Fed) can try to offset demand shocks by using monetary policy to shift AD back. For instance, if AD falls, the Fed could increase the money supply to push AD back to its original position, stabilizing output and employment.

Shocks to Aggregate Supply

A **supply shock** is an event that shifts the AS curve.

- **Adverse Supply Shocks (shift SRAS upward/leftward):**
 - Bad weather destroying crops, pushing up food prices.
 - An oil cartel raising oil prices (like OPEC in the 1970s).
 - These lead to **stagflation**: rising prices (inflation) and falling output (recession).
- **Favorable Supply Shocks (shift SRAS downward/rightward):**
 - A sudden drop in oil prices.
 - These can lead to lower prices and higher output.
- **Shocks to LRAS:**
 - A new technology improving productivity shifts LRAS outward.
 - An improved education system increasing human capital shifts LRAS outward.
 - Increased immigration boosting labor supply shifts LRAS outward.
 - Adverse shocks like the COVID-19 lockdowns (reducing labor supply) can shift LRAS inward, leading to higher prices and recession.

Dealing with supply shocks is harder for policymakers because trying to offset the output effects with AD policy might worsen inflation, and vice-versa.

12-6 Conclusion

The AD-AS model is a key framework for understanding short-run economic fluctuations. It shows how prices being sticky in the short run and flexible in the long run lead to different outcomes from economic shocks and policies. While leading indicators provide some foresight, these fluctuations are largely unpredictable. The Federal Reserve can use

monetary policy to try to stabilize the economy by influencing aggregate demand, especially in response to demand shocks.

Key Concepts

- **Okun's law:** The empirical negative relationship between unemployment and real GDP.
- **Leading indicators:** Variables that tend to fluctuate in advance of the overall economy.
- **Aggregate demand (AD):** The relationship between the price level and the quantity of output demanded.
- **Aggregate supply (AS):** The relationship between the price level and the quantity of output supplied.
- **Shock:** An exogenous change in aggregate supply or aggregate demand.
- **Demand shock:** A shock that shifts the aggregate demand curve.
- **Supply shock:** A shock that shifts the aggregate supply curve.
- **Stabilization policy:** Policy actions aimed at reducing the severity of short-run economic fluctuations.

Questions for Review

1. When real GDP declines during a recession, what typically happens to consumption, investment, and the unemployment rate?
2. Give an example of a price that is sticky in the short run but flexible in the long run.
3. Why does the aggregate demand curve slope downward?
4. Explain the impact of an increase in the money supply in the short run and in the long run.
5. Why is it easier for the Fed to deal with demand shocks than with supply shocks?

Chapter 21: The Financial System: Opportunities and Dangers – Study Guide

This study guide provides a conceptual overview of the financial system, its functions, the nature of financial crises, and policy responses. It is formatted for ease of conversion to .epub.

Introduction

The financial system plays a critical role in the macroeconomy, a fact underscored by the global financial crisis of 2008-2009. This chapter explores what the financial system does, why it's crucial, and what happens when it malfunctions.

21-1 What Does the Financial System Do?

The financial system has several key functions:

Financing Investment

A primary role is to channel resources from **savers** to **borrowers** (often firms undertaking investment in capital, equipment, and machinery).

- **Direct Finance:** Savers provide funds directly to borrowers through financial markets.
 - **Bonds:** A certificate of indebtedness. Companies (or governments) sell bonds to raise funds, promising to repay the principal with interest. This includes "junk bonds" from riskier companies.
 - **Stocks:** A claim to partial ownership in a firm. Companies sell stock to raise funds.
- **Indirect Finance:** Savers provide funds to financial intermediaries, which then lend to borrowers.
 - **Financial Intermediaries:** Institutions like banks, mutual funds, pension funds, and insurance companies.
 - **Banks:** Accept deposits from savers and make loans. Small and medium-sized banks often lend for commercial real estate (e.g., apartment buildings, duplexes, strip malls).
 - **Mutual Funds:** Sell shares to the public and use the proceeds to buy a portfolio of stocks and bonds.
 - **Insurance Companies:** Collect premiums, invest these funds (often in bonds or stocks), and pay claims.

