

Macroeconomics Tutorial Map (provisional)

Topics	Lecture (date)
■ Introduction; Scarcity and choice, market system, positive and normative, alternative systems	1: F (9/01)
■ Introduction: the PPC, benefits of trade	
■ Introduction; Four key macroeconomic variables; definitions; policy goals;	2: F 9/08
■ The circular flow of income; injections and withdrawals	
■ Measuring National Income	3: F 9/15
■ The limits of growth, resource constraints	
■ The business cycle	4: F 9/22
■ Introduction to Demand and Supply	
■ First In-class TEST Receive 1 st take-home assignment	
■ Unemployment – measures causes and types	5: F 9/29
■ Unemployment II – measures causes and types	

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Macroeconomics Tutorial Map (provisional)

Topics	Lecture (date)
■ Aggregate Demand and Aggregate Supply II – what drives National Income?	6: F 10/06
■ Aggregate Demand, Supply and Inflation I	
■ Aggregate Demand, Supply and Inflation II	7: F 10/13
■ Inflation – more on inflation	
■ Fiscal Policy	8: F 10/20
■ Fiscal Policy	
■ Second In-Class Test Receive 2nd take-home assignment	
■ The importance of money. Monetary Policy	9: F 10/27
■ The banking system and interest rates	
■ More on monetary policy	10: F 11/03
■ NO CLASS	F 11/10
■ Supply-side policy I	
■ More on supply side, and productivity II	
■ Key Supply-side policy choices	11: F 11/17

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Macroeconomics Tutorial Map (provisional)

Topics	Lecture (date)
■ NO CLASS	11/24
■ Third In-class TEST Receive 3rd take-home assignment	13: F 12/01
■ International Trade - Reasons for Trade	
■ Evaluating Trade and Trade Policy	
■ Balance of Payments	
■ Exchange rates	14: F 12/08
■ Exchange rates and macroeconomic policy	
■ Examining policy choices	
■ FINAL EXAM 9:30AM	F 12/15

■ Tutorial map

- I reserve the right to change this schedule at any time. I will need to get used to the pace of the class. I may include or exclude topics depending upon how we are progressing
- IN THE EVENT OF A CONFLICT BETWEEN THE SCHEDULE HERE AND THE SYLLABUS, THE MOST RECENT SLIDE PACK TAKES PRECEDENT

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Macroeconomics

LECTURES 3 & 4

Macroeconomics

- Last time
 - The role of government in managing the economy and alternative economic systems
 - Introduction to the 4 key economic variables
 - The Economic Cycle and Circular Flow of Income
 - Injections and withdrawals
 - An overview of the relationship between the four key Macroeconomic objectives
 - Measuring National Income – real vs. nominal
- Today – National Income Accounts
 - Why growth?
 - Measuring National Income
 - The limits of growth, resource constraints
 - The business cycle

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Macroeconomics

Assignment:
Read McC & B Ch 7 for National Income Accounting (read all of the chapter now if you like. We will deal with the shortcomings of GDP as a measure next time)

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**ANY QUESTIONS ON THE
READING OR THE SLIDES FROM
LAST LESSON?**

Macroeconomics

- The first of the four key economic goals: Economic growth
 - Usually change in GDP
 - Usually REAL
 - Less often: GDP per head but important for judging living standards
- Why growth?
- What drives National Income/GDP
 - A world without inflation – the basic determination of output. A closer look at the circular flow of income.
 - A basic Keynesian analysis.
- Next time – What drives National Income/GDP
 - A basic Keynesian analysis II

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Macroeconomics

■ The first of the four key economic goals: Economic growth

- Why do we want growth?
 - More stuff
 - More opportunities, now and in the future
 - More choices, eases the issue of scarcity

■ Watch this!

Assume as follows		GDP per head		
		2013	2025	2050
China GDP growth rate per annum	7.0%			
US GDP growth rate per annum (1)	3%			
US pop growth per annum(2)	0.65%			
China pop growth per annum	0%			
China		\$11,904	\$26,810	\$145,510
US		\$53,143	\$70,102	\$124,828

1) It was actually 3.2% from 1950-2012

2) See here: <http://www.census.gov/population/projections/data/national/2014/summarytables.html> and download table 1. Actual projection is for about 0.8% declining to 0.45% by 2050

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Macroeconomics

■ And.....

