CPI: We observe some fixed basket of goods, and see how the price of this basket changes over time.

CPI =

[(price of the basket in the current year)/(price of the basket in the base year)]\*100

Inflation between year1 and year2 =

[(CPI in year2 – CPI in year1)/CPI in year1]\*100

Problems with CPI:

1. Substitution bias:

When prices change, consumers are expected to buy more of the cheaper goods, and fewer of the expensive goods.

CPI overstates inflation.

1. Ignores the quality of goods.
2. Ignores the introduction of new goods.

When consumers have more choices of goods to buy, their money goes further.

Over states inflation

CPI overstates inflation by about 1%.

GDP vs. GDP deflator:

GDP deflator is based on domestically produced goods.

Example: Oil

CPI is better when households use lots of imported goods.

CPI doesn’t reflect changes in price or production well.

GDP deflator is better when prices and production are fluctuating to a large extent.

Real vs. Nominal interest rates:

Nominal interest rates: Interest rates that are not corrected for inflation.

Real interest rates: Interest rate adjusted for inflation.

Fisher Equation:

Real interest rate = Nominal interest rate – inflation rate.

Approximation.

Example:

Put $100 into a saving account at 10% nominal interest.

A year later you withdraw $110. During the same time, the price level has increased by 10%.

Before, the cellphone cost $100.

After, the cellphone cost $110.

The purchasing power hasn’t changed.

Productivity: output/units of labor

Increase the size of the labor force

Productivity is driven by capital, technology, and natural resources.

Capital: Physical Capital, Human Capital

Physical Capital: The stock of equipment and structures used to produce goods.

Human Capital: Knowledge and skills of workers.

Example: Education.

Technology: Society understanding of the best way to produce goods and services.

Natural resources: Inputs used in the production of goods that are provided by nature.

Savings, investments, and growth:

Households who save their money at banks.

These banks lend the money to firms to acquire more capital.

This can be imported through interest rates.

Households invest in firms, firms use this money to acquire more capital.

Y(output) = F(L(labor),K(capital), technology, natural resources)

Constant returns to scale (CRTS)

A function F has CRTS if for any x≥0

F(x\*L, x\*K, x\*natural resources) = x\*F(L, K, technology, natural resources)

Example: if x=2, this says that doubling all inputs will double output.

Y = F(L, K)

F has CRTS

Y/L = F(L, K)/L Y/L = F(L/L, K/L) = F(1, K/L)

Productivity is only a function of capital per worker.

Diminishing marginal returns (of capital):

Each additional unit of capital has a smaller benefit in terms of per worker output than the previous.

Catch up effect: Poor countries tend to grow faster than richer countries.

Poorer countries have less capital, so additional capital helps more.

Poorest countries have the least to save.

Attract foreign investors to avoid this problem.

Poorest countries tend to have high levels of corruption, poor functioning legal system, political instability etc.

Technology figures in notebook.

Effects of technology change:

1. Direct effects: As technology improves. We can produce more with the same level of capital.
2. Indirect effects: As we produce more, we produce more capital with more capital. With more capital, workers are more productive.

How do we encourage technological advancement?

1. Fund research and development
2. Education.
3. Intellectual property rights or patents

To make technological achievements profitable

These methods increase the probability of a technological advance, but nothing is certain.

Increase the size of the labor force.

A country’s standard of living is tied to its productivity.

If the labor force grows faster than our stock of capital, capital per worker has decreased. Decreases productivity.

Economists have recommended that the poorest countries should take steps to limit population growth.

Financial Market:

Stocks – A claim to partial ownership of a firm.

Bonds – A certificate of indebtedness.

Bonds are debt instruments.

When you buy a bond, you are lending money.

When you sell a bond, you are borrowing money.

Bonds promise a series of future payments.

A bond’s interest rate depends on both the series of future payments, and the price of the bond.

All other things being equal, when the price of a bond goes down, the interest of the bond goes up.

1. Term to maturity

How long does it take to receive the series of future payments?

Term to maturity increases, the interest on the bond also increases.

Compensate the lender for time spent without the money.

1. Default risk (credit risk)

Default: A failure of the borrower to make some portion of the promised series of future payments.