Sharing Risk

The financial system allows for the sharing and allocation of risk.

- **Risk Aversion:** Most people are risk-averse; they dislike uncertainty. For example, most people would not take an \$80,000 (median household income) risk-neutral bet (like a coin flip for \$80,000). European casino roulette (with one zero) is closer to a risk-neutral bet than American roulette (with zero and double zero).
- **Diversification:** Spreading risk across many different assets or individuals.
 - Instead of one person betting \$80,000, 80,000 people could bet \$1 each.
 - Holding a diversified portfolio (e.g., an S&P 500 index fund, which represents about 500 companies) reduces **idiosyncratic risk** (risk associated with a single asset or company, like bad management at one firm).
 - Diversification does not eliminate **systematic risk** (market-wide risk affecting all assets, like a financial system collapse or an economic lockdown).

Dealing with Asymmetric Information

Asymmetric information arises when one party in a transaction has more or better information than the other. FDIC insurance helps reduce problems from asymmetric information for bank depositors.

Two main types in financial transactions:

1. **Adverse Selection (Hidden Knowledge - Before Transaction):** Occurs when borrowers know more about the inherent risks or quality of their projects than lenders do.

- Example: A biotech company seeking a loan might know about severe side effects of its new drug but not disclose them to the bank. Borrowers tend to present only positive information.
2. **Moral Hazard (Hidden Action - After Transaction):** Occurs after the transaction when the borrower engages in behavior that is undesirable from the lender's perspective because the lender cannot perfectly monitor the borrower's actions.
- Example: The biotech company, after receiving a \$100 million loan, uses funds for a non-essential, risky project like a "corporate bowling alley" instead of core research. The bank cannot easily prevent this misuse of funds.

How Banks Mitigate Asymmetric Information:

- **Screening borrowers:** Assessing creditworthiness and project viability.
- **Requiring collateral:** Assets pledged by the borrower that the lender can seize if the borrower defaults. (The joke: to get a \$100k loan, first deposit \$100k).
- **Restricting loan use:** Covenants in loan agreements that specify how funds can be used (e.g., not for a bowling alley).
- **Monitoring:** Venture capitalists and angel investors often closely monitor the businesses they fund.

Role of Government:

- **Enforcing laws against fraud:** Making certain misuses of funds illegal.
- **Requiring disclosure:** Mandating transparency to provide more information to all parties (e.g., Sarbanes-Oxley Act after the Enron scandal).

Fostering Economic Growth

A well-functioning financial system is crucial for long-run prosperity.

- It channels **financial capital** (money for investment) to fund **physical capital** (equipment, machinery).
- It helps identify and finance projects with the best risk-reward ratio, ideally leading to higher rewards for lower risk.

21-2 Financial Crises

Financial crises occur when the financial system malfunctions, often with severe consequences for the broader economy.

The Anatomy of a Crisis

Crises often follow a pattern:

1. **Speculative Asset Bubbles and Price Declines:** Prices of assets (e.g., houses in 2004-2005, dot-com stocks in the late 1990s, possibly Bitcoin) are bid up to unsustainable levels, often driven by the "greater fool theory" (buying an overvalued asset believing a "greater fool" will buy it for even more later). When the bubble bursts, asset prices fall sharply.
2. **Defaults and Insolvencies:** Falling asset prices lead to defaults on loans. Highly **leveraged** financial institutions (those with a high ratio of debt to equity) are particularly vulnerable. Example: During the 2008-2009 crisis,

widespread mortgage defaults occurred ("jingle mail" – mailing keys back to lenders). Banks became hesitant to recognize losses on non-performing loans to avoid appearing insolvent.

