

## **Lesson 01:**

### **Macroeconomics:**

Macroeconomics is that area of economic theory which studies and theorizes about the economy as a whole. Macroeconomics is also known as national income or employment theory or aggregative economics. In **Gardner's Ackley's** words macroeconomics in short is “the study of the forces or factors that determine the level of aggregate production, employment, and prices in an economy and their rates change overtime”.

Macroeconomics provides a framework for the study of the determinants & movements of such key economic variables as...

- unemployment
- inflation
- interest rates
- exchange rate
- productivity and growth
- government budget deficit/surplus
- foreign trade deficit

In Macroeconomics, we study the likely response of key economic variables to such public policies as...

- fiscal policy
- monetary policy
- trade policies

### **OBJECTIVE:**

- ¾ Help you learn how the national economy works
- ¾ Enable you to understand such issues as...
  - Why key economic variables are at their present levels...
  - What may be the likely future paths of these variables...?
  - Causes and consequences of recessions, inflation, etc.
  - What the government can do about these problems...
  - Side effects of government actions...
  - pros and cons of free trade versus trade restrictions

### **Economy:**

The word *economy* comes from a Greek word for “one who manages a household.”

### **TEN PRINCIPLES OF ECONOMICS:**

- A household and an economy face many decisions:
  - Who will work?
  - What goods and how many of them should be produced?

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- What resources should be used in production?
- At what price should the goods be sold?

Society and Scarce Resources:

- The management of society's resources is important because resources are scarce.
- Scarcity . . . means that society has limited resources and therefore cannot produce all the goods and services people wish to have.

Economics is the study of how society manages its scarce resources.

- How people make decisions.
  - People face tradeoffs.
  - The cost of something is what you give up to get it.
  - Rational people think at the margin.
  - People respond to incentives.
- How people interact with each other.
  - Trade can make everyone better off.
  - Markets are usually a good way to organize economic activity.
  - Governments can sometimes improve economic outcomes.
- The forces and trends that affect how the economy as a whole works.
  - The standard of living depends on a country's production.
  - Prices rise when the government prints too much money.
  - Society faces a short-run tradeoff between inflation and unemployment.

### **Lesson 02:**

#### **Efficiency:**

A measure of how well resources are used to achieve a goal.

#### **Equity:**

Means the benefit of those resources are distributed fairly among the members of society.

#### **Opportunity cost:**

The opportunity cost of an item is what you give to obtain that item.

#### **Market Economy:**

A market economy is an economy that allocates resources through the decentralized decisions of many firms and household as they interact in markets for goods and services.

- Households decide what to buy and who to work for.
- Firms decide who to hire and what to produce.

Adam smith made the observation that households and firms interacting in markets act as if guided by an “**invisible hand.**”

#### **Market failure:**

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Market failure occurs when the market fails to allocate resources efficiently.

**Externality:**

An externality, which is the impact of one person or firm's actions on the well-being of a bystander?

**Market power:**

This is the ability of a single person or firm to unduly influence market prices.

**Productivity:**

Productivity is the amount of goods and services produced from each hour of a worker's time.

**Lesson 03:**

**Economic models:**

These are simplified versions of a more complex reality. These are used to:

- Show the relationships between economic variables
- Explain the economy's behavior
- Devise policies to improve economic performance

**Endogenous variable:**

Is a variable that is identified within the workings of the model? Also, termed a dependent variable, an endogenous variable is in essence the "output" of the model.

**Exogenous variable:**

Is a variable that is identified outside the workings of the model? Also, termed an independent variable, an exogenous variable is in essence the "input" of the model.

**Flexible prices:**

Flexible prices mean that the prices adjust in the long run in response to market shortages or surpluses.

**Sticky prices:**

Sticky prices mean that some prices adjust slowly in response to market shortages or surpluses.

**Market clearing:**

Market clearing is an assumption that prices are flexible and adjust to equate supply and demand.

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#### **Lesson 04:**

##### **Gross Domestic product (GDP):**

Gross Domestic product is the total market value of all goods and services produced within the political boundaries of the economy during a given period of time, usually one year. If we subtract the income earned through foreign services, we get GDP. It is as;

$$GDP = GNP - FI$$

Where FI = Foreign income

##### **Nominal GDP:**

The value of final goods and services measured at current prices is called nominal GDP.