- Better stuff (PCs vs. mainframe computers, today's cars vs. 1950s cars)
- More leisure time to enjoy the stuff
- A longer life
- Political "progress" along with economic wealth

■ But.....

- Volatility and stress
- A different "society"
- Urban living
- Varied "relative" progress

■ Also.....

- How do we know we have measured all the stuff?
 - The "black economy"
 - Barter
 - Unpaid transactions
 - Statistical mistakes

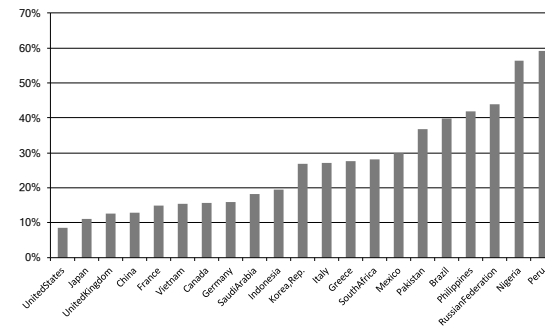
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Things We might Not measure

	Monetary	Non-Monetary								
Illegal	<ul style="list-style-type: none"> • Trade in stolen goods • Drug dealing & manufacturing • Prostitution • Gambling • Smuggling • Fraud 	<ul style="list-style-type: none"> • Barter of drugs • Stolen, or smuggled goods • Producing or growing drugs for own use • Theft for own use 								
Legal (avoid) + Illegal (evade)	<table border="1"> <thead> <tr> <th>Evading Tax:</th> <th>Avoiding Tax</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Unreported income from self-employment • Remuneration from unreported work related to legal services and goods </td> <td> <ul style="list-style-type: none"> • Employee discounts, fringe benefits </td> </tr> </tbody> </table>	Evading Tax:	Avoiding Tax	<ul style="list-style-type: none"> • Unreported income from self-employment • Remuneration from unreported work related to legal services and goods 	<ul style="list-style-type: none"> • Employee discounts, fringe benefits 	<table border="1"> <thead> <tr> <th>Evading Tax</th> <th>Avoiding Tax</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Barter of legal services and goods </td> <td> <ul style="list-style-type: none"> • All do-it-yourself work and neighbor help </td> </tr> </tbody> </table>	Evading Tax	Avoiding Tax	<ul style="list-style-type: none"> • Barter of legal services and goods 	<ul style="list-style-type: none"> • All do-it-yourself work and neighbor help
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Methodology from: <http://www.imf.org/External/Pubs/FT/issues/issues30/#2>

The "Shadow Economy"¹ Legal but unreported



1: Includes all market-based legal production of goods and services that are deliberately concealed from public authorities. Source: <https://openknowledge.worldbank.org/bitstream/handle/10986/3928/WPS5356.pdf?sequence=1> Schneider world bank policy research average data 1999-2006

Macroeconomics

- Drivers of growth
 - Remember our basic checklist:

	Land	Labor	Capital	Entrepreneurship
More				
More productive				

- Pro-enterprise environment: property rights, patents and copy rights
 - Financial institutions and the flow of savings and investment
 - Literacy and education
 - Free trade
 - Competitive market system
-
- Remember to use the PPF – movements towards the edge of the PPF and movements of the PPF outwards

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Assignment

- For further study of the drivers of long term growth, and arguments for and against growth as an economic goal read McC & B Ch 8.

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Basic KEYNESIAN THEORY

- We have learned that the four macroeconomic goals are interrelated. High growth, while reducing unemployment via stimulation of the demand for labour may also cause inflation and balance of payments problems.
- In order to move to consideration of Inflation itself we need to learn something of its causes.
- In order to do that we must examine the nature of the economy more closely.
- We do this by learning more about the nature of economic activity in a world without inflation.
- We then take the techniques learned and apply them to our economic model to understand the causes of inflation by examining the link between levels of economic activity and the levels of prices and inflation.
- We first learn basic Keynesian analysis of economic activity.

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Basic KEYNESIAN THEORY

- In what follows we assume there is available capacity and that other variables do not change:
 - if people demand more there is supply available to meet that demand
 - The price level does not change
 - The rate of interest (something that we will talk about later) is constant.

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Basic KEYNESIAN THEORY

- The economy is a giant set of flows. Demand creating supply, and supply, by creating the need for factors of production, generating factor payments to households that enable them to pay for the things they demand.
- However it is not a perfect stable circle but an expanding and contracting one. There are withdrawals (leakages) from the circle and injections into it.