3. **Falling Confidence and Bank Runs:** Insolvencies lead to a loss of confidence in other institutions, even healthy ones. Depositors with uninsured funds may rush to withdraw their money, causing a **bank run**. Example: Silicon Valley Bank experienced a run due to concerns from high-net-worth individuals with deposits exceeding FDIC insurance limits.
4. **Fire Sales:** To meet withdrawals, banks may be forced to sell assets quickly at deeply discounted prices ("fire sales"), further depressing asset values and worsening insolvencies. FDIC insurance and Federal Reserve actions aim to prevent fire sales in the U.S.
5. **Credit Crunch:** With increased uncertainty and diminished capital, banks reduce lending to preserve liquidity. This is a **credit crunch**. Even good investment projects may not get funding, or only at very high interest rates.
6. **Recession and Vicious Circle:** The credit crunch reduces aggregate demand (investment and consumption fall), leading to a recession (e.g., unemployment reached ~10% in the 2008-2009 crisis). The recession, in turn, causes more defaults and further erodes confidence, creating a vicious circle.

Policy Responses to a Crisis

Governments and central banks typically employ a multi-pronged approach:

1. Conventional Monetary and Fiscal Policy:

- **Monetary Policy:** Central banks lower interest rates (e.g., to zero) to stimulate demand. However, this may be ineffective if banks are unwilling to lend or businesses are unwilling to borrow.
- **Fiscal Policy:** Governments increase spending or cut taxes to boost aggregate demand (e.g., 2008-2009 U.S. stimulus, 2020-2022 stimulus packages). These often lead to increased government debt. Some programs, like "Cash for Clunkers" (where old Ford F-150s were often traded for new ones), are criticized by economists for their ineffectiveness and unintended consequences (like reducing used car supply).

2. Lender of Last Resort:

- The central bank provides liquidity to solvent but illiquid financial institutions to prevent bank runs and systemic collapse. The FDIC also plays a role in managing bank failures, often by bringing troubled banks into receivership and selling them to healthier banks.
- Banks may be reluctant to publicly seek help from the Fed due to the stigma.

3. Public Funds / Bailouts:

- The government may inject public funds to prop up the financial system. Example: The Troubled Asset Relief Program (TARP) during the 2008 crisis, which initially intended to buy bad mortgage securities but ended up giving cash directly to banks.
- **Moral Hazard Problem:** Bailouts can create moral hazard, as institutions deemed "too big to fail" might take excessive risks knowing the government will rescue them. This applies to traders whose bonuses are tied to risky bets but whose downside is limited (they just get fired if they lose a lot for the company).

Policies to Prevent Crises

Preventing crises is difficult, but efforts focus on:

- **Regulating Shadow Banks:** Entities like title loan and paycheck advance places that perform bank-like functions for the unbanked (around 20% of the U.S. adult population) often operate outside traditional banking regulations.

The Fed may offer aid to these institutions too.

- **Restricting Size of Financial Firms ("Too Big to Fail"):** Breaking up large institutions or limiting mergers is proposed, but often, failing small/medium banks are sold to larger ones, making them even bigger.
- **Limiting Excessive Risk-Taking:** Regulations like the **Volcker Rule** (part of Dodd-Frank) aim to prevent commercial banks from engaging in certain types of speculative investments (e.g., taking large positions in Bitcoin). Defining "excessive" is challenging.
- **Reforming Regulatory Agencies:** Post-crisis reforms like the **Dodd-Frank Act** created new regulatory bodies like the Consumer Financial Protection Bureau (CFPB).
- **Regulatory Burden:** Heavy regulation (like Sarbanes-Oxley or Dodd-Frank) can push financial activity into less-regulated "shadow" sectors or discourage firms from going public (Wilshire 5000 index now has fewer than 5000 companies). The cumulative effect of many regulations can be like Gulliver tied down by many small Lilliputian ropes, stifling business.
- **Microprudential vs. Macroprudential Regulation:**
 - **Microprudential:** Focuses on the safety and soundness of individual financial institutions.
 - **Macroprudential:** Focuses on the stability of the financial system as a whole, addressing systemic risks.