##### **Real GDP:**

Is the value of goods and services measured using a constant set of prices?

#### **Lesson 05:**

##### **GDP Deflator:**

The GDP deflator, also called the implicit price deflator for GDP, measures the price of output relative to its price in the base year. It reflects what's happening to the overall level of prices in the economy

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

##### **Consumption (C):**

Consumption is the value of all goods and services bought by households. Includes:

- Durable goods last a long time ex: cars, home appliances
- non-durable goods last a short time ex: food, clothing
- Services work done for consumers ex: dry cleaning, air travel.

##### **Investment (I):**

Spending on [the factor of production] capital. Spending on goods bought for future use.

Includes:

- Business Fixed Investment spending on plant and equipment that firms will use to produce other goods & services

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- Residential Fixed Investment spending on housing units by consumers and landlords
- Inventory Investment the change in the value of all firms' inventories

### **Stock:**

Stock is a variable or measurement that is defined for an instant in time.

### **Flow:**

Flow is a variable or measurement that is defined for a period of time.

### **Lesson 06:**

#### **Gross National Product (GNP):**

The GNP of a country is the summation of all those finally produced goods and services which the labor and capital like factors of production have produced by utilizing all the resources of the country in a year. If we define GNP from market prices point of view then “GNP is the market value of all those goods and services produced in a country in a year”.

$$\text{GNP} = Y = C + I + G + (X - M)$$

#### **Net National Product (NNP):**

There is a depreciation of machines and plants etc. again the houses, factories and stores also become prey to wear and tear. Therefore, there is need to repair the machinery, plants, houses and factories. Accordingly, whatsoever is borne by the firms regarding the replacement of machines etc. is known as *depreciation allowances*. Hence, to know NNP we will have to deduct depreciation allowances from GNP. The depreciation allowances are also known as replacement costs or capital consumption costs. Thus, NNP is written as

$$\text{NNP} = \text{GNP} - \text{depreciation allowances, (capital consumption allowances)}$$

#### **National Income (NI):**

The NNP is the summation of market values of all goods produced and services in a country in a year. Accordingly, to know NI we will have to subtract the indirect taxes and add subsidies in NNP. It is shown as

$$\text{NI} = \text{NNP} - \text{IT} + \text{S}$$

Here, IT = indirect taxes while S = subsidies

#### **Personal Income (PI):**

NI does not show how much amounts are possessed by the people. There are the persons who get incomes without rendering their services. As the case of transfer payments like pensions,

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unemployment allowances, social security allowances and stipends, etc. accordingly, if we include transfer payments and subtract undistributed profits, etc. from NI we get personal income. It is as

$$PI = NI + R - PT - UP$$

Where PT = taxes on profits, R = transfer payments

And UP = undistributed profits

### **Disposable Personal Income (DPI):**

If personal taxes are subtracted from personal income we get DPI. It is as

$$Y_d = DPI = PI - TP = C + S$$

Where TP = personal taxes,  $Y_d = DPI$

### **CONSUMER PRICE INDEX (CPI):**

Consumer price index is a measure of the overall level of prices. Published by the Federal Bureau of Statistics

$$100 \times \frac{\text{cost of basket in that month}}{\text{cost of basket in base period}}$$

**Substitution bias:** The CPI uses fixed weights, so it cannot reflect consumers' ability to substitute toward goods whose relative prices have fallen. CPI uses fixed weights.

**Introduction of new goods:** The introduction of new goods makes consumers better off and, in effect, increases the real value of the dollar. But it does not reduce the CPI, because the CPI uses fixed weights.

**Unmeasured changes in quality:** Quality improvements increase the value of the dollar, but are often not fully measured.

### **CATEGORIES OF THE POPULATION:**

- **Employed** working at a paid job
- **Unemployed** not employed but looking for a job
- **Labor force** the amount of labor available for producing goods and services; all employed plus unemployed persons
- **Not in the labor force** not employed, not looking for work.

