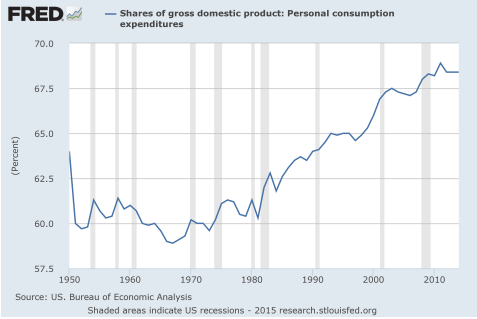
Aggregate Expenditure Model

- Consumption function
- Aggregate planned expenditure
- Keynesian cross
- Expenditure multiplier
- Relation of AE and AS-AD models

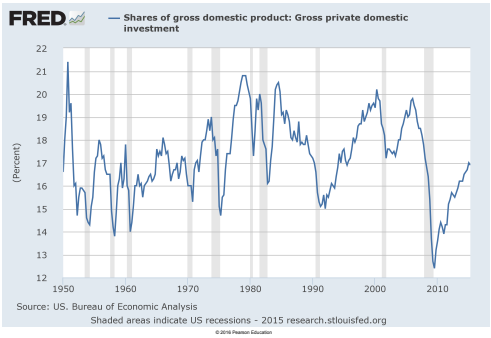
Reading: Ch.11 pg. 266-67, 270-76, 279-83, 286-87

HW07: TBA

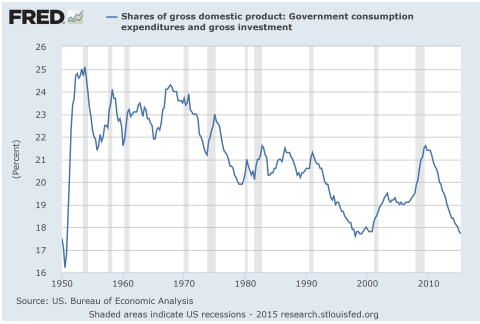
Consumption as a Share of GDP in U.S.



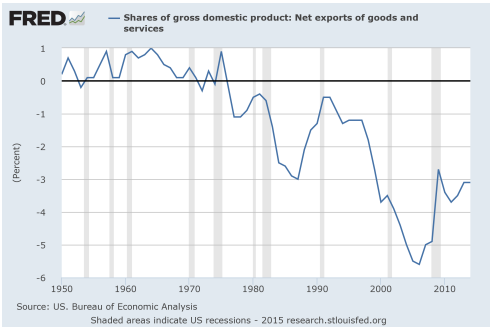
Investment as a Share of GDP in U.S.



Gov-t Expenditure as a Share of GDP in U.S.



Net Exports as a Share of GDP in U.S.



Simplification for U.S. Economy

- The share of net exports is very small
- Therefore, we usually abstract from net exports when studying U.S. economy
- In other words, we assume that U.S. is an autarky:

$$Y \approx C + I + G$$

- This will make our lives easier

Consumption and Saving Plans

- Influenced by many factors but the most direct one is disposable income
- **Disposable income** is aggregate income or real GDP, minus net taxes:

$$YD = Y - T$$

- Disposable income can be spent on consumption of goods and services or saved:

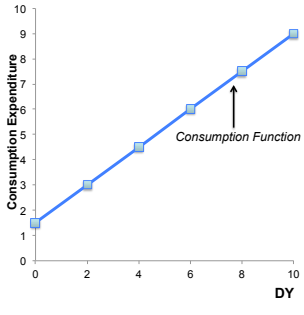
$$YD = C + S$$

Consumption Function

- The relationship between consumption expenditure and disposable income, other things remaining the same, is the **consumption function:**

$$C = a + b \times YD$$

Consumption Function

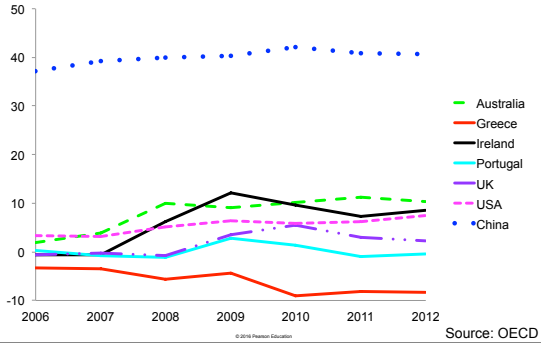


	DY	C	S
A	0	1.5	-1.5
B	2	3	
C	4	4.5	
D	6	6	
E	8	7.5	
F	10	9	

Consumption at Point A is **autonomous consumption**

Everything that is in excess of that is **induced consumption**

Can Saving Be Negative?