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Basic KEYNESIAN THEORY

1. Households and firms do not spend all their income, they save some of it (S).
2. Governments tax households and firms (T), who therefore do not receive everything they earn from supplying their factors.
3. Households and firms do not buy everything in the US but import (M) some of the things they need.

These withdrawals cause the circle to shrink

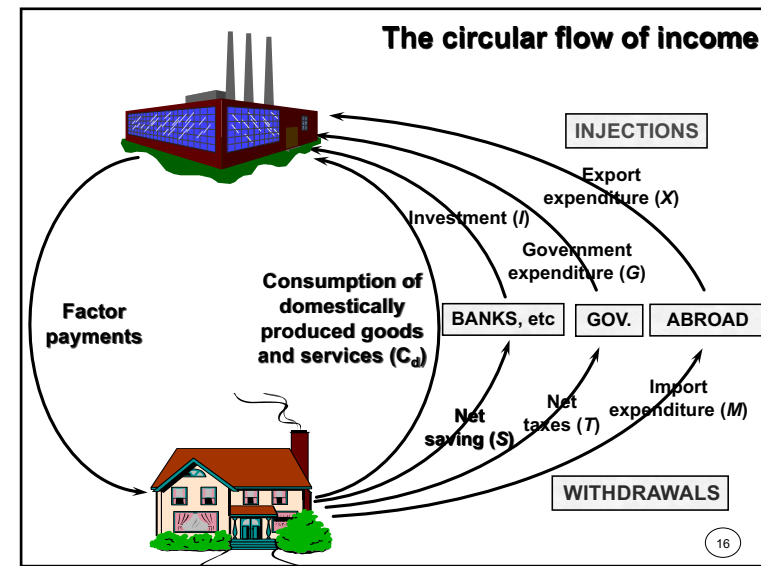
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Basic KEYNESIAN THEORY

4. Households and firms invest money that they have saved in the past. (I).
5. Governments spend money (G) on services they think the country needs.
6. Foreigners buy products which are exported from the US (X)

These injections cause the circle to expand

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Basic KEYNESIAN THEORY

National Income is therefore the equilibrium of the amount that people desire to spend (E for expenditure).

$$\text{This is } E = C + I + G + X - M$$

And the amount that they earn (Y) in order to spend this amount.

Some of these variables are Exogenous (like, in a simple model, investment). Exogenous means the variable, such as investment, is assumed to vary for its own reasons and not because income is varying.

Some (like consumption and saving) are endogenous. They vary as income varies.

Let us look at the C term first. How does it work?

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Basic KEYNESIAN THEORY

$C = k + cY$. i.e there is a CONSUMPTION FUNCTION. It is endogenous – a percentage of income. For example households may save 20% of their next \$ of income. They therefore spend 80%.

$$c = 0.8.$$

We say the MARGINAL propensity to consume is 0.8

The other aspect of this function is the k term. Satisfy yourself that a positive k term means we spend a higher proportion of our incomes when our incomes are low than when they are high. Thus the AVERAGE PROPENSITY TO CONSUME falls as income rises.

Assume C and S are the only endogenous variables for now.

Note: endogenous – a variable whose value is determined by the model of which it is part.

Exogenous – a variable whose value is determined independently of the model of which it is part.

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Basic KEYNESIAN THEORY

Propensity to consume

In this example the consumption function is $C = 15 + 0.6Y$

i.e. $k = 15$ $c = 0.6$

Y	1	25	50	75	100	125	150
C	15.6	30	45	60	75	90	105
APC	1560%	120%	90%	80%	75%	72%	70%

What is the marginal propensity to consume?

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Basic KEYNESIAN THEORY

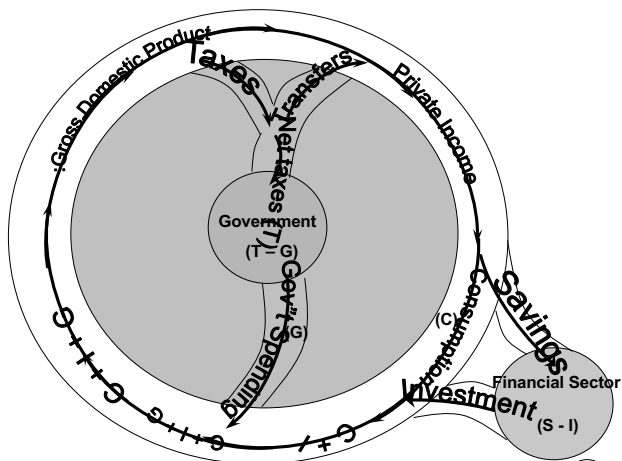
■ Now we have the consumption function. Let us simplify this economy so that we do not have too many parts of the circular flow to worry about.