### **Two important labor force concepts:**

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- **unemployment rate:**

Percentage of the labor force that is unemployed

$$\text{Unemployment Rate} = \frac{\text{Number of unemployed}}{\text{labor force}} \times 100$$

- **Labor force participation rate:**

The fraction of the adult population that 'participates' in the labor force

$$\text{labor - force participation rate} = \frac{\text{labor force}}{\text{Adult population}} \times 100$$

**Okun's Law:** states that a one-percent decrease in unemployment is associated with two percentage points of additional growth in real GDP.

**Lesson 09:**

**Consumption, C:**

Disposable income is total income minus total taxes:

$$Y - T$$

Consumption function:

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

Shows that  $\uparrow(Y - T) \Rightarrow \uparrow C$

**Investment, I:**

The investment function is  $I = I(r)$

Where  $r$  denotes the real interest rate, the nominal interest rate corrected for inflation.

The real interest rate is the cost of borrowing. The opportunity cost of using one's own funds to finance investment spending.

So,  $\uparrow r \Rightarrow \downarrow I$

**Government spending, G:**

- $G$  includes government spending on goods and services.
- $G$  excludes transfer payment

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- Assume government spending and total taxes are exogenous.

### **Types of saving:**

- Private saving =  $(Y - T) - C$
- Public saving =  $T - G$
- National saving,  $S$

= private saving + public saving

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

=  $Y - C - G$

### **Digression:**

Budgets surpluses and deficits:

- When  $T > G$ , budget surplus =  $(T - G)$  = public saving
- When  $T < G$ , budget deficit =  $(G - T)$  and public saving is negative.
- When  $T = G$ , budget is balanced and public saving = 0.

### **Digression: mastering models:**

For each curve in the diagram, know

- Definition
- Intuition for slope
- All the things that can shift the curve

Use the model to analyze the effects of each item in 2c.

### **Mastering the loan able funds model:**

Things that shift the saving curve

- Fiscal policy : changes in  $G$  or  $T$
- Private saving
- Preferences
- Tax laws that affect saving

### **Lesson 10:**

#### **The role of government:**

- Increase defense spending  $G > 0$
- Big tax cuts  $T < 0$

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- According to our model both policies reduce national saving

$$\bar{S} = \bar{Y} - C(\bar{Y} - \bar{T}) - \bar{G}$$

↑ — —

G => ↓ S

↓ T => ↑ C => ↓ S

- The increase in the deficit reduces saving...
- This causes the real interest rate to rise
- This reduces the level of investment.

### **Saving and the interest rate:**

- Why might saving depend on r?
- How would the results of an increase in investment demand be different?
- Would r rise as much?
- Would the equilibrium value of I change?

### **The classical theory of inflation:**

- Inflation
- Causes
- Effects
- Social costs
- “Classical” -- assumes prices are flexible & markets clear.
- Applies to the long run.

### **The connection between money and prices:**

- Inflation rate = the percentage increase in the average level of prices.
- Price = amount of money required to buy a good.
- Because prices are defined in terms of money, we need to consider the nature of money, the supply of money, and how it is controlled.

### **MONEY:**

Money is the stock of assets that can be readily used to make transactions.

### **Money: functions:**

- Medium of exchange we use it to buy stuff
- Unit of account the common unit by which everyone measures prices and values
- Store of value transfers purchasing power from the present to the future

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The ease with which money is converted into other things-- goods and services-- is sometimes called money's liquidity.

### **Money: Types:**

#### **Fiat money**

- has no intrinsic value
- example: the paper currency we use

#### **Commodity money**

- has intrinsic value
- examples: gold coins,

### **the money supply & monetary policy:**

- the money supply is the quantity of money available in the economy.
- Monetary policy is the control over the money supply.

### **The Central Bank:**

- Monetary policy is conducted by a country's central bank.
- In Pakistan, the central bank is called state bank of Pakistan (SBP).
- To expand the money supply:

The state bank buys **treasury bills** and pays for them with new money.

- To reduce the money supply:

The state bank sells **treasury bills** and receives the existing dollars and then destroys them.

### **The Quantity Theory of Money:**

- A simple theory linking the inflation rate to the growth rate of the money supply. Begins with a concept called "velocity"...