Source: OECD

Consumption Function

- We know that disposable income is:

$$YD = Y - T$$

- We can substitute this into the consumption function:

$$C = a + b \times YD = a + b(Y-T)$$

Keynesian Model (for autarky)

Assumption: ***The price level is fixed***

- *Think of a store that updates its prices every morning*
- *The store does not change prices throughout a day*
- *So, we are going to think what happens during a single day*
- *This way we are abstracting from aggregate supply*

Keynesian Model

This model is what we call “demand driven”:

The level of real GDP on any given day is determined by aggregate demand

Now we need to find out what determines aggregate demand in this model

Aggregate Planned Expenditure

The components of aggregate planned expenditure:

$$APE = C^P + I^P + G^P$$

- *Planned consumption expenditure*
- *Planned investment*
- *Planned government expenditure*

Aggregate Planned Expenditure as a Function of Real GDP

Aggregate planned expenditure is:

$$APE = C^P + I^P + G^P$$

Use the consumption function:

$$APE = a + b(Y-T) + I^P + G^P$$

Simplify:

$$APE = a - bT + I^P + G^P + bY$$

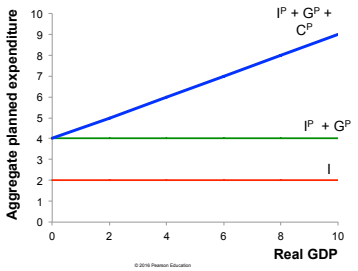
Aggregate Planned Expenditure

$$APE = a - bT + I^P + G^P + bY$$

- The part of aggregate planned expenditure that varies with real GDP is **induced expenditure**
- The part of aggregate planned expenditure that does not vary with GDP is **autonomous expenditure**

Aggregate Planned Expenditure Curve

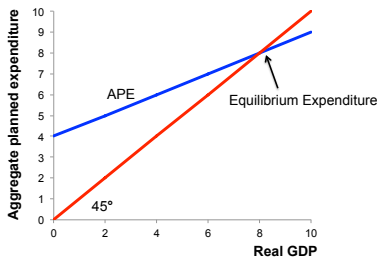
The relationship between aggregate planned expenditure and real GDP



Actual vs. Planned Expenditure

- *Aggregate planned expenditure* may differ from actual aggregate expenditure
- **Equilibrium expenditure** is the level of aggregate expenditure that occurs when aggregate *planned* expenditure equals real GDP

Equilibrium Expenditure



Equilibrium Expenditure

$$APE = Y$$

Recall that:

$$APE = a - bT + I + G + bY$$

Therefore:

$$Y = a - bT + I + G + bY$$

We can collect Y:

$$Y = \frac{1}{1-b} \cdot (a - bT + I + G)$$

What happens when I or G increase?

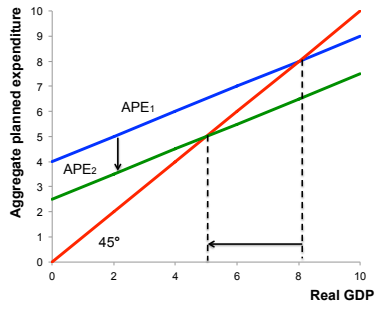
The Expenditure Multiplier

$$Y = \frac{1}{1-b} \cdot (a - bT + I + G)$$

The **multiplier** is the amount by which a change in autonomous expenditure is multiplied to determine the change in equilibrium expenditure and real GDP

Recall that ***b*** is the slope of the APE curve

The Expenditure Multiplier



The Expenditure Multiplier

When gov-t expenditure decreases by 1.5:

Using the numbers from the figure:

***b* =**

And the multiplier (***m***) is:

***m* =**

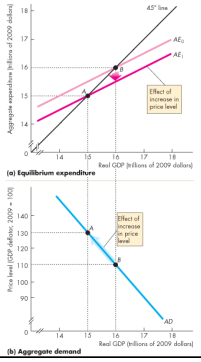
The Expenditure Multiplier

When investment increases by 1:

The Multiplier and the Price Level

- So far, in this lecture we assumed that the price level is constant
- In reality, firms don't hold their prices constant for long, therefore the price level is not constant
- Recall that the *AS-AD* model simultaneously determines real GDP and the price level
- We can relate the two models

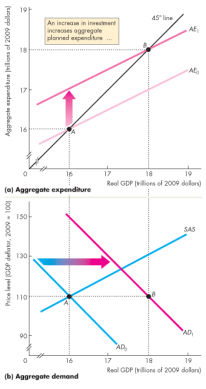
Increase in the Price Level



Increase in G

The increase in gov-t expenditure shifts the *AE* curve upward and shifts the *AD* curve rightward

With no change in the price level, real GDP would increase to $18 trillion at point *B*

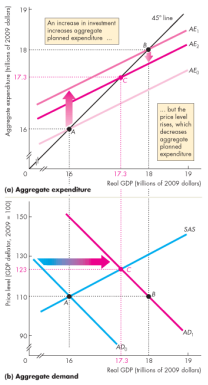


Increase in G

But the price level rises

The *AE* curve shifts downward

The multiplier in the short run is smaller than when the price level is fixed

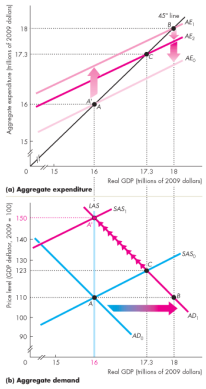


Increase in G Long-Run Effects

The money wage rate rises

SAS curve shifts leftward until real GDP equals potential GDP

In the long run, the multiplier is zero



Estimated Output Multipliers of Major Provisions of the ARRA of 2009

	Estimated output multipliers	
Type of activity	Low estimate	High estimate
Purchase of goods and services by the Federal Government	0.5	2.5
Transfer payments to state and local governments for infrastructure	0.4	2.2
Transfer payments to state and local governments for other purposes	0.4	1.8
Transfer payments to individuals	0.4	2.1
One-time payments to retirees	0.2	1.0
Two-year tax cuts for lower- and middle-income people	0.3	1.5
One-year tax cut for higher-income people	0.1	0.6

Source: CBO (2012a), Table 2
https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/02-22-ARRA.pdf