

TA Info

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Ch. 19 – Quantity theory of money

Velocity of money

- Equation of exchange

$$M \times V = \underbrace{P \times Y}_{\text{nom. GDP}}$$

M - Money supply V - Velocity of money P - Price level Y - Real GDP

- In Irving Fisher's view, velocity was constant and wages and prices perfectly flexible, so doubling money supply, just doubles price level.

Quantity theory and inflation

Because the percent change of a product is approximately the sum of the percent changes, we can use the equation of exchange to write

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

If velocity is constant, this means we can write the inflation rate as

$$\% \Delta P = \% \Delta M - \% \Delta Y$$

So, if velocity is constant, inflation occurs when money supply grows faster than the economy.

Ch. 19 - Keynesian demand for money and liquidity preference

Why hold money (according to Keynes)?

- Transactions motive** – Need money to buy stuff
- Precautionary motive** – Need money in case of unexpected expenses
- Speculative motive** - Hold money as a store of wealth

Putting these together we can express the demand for *real* money holdings (M/P) in terms of interest rates and output:

$$\frac{M}{P} = \underbrace{L(i, Y)}_{\text{liquidity preference}}$$

- If interest rates *increase*, people want to hold *less* money because the opportunity cost is higher (want to hold wealth as interest-earning assets) (lower speculative motive)
- If output *increases*, people want to hold *more* money because there's more stuff to buy (more transactions motive)

Velocity with liquidity preference

Unlike Fisher, Keynes didn't see velocity as constant. We can plug the liquidity preference equation into the equation of exchange to get

$$V = \frac{Y}{L(i, Y)}$$

Note that interest rates fluctuate much more than output does, so as interest rates increase (in the short term), velocity must increase.

Ch. 20 – IS curve

We're working up towards the classic aggregate demand / aggregate supply (AD-AS) model of the macroeconomy to understand recessions and the role the central bank may play to mitigate them.

To get there, we start with understanding how output varies with interest rates.

First, recall how we measure (domestic) output (GDP):

$$Y = \underbrace{C}_{\text{consumption}} + \underbrace{I}_{\text{investment}} + \underbrace{G}_{\text{govt. spending}} + \underbrace{NX}_{\text{net exports}}$$

- Consumption varies with income (output = income):
- Government spending is fixed:

$$C = \bar{C} + mpc \times \underbrace{(Y - \bar{T})}_{\text{after tax income}} \qquad G = \bar{G}$$

mpc : marginal propensity to consume

- Net exports *fall* as real interest rates *rise*:

$$NX = \bar{NX} - x \times r$$

- Investment *falls* as real interest rates *rise*

$$I = \bar{I} - d \times (r - \bar{f})$$

\bar{f} : financial frictions

Plug each of these into the GDP equation and solve for Y to find the IS curve:

$$Y = \left[\bar{C} + \bar{I} - d\bar{f} + \bar{G} + \bar{NX} - mpc \times \bar{T} \right] \times \frac{1 - r \times (d + x)}{1 - mpc}$$

Exercises

- According to the quantity theory of money, when money supply doubles
 - nominal income doubles
 - nominal income falls by 50%
 - velocity falls by 50%
 - velocity doubles
- If money supply is \$20 trillion and velocity is 2, the nominal GDP is
 - \$2 trillion
 - \$10 trillion
 - \$20 trillion
 - \$40 trillion
- Keynes hypothesized that the transactions component of money demand was primarily determined by the level of
 - income
 - stock market prices
 - interest rates
 - velocity
- An autonomous depreciation of the U.S. dollar makes American goods _____ relative to foreign goods and results in a _____ in U.S. net exports, everything else held constant.
 - more expensive, rise
 - more expensive, decline
 - cheaper, rise
 - cheaper, decline