### **Velocity:**

- Basic concept: the rate at which money circulates
- the number of times the average rupee bill changes hands in a given time period.

### **Example:**

- Rs50 billion in transactions
- Money supply = Rs10 billion

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- The average rupee is used in five transactions
- So, velocity = 5

This suggests the following definition:

$$V = T / M$$

Where

V = velocity

T = value of all transactions

M = money supply

Use nominal GDP as a proxy for total transactions.

Then,

$$V = (P \times Y) / M$$

### **The Quantity Equation:**

- The quantity equation

$$M \times V = P \times Y$$

follows from the preceding definition of velocity.

- It is an identity:
- it holds by definition of the variables.

### **Lesson 11:**

#### **Money supply measures:**

<u>Symbol</u>	<u>Assets included</u>
C	Currency
M1	C + demand deposits, travelers' checks, other checkable deposits
M2	M1 + small time deposits, savings deposits, money market mutual funds, money market deposit accounts

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M3                      M2 + large time deposits,  
                                 repurchase agreements,  
                                 institutional money market  
                                 mutual fund balances

### **Money demand and the quantity equation:**

- Let's now express the quantity of money in terms of the quantity of goods and services it can buy;
- $M/P$  = real money balances, the purchasing power of the money supply.
- A simple money demand function:

$$(M/P)_d = k Y$$

Where

- $k$  = how much money people wish to hold for each rupee of income ( $k$  is exogenous)
- This equation states that the quantity of real money balances demanded is proportional to real income.
- Money demand:  $(M/P)_d = k Y$
- Quantity equation:  $M \times V = P \times Y$
- The connection between them:  $k = 1/V$
- When people hold lots of money relative to their incomes ( $k$  is high), money changes hands infrequently ( $V$  is low).

### **SEIGNIORAGE:**

- To spend more without raising taxes or selling bonds, the govt. can print money.
- The "revenue" raised from printing money is called seigniorage

(pronounced SEEN-your-ige)

- The inflation tax:

Printing money to raise revenue causes inflation. Inflation is like a tax on people who hold money.

### **Inflation and interest rates:**

- Nominal interest rate,  $i$  not adjusted for inflation
- Real interest rate,  $r$  adjusted for inflation:

$$r = i - \pi$$

### **The Fisher Effect:**

- The fisher equation:

$$r = i - \pi$$

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- $S = I$  determines  $r$ .
- Hence, an increase in  $\pi$  causes an equal increase in  $i$ .
- This one-for-one relationship is called fisher effect.

### Lesson 12:

#### Exercise:

Suppose  $V$  is constant,  $M$  is growing 5% per year,  $Y$  is growing 2% per year, and  $r = 4$ .

- Solve for  $i$  (the nominal interest rate).
- If SBP increases the money growth rate by 2 percentage points per year, find  $i$ .
- If the growth rate of  $Y$  falls to 1% per year
- What will happen to  $\pi$ ?
- What must SBP do if it wishes to keep  $\pi$  constant?

#### Answers:

- First, find  $\pi = 5 - 2 = 3$ .
- Then, find  $i = r + \pi = 4 + 3 = 7$ .
- $i = 2$ , same as the increase in the money growth rate.
- If SBP does nothing,  $\Delta\pi = 1$ .
- To prevent inflation from rising, SBP must reduce the money growth rate by 1 percentage point per year.

#### Two real interest rates:

- $\pi$  = actual inflation rate  
(not known until after it has occurred)
- $\pi^e$  = expected inflation rate
- $i - \pi^e$  = **ex ante** real interest rate:  
what people expect at the time they buy a bond or take out a loan
- $i - \pi$  = ex post real interest rate:  
what people actually end up earning on their bond or paying on their loan

#### Money demand and the nominal interest rate:

- The nominal interest rate  $i$  is the opportunity cost of holding money (instead of bonds or other interest-earning assets).
- Hence,  $\uparrow i \Rightarrow \downarrow$  in money demand.

