## ECO 209Y

## Macroeconomic <br> Theory and Policy

## Lecture 12: The Derivation of the Aggregate Demand Curve

## Fixed-Price Model

- Everything we have done in the IS-LM model has been in terms of demand, where AE determined supply
> We assumed that the price level was fixed and, therefore, that firms were willing to supply all that was demanded at this given price level
- Therefore, the equilibrium determined in the IS-LM model was referring exclusively to the demand side of the economy
$>$ That is, it could be said that the IS-LM equilibrium indicated the real value of the quantity demanded of goods and services at the fixed price level


## Flexible-Price Model

- We will now allow the price level ( $\mathbf{P}$ ) to change and see how this affects the demand side of the economy
$>$ That is, how the IS-LM equilibrium changes as $\mathbf{P}$ changes
- Allowing $\mathbf{P}$ to change, we will construct the aggregate demand (AD) curve for the economy
> We will do so while holding $\overline{\mathbf{A E}}$ and $\mathbf{M}$ constant
- The AD curve shows the real value of the quantity demanded of goods and services ( $\mathbf{Y}$ ) at each price level ( $\mathbf{P}$ )
- Therefore, the AD curve maps out the combinations of $\mathbf{P}$ and Y at which the goods and assets markets are simultaneously in equilibrium (while still assuming that firms supply all that is demanded at each price level)


## The Derivation of the AD Curve in A Closed Economy

■ In order to derive the AD curve we must allow the price level to change and see how it affects the level of output in the ISLM model of a closed economy

- As the price level increases, for instance, the real supply of money (M/P) decreases and the LM curves shifts upward
- Recall that the equation for the LM curve is given by

$$
i=-(M / P) / h+(k / h) Y
$$

where $\mathbf{h}$ is the interest sensitivity of the demand for money and $\mathbf{k}$ is the income sensitivity of the demand for money

- As P increases, therefore, the IS and LM curve intersect at lower levels of income
$>$ Hence, the AD curve has a negative slope


## The Derivation of the AD Curve



When the price level is $P_{1}$, the real money supply is $M / P_{1}$ and the corresponding LM curve is $\mathrm{LM}\left(\mathrm{P}_{1}\right)$.

When the price level is $P_{1}$, the goods and the money markets are in equilibrium at $Y_{1}$. This combination of $P$ and $Y$ is one point on the AD curve.

If the price level increases to $\mathrm{P}_{2}$, the real money supply decreases and the LM curve shifts to $\mathrm{LM}\left(\mathrm{P}_{2}\right)$.

When the price level is $P_{2}$, the goods and the money markets are in equilibrium at $Y_{2}$. This combination of $P$ and $Y$ is another point on the AD curve.

## The Slope of the AD Curve



## The Slope of the AD Curve

- But what determines the slope of the AD curve?
- Since changes in $\mathbf{P}$ affect the real money supply (M/P), we need to see how changes in the real money supply affect the equilibrium income in the IS-LM framework
- Recall that the equation for equilibrium income is given by:

$$
Y=\beta_{F P} \overline{A E}+\beta_{M P}(\bar{M} / P)
$$

- Hence, the larger the monetary policy multiplier ( $\beta_{\mathrm{MP}}$ ) the flatter the AD curve
- Also recall that the monetary policy multiplier is:

$$
\beta_{M P}=\frac{1}{(h / b)[1-c(1-t)]+k}
$$

## The Slope of the AD Curve



When the price level is $P_{1}$, the real money supply is $\bar{M} / P_{1}$ and the corresponding LM curve is $\mathrm{LM}\left(\mathrm{P}_{1}\right)$.

If the price level decreases to $\mathrm{P}_{2}$, the real money supply increases and the LM curve shifts to $\mathrm{LM}\left(\mathrm{P}_{2}\right)$ when the monetary policy multiplier is $\beta_{\mathrm{MP}}{ }^{1}$. This is a movement down along the $A D_{1}$ curve.

If the monetary policy multiplier is $\beta_{M P}^{2}$ instead, then the LM curve shifts to $\mathrm{LM}^{\prime}\left(\mathrm{P}_{2}\right)$ when the price level decreases to $P_{2}$. This is a movement down along the $A D_{2}$ curve.

## The Effect of Fiscal Policy on the AD Curve



When the price level is $\mathrm{P}_{1}$, the goods and money markets are in equilibrium at $Y_{1}$. This combination of $P$ and $Y$ is one point on the $A D$ curve.

The horizontal shift of the IS curve is equal to $\alpha_{A E} \Delta \bar{G}$.

After the increase in G, and with no change in the price level, the goods and money markets would be in equilibrium at $Y_{2}$. This combination of $P$ and $Y$ is one point on a different AD curve.

The horizontal shift of the AD curve is equal to $\beta_{\mathrm{FP}} \Delta \overline{\mathrm{G}}$.

## The Effect of Monetary Policy on the AD Curve

 | When the price level is $P_{1}$, the |
| :--- |
| goods and money markets are in |
| equilibrium at $Y_{1}$. This |
| combination of $P$ and $Y$ is one |
| point on the AD Curve. |

After the increase in $M$, and with no change in the price level, the goods and money markets would be in equilibrium at $Y_{2}$. This combination of $P$ and $Y$ is one point on a different $A D$ Curve.

The horizontal shift of the AD curve is equal to $\beta_{M P} \Delta(M / P)$.