Case Study: The European Sovereign Debt Crisis

Around 2010-2012, several European countries, notably Greece (but also Portugal, Italy, Spain - collectively dubbed "PIGS" by some bond traders), faced a sovereign debt crisis with sharply rising interest rates on their government bonds due to fears of default.

- A partial default of Greek bonds was negotiated by the European Central Bank (ECB) and International Monetary Fund (IMF). International banks (outside Greece) largely absorbed these losses to protect the Greek banking system.
- There were fears Greece might leave the Eurozone, leading to a "bank jog" (not a full run, due to ATM withdrawal limits like €100/day) as citizens tried to withdraw euros.
- Bailouts were provided, contingent on **austerity measures** (spending cuts, tax increases) in Greece. One measure was an across-the-board 10% pay cut for government workers, causing widespread hardship.
- While the immediate crisis was contained with "band-aids," underlying structural issues in some Eurozone economies may remain.

21-3 Conclusion

The financial system serves vital functions by channeling savings to investment, allocating risk, and mitigating asymmetric information, all of which foster economic growth. However, it is also prone to crises that can have devastating macroeconomic impacts. Policymakers face ongoing challenges in designing regulations that promote stability without stifling innovation and growth, a delicate balance between preventing systemic risk and avoiding excessive regulatory burden.

Key Concepts

- **Financial system:** The group of institutions in an economy that help to match one person's saving with another person's investment.
- **Financial markets:** Financial institutions through which savers can directly provide funds to borrowers (e.g., bond market, stock market).
- **Bonds:** Certificates of indebtedness specifying obligations of the borrower to the holder.
- **Stocks:** Claims to partial ownership in a firm.
- **Debt finance:** Raising investment funds by selling bonds.
- **Equity finance:** Raising investment funds by selling stock.
- **Financial intermediaries:** Financial institutions through which savers can indirectly provide funds to borrowers (e.g., banks, mutual funds).
- **Risk averse:** Exhibiting a dislike of uncertainty.
- **Diversification:** Reducing risk by holding a broad portfolio of assets whose returns are not perfectly correlated.
- **Mutual funds:** Institutions that sell shares to the public and use the proceeds to buy a portfolio of stocks and bonds.
- **Asymmetric information:** A situation in which one party to an economic transaction has more information about the transaction than the other party.
- **Adverse selection:** The problem that arises when one party knows more about the attributes of a good or service ("hidden knowledge") than the other party, leading to the less desirable traders being more likely to participate.
- **Moral hazard:** The problem that arises when one party (the agent) performs a task on behalf of another party (the principal) and the principal cannot perfectly monitor the agent's behavior ("hidden action").
- **Financial crisis:** A major disruption in financial markets characterized by sharp declines in asset prices and the failures of many financial and nonfinancial firms.
- **Speculative bubble:** A situation in which the price of an asset rises above what appears to be its fundamental value.
- **Leverage:** The use of borrowed money to supplement existing funds for purposes of investment. The leverage ratio is the ratio of assets to bank capital.
- **Fire sale:** The precipitous sale of assets to meet demands for cash, often at heavily discounted prices.
- **Lender of last resort:** A role often played by the central bank, providing liquidity to financial institutions when they are unable to obtain funding from other sources.
- **Shadow banks:** Financial institutions that are not regulated as banks but perform bank-like functions.
- **Microprudential regulation:** Regulation that focuses on the risks within individual financial institutions.
- **Macroprudential regulation:** Regulation that focuses on the risks to the financial system as a whole.

Questions for Review

1. Explain the difference between debt finance and equity finance.
2. What is the main advantage of holding a stock mutual fund rather than an individual stock?
3. What are adverse selection and moral hazard? How do banks mitigate these problems?
4. How does the leverage ratio influence a financial institution's stability in response to bad economic news?
5. Explain how a financial crisis reduces the aggregate demand for goods and services.
6. What does it mean for a central bank to act as lender of last resort?
7. What are the pros and cons of using public funds to prop up a financial system in crisis?