#### The money demand function:

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$$(M/P)^d = L(i, Y)$$

- (M/P)<sup>d</sup> = real money demand, depends
- negatively on i
- i is the opportunity cost of holding money
- positively on Y
- higher Y ⇒ more spending so, need more money

(L is used for the money demand function because money is the most liquid asset.)

$$(MP)^d = L(i, Y)$$

$$= L(r + \pi^e, Y)$$

When people are deciding whether to hold money or bonds, they don't know what inflation will turn out to be.

Hence, the nominal interest rate relevant for money demand is  $r + \pi^e$

**Equilibrium:**

$$M = L(r + \pi^e, Y)$$

—  
P

**What determines what:**

Variable      how determined (in the long run)

M      exogenous (SBP)

r      adjusts to make S = I

Y       $\bar{Y} = F(\bar{K}, \bar{L})$

P      adjusts to make  $\frac{M}{P} = L(i, Y)$

**How P responds to M:**

- For given values of r, Y, and  $\pi^e$ ,

a change in M causes P to change by the same percentage --- just like in the Quantity Theory of Money.

**What about expected inflation?**

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- Over the long run, people don't consistently over- or under-forecast inflation, so  $\pi^e = \pi$  on average.
- In the short run,  $\pi^e$  may change when people get new information.

EX: Suppose SBP announces it will increase M next year. People will expect next year's P to be higher, so  $\pi^e$  rises.

- This will affect P now, even though M hasn't changed yet.

**How P responds to  $\Delta\pi^e$ :**

$$\frac{M}{P} = L(r + \pi^e, Y)$$

- For given values of r, Y, and M,

$$\uparrow \pi^e \Rightarrow \uparrow i \text{ (the Fisher effect)}$$

$$\Rightarrow \downarrow (MP)^d$$

$$\Rightarrow \uparrow P \text{ to make } (MP) \text{ fall to re-establish eq'm}$$

**Lesson 13:**

**A common misperception:**

Common misperception: inflation reduces real wages. This is true only in the short run, when nominal wages are fixed by contracts. In the long run, the real wage is determined by labor supply and the marginal product of labor, not the price level or inflation rate.

**The classical view of inflation:**

The classical view: A change in the price level is merely a change in the units of measurement. So why, then, is inflation a social problem?

**The social costs of inflation:**

The social costs of inflation fall into two categories:

- Costs when inflation is expected
- Additional costs when inflation is different than people had expected.

**Costs of expected inflation:**

**Menu costs:**

The costs of changing prices.

Examples:

- Print new menus
- Print & mail new catalogs

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- The higher is inflation, the more frequently firms must change their prices and incur these costs.

### **Relative price distortions:**

- Firms facing menu costs change prices infrequently.
- Example: Suppose a firm issues new catalog each January. As the general price level rises throughout the year, the firm's relative price will fall.

### **Unfair tax treatment:**

Some taxes are not adjusted to account for inflation, such as the capital gains tax.

Example:

- 1/1/2001: you bought Rs100, 000 worth of ABC stock
- 12/31/2001: you sold the stock for Rs110, 000,
- so your nominal capital gain was Rs10, 000 (10%).
- Suppose  $\pi = 10\%$  in 2001. Your real capital gain is Rs 0.
- But the govt. requires you to pay taxes on your Rs1000 nominal gain!!

### **General inconvenience:**

- Inflation makes it harder to compare nominal values from different time periods.
- This complicates long-range financial planning.

### **Additional cost of unexpected inflation:**

Arbitrary redistributions of purchasing power

- Many long-term contracts not indexed, but based on  $\pi_e$ .
- If  $\pi$  turns out different from  $\pi_e$ , then some gain at others' expense.

Example: borrowers & lenders

- If  $\pi > \pi_e$ , then  $(r - \pi) < (r - \pi_e)$  and purchasing power is transferred from lenders to borrowers.
- If  $\pi < \pi_e$ , then purchasing power is transferred from borrowers to lenders.

### **One benefit of inflation:**

Nominal wages are rarely reduced, even when the equilibrium real wage falls. Inflation allows the real wages to reach equilibrium levels without nominal wage cuts. Therefore, moderate inflation improves the functioning of labor markets.