■ Let us remove the international economy. In our simplified world there are no exports or imports.

■ Remembering that, in the real world, the propensity to consume may move around

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The circular flow of income



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Basic KEYNESIAN THEORY

solving equilibrium income and output.

At equilibrium injections equal withdrawals (which ones?)

In this example the consumption function is $C = 15 + 0.6Y$

The two exogenous amounts that do not depend on Y (G and I) are 15 and 10 respectively.

If desired expenditure E is greater than Y , then firms will increase their output until they meet all desired expenditure.

Note how, at equilibrium, withdrawals (S) equal injections ($I+G$) = 25

In this closed economy (no imports or exports) there is capacity to fulfil any desired output, then here the actual or realised output will be \$100bn. $Y = E$

$c = 0.6 \quad k = 15$

Y	0	25	50	75	100	125	150
C	15	30	45	60	75	90	105
I	10	10	10	10	10	10	10
G	15	15	15	15	15	15	15
E	40	55	70	85	100	115	130

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Basic KEYNESIAN THEORY

Imagine there is an increase in desired expenditure

The result is that the economy expands by more than the amount by which any exogenous variable is increased.

Let us say G rises by \$1bn. The people who receive the extra \$1bn (e.g. construction companies building a new hospital) spend some of that money i.e. 60% in the example above. The recipients of their 0.6 expenditure in turn spend 60% 0.36.....and so on. The resulting expenditure increase is 1/the MPS (MPS is the propensity to withdraw or save). In this case $1/0.4 = 2.5$. We say the MULTIPLIER is 2.5

Imagine in the above example the full employment level of income in the economy was \$110bn but currently $Y = E = \$100bn$, how much would the government have to spend (ΔG) to raise Y to \$110bn?

[lecture4 multiplier.xls](#)

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Basic KEYNESIAN THEORY

Note that to add \$10bn to Y , G has to rise by \$4bn. This is because the 4 will be subject to the multiplier of 2.5X

Remember $C = 15 + 0.6Y$

Y	0	25	50	75	100	110	125	150
C	15	30	45	60	75	81	90	105
I	10	10	10	10	10	10	10	10
G	15	19	19	19	19	19	19	19
E	44	59	74	89	104	110	119	134
S	-15	-5	5	15	25	29	35	45

Note: at equilibrium $J = W = 29$

Suppose investment rose to \$12bn what would be the equilibrium GDP now?

Suppose G fell by \$5bn, what happens?

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Basic KEYNESIAN THEORY

- Next time: – What drives National Income/GDP
 - A basic Keynesian analysis II

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Assignment

- For those wanting to review the Keynesian world, read Ch. 11.
- There is more in that chapter than we have covered here. Concentrate on the parts of the chapter that relate to material covered in class.

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1. Which of the following is an increase in an injection?

- a) A San Diego physician increasing the number of patients he treats from Mexico
- b) The California government increasing state income tax revenue
- c) An increase in the share price of Apple Computer
- d) A French company increasing its sales of products to the US
- e) None of the above
- f) More than one, which ones?.....

■ **Briefly explain your answer**

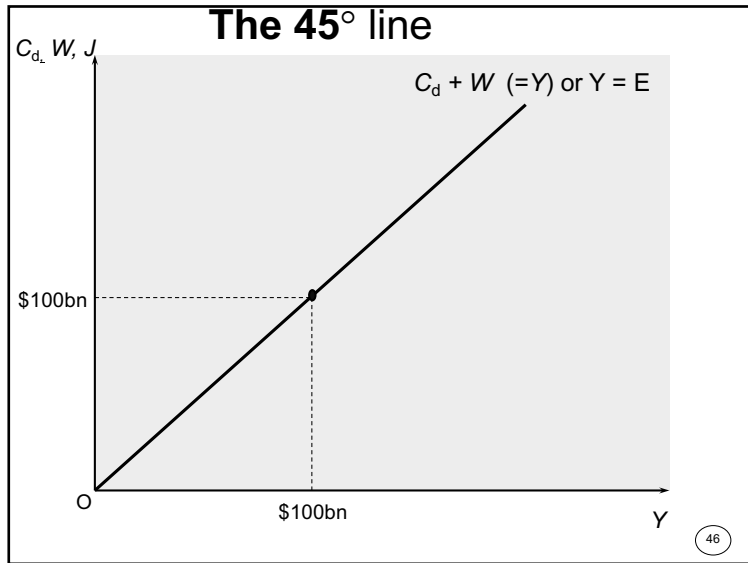
One mark for the correct answer, 4 marks for the explanation