Default risk increases, price of the bond goes down, interests on the bond goes up.

1. Tax treatment

Most bonds have fully taxable interest.

A few bonds are exempt from taxation.

Ex. Municipal bonds

Corporate bond: 6% interest

Municipal bond: 4% interest

Tax rate of 40%

Corporate after tax return:

60%\*6% = 3.6%

The more a bond is taxed, the higher the return.

Stocks: Equity instruments. Shareholders re partial owners of a firm, and they are entitled to a portion of that firm profits.

A firm’s after tax earnings are split into retained earnings, and dividends.

Dividends are firm profit divided among shareholders.

Done to increase the stock price.

Retained earnings: The firm reinvests in equipment, buildings, capital, etc.

Stocks vs. Bonds

Bondholders always get paid first, dividends fluctuate with profit, repayments on bonds do not vary.

If company goes bankrupt, their assets are used to repay bondholders first. If there is anything left over, it is split amongst stockholders.

Stocks are riskier than bonds.

Stocks potentially have higher returns.

Loanable funds market

Y = C + I + G + NX

Assume a closed economy, NX=0

Y = C + I + G

T: Total taxes paid to the government

Y – T = C + I + G – T

I = (Y – C – T) + (T – G)

(Y – C – T) Household or private savings

(T – G) Public savings

Investment = Savings

Demand for loanable funds = supply of loanable funds

Private saving + Public saving = National saving = Y –C – G = I

Y = $8 trillion

T = $1.5 trillion

Private saving = $0.5 trillion

Public saving = $0.2 trillion

What is C, I, G, National saving

8 – 1.5 = C + I + G - 1.5

I = 0.5 + 0.2 = 0.7 national saving

8-C-1.5 = 0.5

C = 6

1.5 - G = 0.2

G = 1.3

Savings are the source of the supply for loanable funds

If the invest rate goes up, any money saved today will buy more future goods.

If the invest rate goes up, any money spent, requires you to give up more future money, future goods.

When interest rates rise, consume less today, save more today, and consume more in the future.

Investment is the source of demand for loanable funds.

If interest rates go up, you have to give up more future money in order to invest today.

When interest rates go up, investment goes down.

How can we increase the quantity of loanable funds?

1. Increase supply of loanable funds.

Savings are the source of supply of loanable funds.

Savings = Private saving + Public saving

How do we increase private saving?

1. Lower taxes on interest.

2. Tax consumption, not income.

How do we increase public savings?

Reduce deficits

Crowding out effect:

The lost investment resulting from a move from l0 to l1 is said to have been crowded out.

Deficits can be reduced either by reducing government spending, or increasing taxes.

1. Increase demand for loanable funds.

Increase investment:

Subsidies/or tax credits for investment.

Decrease the corporate tax rate.

Time value of money:

PV = FVn/(1+i)^n

FVn: A future payment made after n periods. FV stands for future value.

i: interest rate

n: the number of periods you must wait before receiving the future payment.

PV: present value of the future payment. The amount you would pay today for this future payment.

Example:

What is a payment of $1000, made 3 years from now worth today if i = 9%.

PV = 1000/(1+0.09)^3 = 649.93.

$100,000 is put into an account earning 9.5% interest for 12 years. What is the value of this account after 12 years?

(1+0.095)^12 \* 100000 = 297,145.56

The rule of 70: At an interest rate of i%. An account will double in value in 70/i periods.

Do not use decimal form for i when suing the rule of 70.

Your saving account pays 6% interest:

Your saving account will double in value approximately every 70/6 years.

Evaluating an investment: we pay some amount of money today. We receive a series of future payments.

Convert all payments to present value.

Add the present values of all future payments together. Make the investment if the amount we pay today is less than the present value of the future payments.

You can make an investment that pays

$32000 in one year

$26000 in two years

$22000 in three years

i = 5.2%

What is the most someone should pay today for this investment?

PV = 32000/(1+0.052)

+

PV = 26000/(1+0.052)^2

+

PV = 22000/(1+0.052)^2

=

$72807.68

Example:

You can have $1000 today, or you can have $x in 7 years. How big does x need to be so that you are indifferent between these options.

i = 4.5%