### **Hyperinflation:**

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$\pi \geq 50\%$  per month All the costs of moderate inflation described above become HUGE under hyperinflation. Money ceases to function as a store of value, and may not serve its other functions (unit of account, medium of exchange). People may conduct transactions with barter or a stable foreign currency.

### **What causes hyperinflation?**

- Hyperinflation is caused by excessive money supply growth:
- When the central bank prints money, the price level rises.
- If it prints money rapidly enough, the result is hyperinflation.

### **Lesson 14:**

#### **The Classical Dichotomy**

Real variables are measured in physical units: quantities and relative prices, e.g.

- Quantity of output produced
- Real wage: output earned per hour of work
- Real interest rate: output earned in the future by lending one unit of output today

**Nominal variables:** measured in money units, e.g

- Nominal wage: dollars per hour of work
- Nominal interest rate: dollars earned in future by lending one dollar today
- The price level: the amount of dollars needed to buy a representative basket of goods

#### **Classical Dichotomy:**

“The theoretical separation of real and nominal variables in the classical model, which implies nominal variables do not affect real variables.”

#### **The Open Economy:**

- Accounting identities for the open economy
- Small open economy model
- What makes it “small”
- How the trade balance and exchange rate are determined
- How policies affect trade balance & exchange rate

#### **Preliminaries:**

$$\begin{aligned}C &= C^d + \\C^f I &= I^d \\+ I^f \\G &= G^d + G^f\end{aligned}$$

Speedy notes.....!

**Superscripts:**

d = spending on domestic goods

f = spending on foreign goods

EX = exports = foreign spending on domestic goods

IM = imports =  $C^f + I^f + G^f$  = spending on foreign goods

NX = net exports (the “trade balance”)

=EX – IM

- If  $NX > 0$ , country has a trade surplus equal to NX
- If  $NX < 0$ , country has a trade deficit equal to – NX

**GDP = expenditure on domestically produced goods & services:**

$$\begin{aligned} Y &= C^d + I^d + G^d + EX \\ &= (C - C^f) + (I - I^f) + (G - G^f) + EX \\ &= C + I + G + EX - (C^f + I^f + G^f) \\ &= C + I + G + EX - IM \\ &= C + I + G + NX \end{aligned}$$

**The national income identity in an open economy:**

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

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

Where,

NX => Net Export

Y => Output

$C + I + G$  => Domestic Spending

**Net Foreign Investment and Trade Balance:**

- We have

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

Re-arranging;

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

- Recall,  $Y - C - G$  is national savings S,

the sum of private savings ( $Y - T - C$ ) and public savings ( $T - G$ ).

Hence;

$$S = I + NX$$

or

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$$S - I = NX$$

- $S - I$  is the difference between domestic saving and domestic investment, referred to as Net Foreign Investment
- While  $NX$  is the Trade Balance
- So

$$\text{Net Foreign Investment} = \text{Trade Balance}$$

$$S - I = NX$$

### **International capital flows:**

- Net capital outflows

=  $S - I$  = net outflow of “loanable funds”

= net purchases of foreign assets

- Net capital outflows

the country's purchases of foreign assets minus foreign purchases of domestic assets

- When  $S > I$ , country is a net lender
- When  $S < I$ , country is a net borrower

### **Saving and Investment in a Small Open Economy:**

production function:  $Y = \bar{Y} = F(\bar{K}, \bar{L})$   
consumption function:  $C = C(Y - T)$   
investment function:  $I = I(r)$   
exogenous policy variables:  $G = \bar{G}, T = \bar{T}$

### **Lesson 15:**

#### **Assumptions: capital flows:**

- Domestic & foreign bonds are perfect substitutes
- Perfect capital mobility:

no restrictions on international trade in assets

- Economy is small:

cannot affect the world interest rate, denoted  $r^*$

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**The nominal exchange rate:**

$e$  = nominal exchange rate, the relative price of domestic currency in terms of foreign currency (e.g. Yen per Dollar)

**Exchange rates as of February 26, 2005**

<i>Country</i>	<i>Currency</i>	<i>exchange rate</i>
Europe	Euro(€)	Rs. 78.53
Japan	Yen(¥)	Rs. 0.5642
U.K.	Pound(£)	Rs. 113.99
United States	Dollar(\$)	Rs. 59.32
UAE	Dirham	Rs. 16.15