Basic KEYNESIAN THEORY

The circular flow in graph form.

First a line showing that any income must be either consumed or withdrawn (saved, paid in tax or spent on imports)

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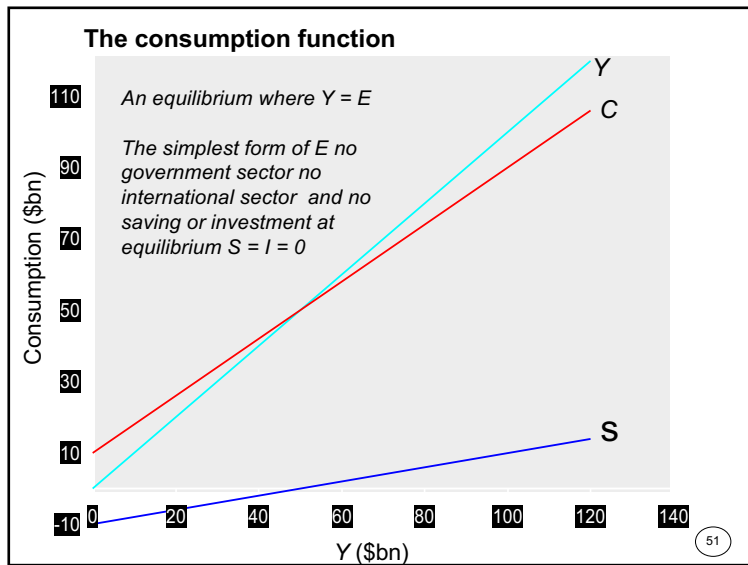
BACKGROUND TO KEYNESIAN THEORY

- Now a consumption function. There can be many forms of the function but this is the simple form
- $C = k + cY$, In this case $C = 10 + 0.8Y$
- *The simplest form of E no government sector no international sector and no saving or investment at equilibrium $S = I = 0$*

Y	0	25	50	75	100	110	125	150
C	10	30	50	70	90	98	110	130
I	0	0	0	0	0	0	0	0
G	0	0	0	0	0	0	0	0
E	10	30	50	70	90	98	110	130
S	-10	-5	0	5	10	12	15	20

- *Now let's see that in graph form:*

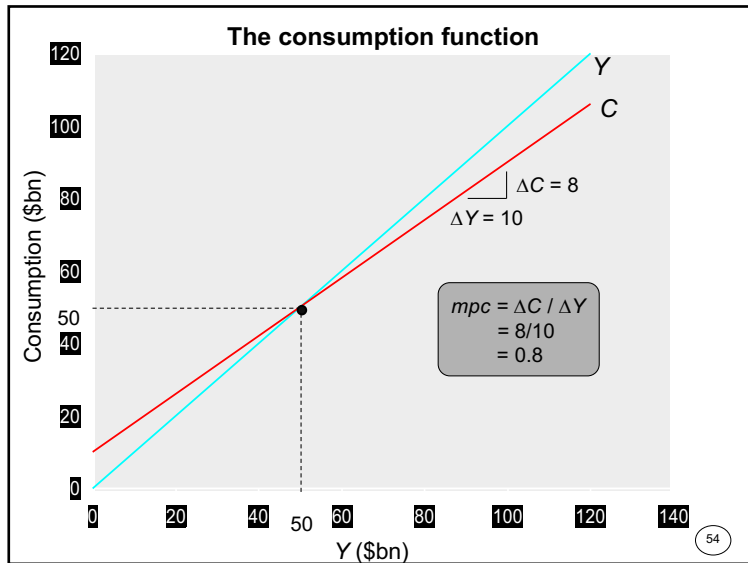
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BACKGROUND TO KEYNESIAN THEORY

- The propensity to spend the next \$ called the marginal propensity to consume, (mpc) is the slope of the consumption function.