**The real exchange rate:**

$\varepsilon$  = real exchange rate, the relative price of domestic goods in terms of foreign goods (e.g. Japanese Big Macs per U.S. Big Mac)

**Understanding the units of  $\varepsilon$ :**

$$\begin{aligned} \varepsilon &= \frac{e \times P}{P^*} \\ &= \frac{(\text{Yen per } \$) \times (\$ \text{ per unit U.S. goods})}{\text{Yen per unit Japanese goods}} \\ &= \frac{\text{Yen per unit Japanese goods}}{\text{Yen per unit U.S. goods}} \\ &= \frac{\text{Yen per unit Japanese goods}}{\text{Units of Japanese goods}} \\ &= \text{per unit of U.S. goods} \end{aligned}$$

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To buy a U.S. burger, someone from Japan would have to pay an amount that could buy 1.5 Japanese Burgers.

### **ε in the real world & our model:**

In the real world: We can think of  $\hat{\epsilon}$  as the relative price of a basket of domestic goods in terms of a basket of foreign goods. In our macro model: There's just one good, "output." So  $\hat{\epsilon}$  is the relative price of one country's output in terms of the other country's output.

### **How NX depends on $\hat{\epsilon}$ :**

$\uparrow \hat{\epsilon} \Rightarrow$  US goods become more expensive relative to foreign goods

$\Rightarrow \downarrow EX, \uparrow IM \Rightarrow$

$\downarrow NX$

### **Lesson 16:**

#### **How $\hat{\epsilon}$ is determined:**

- The accounting identity says  $NX = S - I$
- We saw earlier how  $S - I$  is determined:
- $S$  depends on domestic factors (output, fiscal policy variables, etc)
- $I$  is determined by the world interest rate  $r^*$
- So,  $\hat{\epsilon}$  must adjust to ensure

$$NX(\hat{\epsilon}) = S - I(r^*)$$

#### **The net exports function:**

The net exports function reflects this inverse relationship between  $NX$  and

$$\hat{\epsilon}: NX = NX(\hat{\epsilon})$$

#### **The Determinants of the Nominal Exchange**

**Rate :**

Start with the expression for the real exchange rate:

$$\gamma \square \frac{e \square P}{P^*}$$

Solve it for the nominal exchange rate:

$$e \square \gamma \square P^*$$

### **Lesson 17:**

#### **Purchasing Power Parity (PPP):**

- a doctrine that states that goods must sell at the same (currency-adjusted) price in all countries.

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- the nominal exchange rate adjusts to equalize the cost of a basket of goods across countries.
- Reasoning: arbitrage, the law of one price.

$$e = P^* / P^* = 1$$

### **Does PPP hold in the real world?**

No, for two reasons:

1. International arbitrage not possible.
  - Non traded goods
  - Transportation costs
2. Goods of different countries not perfect substitutes.

Nonetheless, PPP is a useful theory:

- It's simple & intuitive
- In the real world, nominal exchange rates have a tendency toward their PPP values over the long run.

### **Issues in Unemployment:**

The natural rate of unemployment:

- What it means
- What causes it
- Understanding its behavior in the real world

### **Natural Rate of Unemployment:**

Natural rate of unemployment:

- the average rate of unemployment around which the economy fluctuates.
- In a recession, the actual unemployment rate rises above the natural rate.
- In a boom, the actual unemployment rate falls below the natural rate.

### **A first model of the natural rate:**

Notation:

L = # of workers in labor force

E = # of employed workers

U = # of unemployed

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$U/L$  = unemployment rate

**Assumptions:**

1.  $L$  is exogenously fixed.
2. During any given month,

$s$  = fraction of employed workers that become separated from their jobs,

$f$  = fraction of unemployed workers that find jobs.

$s$  = rate of job separations,  $f$  = rate of job finding (both exogenous)

**The steady state condition:**

the labor market is in steady state, or long-run equilibrium, if the unemployment rate is constant.