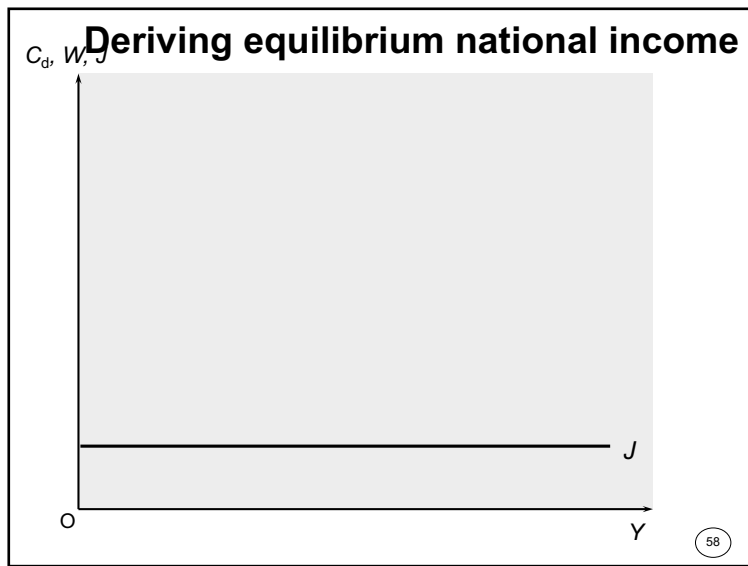
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BACKGROUND TO KEYNESIAN THEORY

- Now look at injections imagine they are exogenously determined.
 - investment
 - increased consumer demand
 - expectations
 - cost and efficiency of capital
 - rate of interest
 - taxes
 - government expenditure
 - Exports
- In our graph the injections function will be a flat line. It is what it is no matter what the level of National Income (Y).

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THE DETERMINATION OF NATIONAL INCOME

- We can now determine National Income as the point where income equals expenditure. (As before, if it did not then there would be changes). If expenditure was planned to be greater than income (from the goods and services produced) there would be excess demand. This would lead producers to produce more and income would rise as income from the extra factors of production supplied was created.
- If Income was more than expenditure then there would be excess supply. Producers would cut production and income would fall.
- Equilibrium national income
 - withdrawals equal injections

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THE DETERMINATION OF NATIONAL INCOME

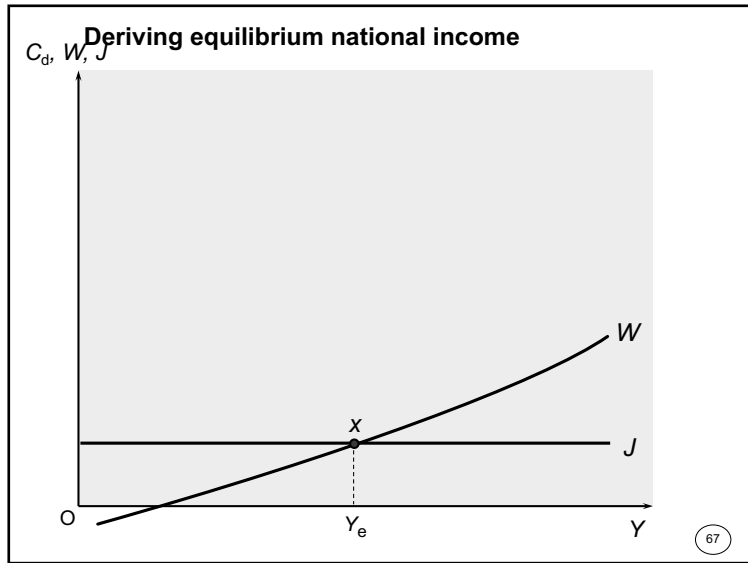
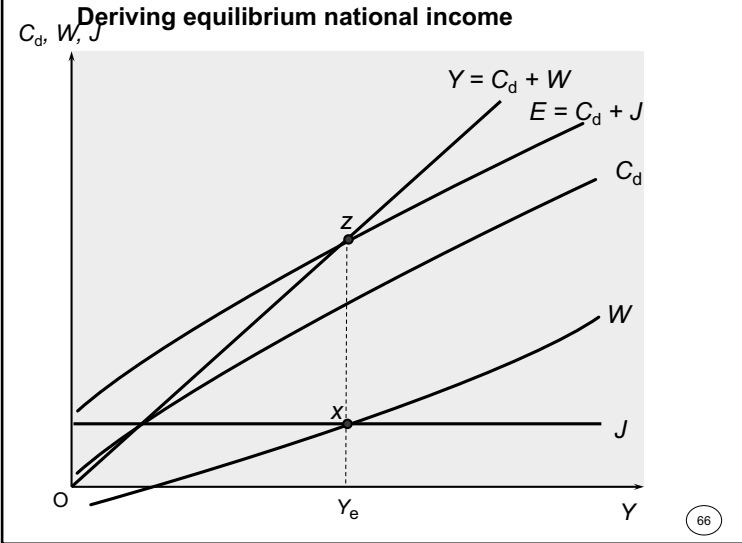
- Therefore equilibrium occurs where Income (Y) equals expenditure (E).
- However we know Consumption is income less what is withdrawn (saving, taxes and imports), and Expenditure is consumption plus what is injected (investment government spending, exports)