The steady-state condition is:

$$s \times E = f \times U$$

number of employed people who lose jobs = number of unemployed people who find jobs

**Solving for the “equilibrium” U rate:**

$$\begin{aligned} f \times U &= s \times E \\ &= s \times (L - U) \\ &= s \times L - s \times U \end{aligned}$$

Solve for  $U/L$ :

$$(f + s) \times U = s \times L$$

$$\frac{U}{L} = \frac{s}{s + f}$$

**Example:**

- Each month, 1% of employed workers lose their jobs ( $s = 0.01$ )
- Each month, 19% of unemployed workers find jobs ( $f = 0.19$ )
- Find the natural rate of unemployment:

$$\frac{U}{L} = \frac{s}{s + f} = \frac{0.01}{0.01 + 0.19} = 0.05, \text{ or } 5\%$$

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### **Policy implication:**

A policy that aims to reduce the natural rate of unemployment will succeed only if it lowers  $s$  or increases  $f$ .

### **Why is there unemployment?**

1. If job finding were instantaneous ( $f = 1$ ),

then all spells of unemployment would be brief, and the natural rate would be near zero.

2. There are two reasons why  $f < 1$ :

- Job search
- Wage rigidity

### **Job Search & Frictional Unemployment:**

- Frictional unemployment: caused by the time it takes workers to search for a job
- Occurs even when wages are flexible and there are enough jobs to go around

Occurs because

- Workers have different abilities, preferences
- Jobs have different skill requirements
- Geographic mobility of workers not instantaneous
- Flow of information about vacancies and job candidates is imperfect

### **Lesson 18:**

#### **Sectoral shifts:**

changes in the composition of demand among industries or regions

#### **Example#1** Technological change

increases demand for computer repair persons, decreases demand for typewriter repair persons.

**Example#2** A new international trade agreements cause greater demand for workers in the export sectors and less demand for workers in import-competing sectors.

It takes time for workers to change sectors, so sectoral shifts cause frictional unemployment.

#### **Sectoral shifts abound:**

- In our dynamic economy, smaller (though still significant) sectoral shifts occur frequently, contributing to frictional unemployment.

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### **Public Policy and Job Search:**

Govt programs affecting unemployment

- Govt employment agencies:

disseminate info about job openings to better match workers & jobs

- Public job training programs:

help workers displaced from declining industries get skills needed for jobs in growing industries.

### **Unemployment insurance (UI):**

- UI pays part of a worker's former wages for a limited time after losing his/her job.
- UI increases search unemployment, because it:
  - reduces the opportunity cost of being unemployed
  - reduces the urgency of finding work
  - hence, reduces f
- Studies: The longer a worker is eligible for UI, the longer the duration of the average spell of unemployment.

### **Benefits of UI:**

By allowing workers more time to search, I may lead to better matches between jobs and workers, which would lead to greater productivity and higher incomes.

### **Reasons for wage rigidity:**

1. Minimum wage laws
2. Labor unions
3. Efficiency wages

### **The minimum wage:**

- The minimum wage is well below the equilibrium wage for most workers, so it cannot explain the majority of natural rate unemployment.
- However, the minimum wage may exceed the equilibrium wage of unskilled workers, especially teenagers.

### **Labor unions:**

- Unions exercise monopoly power to secure higher wages for their members.
- When the union wage exceeds the equilibrium wage, unemployment results.
- Employed union workers are insiders whose interest is to keep wages high.

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- Unemployed non-union workers are outsiders and would prefer wages to be lower (so that labor demand would be high enough for them to get jobs).

### **Efficiency Wage Theory:**

- Theories in which high wages increase worker productivity:
  - Attract higher quality job applicants
  - Increase worker effort and reduce “shirking”
  - Reduce turnover, which is costly
  - Improve health of workers (in developing countries)
- The increased productivity justifies the cost of paying above-equilibrium wages.
- The result: unemployment

### **The duration of unemployment:**

The data:

- More spells of unemployment are short-term than medium-term or long-term.
- Yet, most of the total time spent unemployed is attributable to the long-term unemployed.
- This long-term unemployment is probably structural and/or due to sectoral shifts among vastly different industries.
- Knowing this is important because it can help us craft policies that are more likely to succeed.

\*\*\*\*\*THE END\*\*\*\*\*