$$C = Y - W$$

$$E = C + J$$

- Setting these two equal at equilibrium, equilibrium occurs where $W = J$
 - withdrawals equal injections

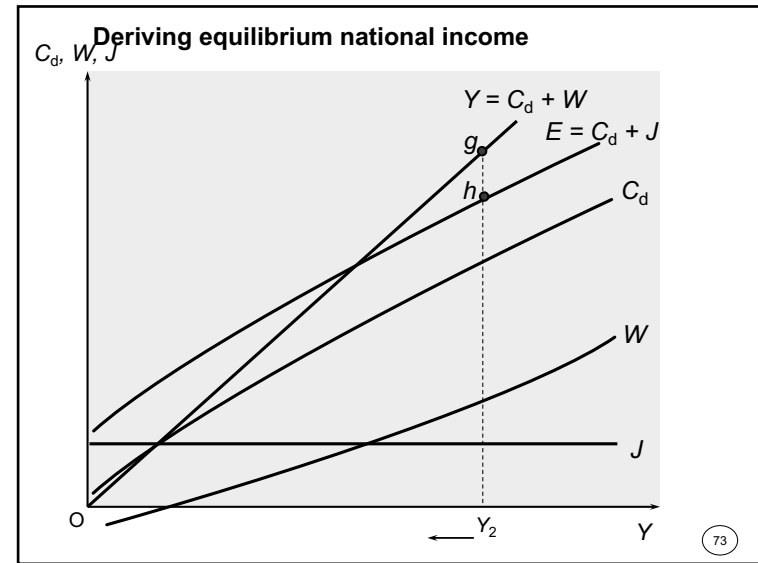
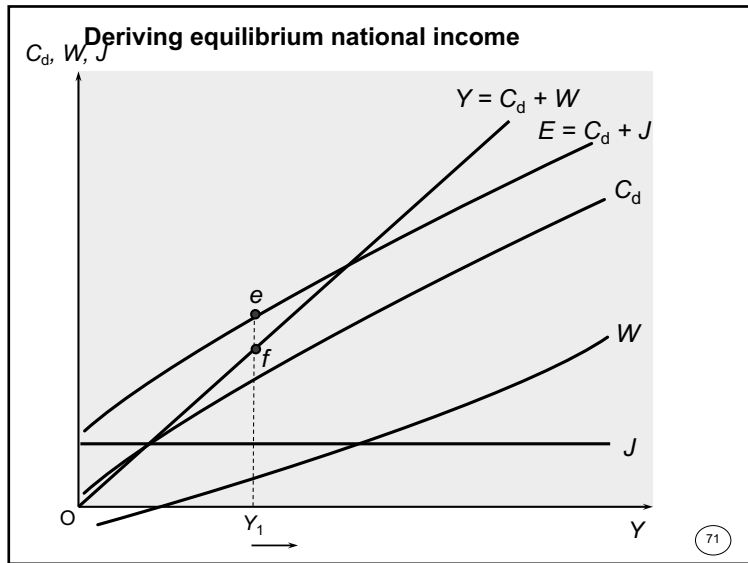
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THE DETERMINATION OF NATIONAL INCOME

- Equilibrium national income
 - withdrawals equal injections
 - income equals expenditure
- In the next two diagrams satisfy yourself that you can see that if income is not equal to expenditure income will change, consumption will change and withdrawals (i.e. the endogenous variables will change) until $Y = E$

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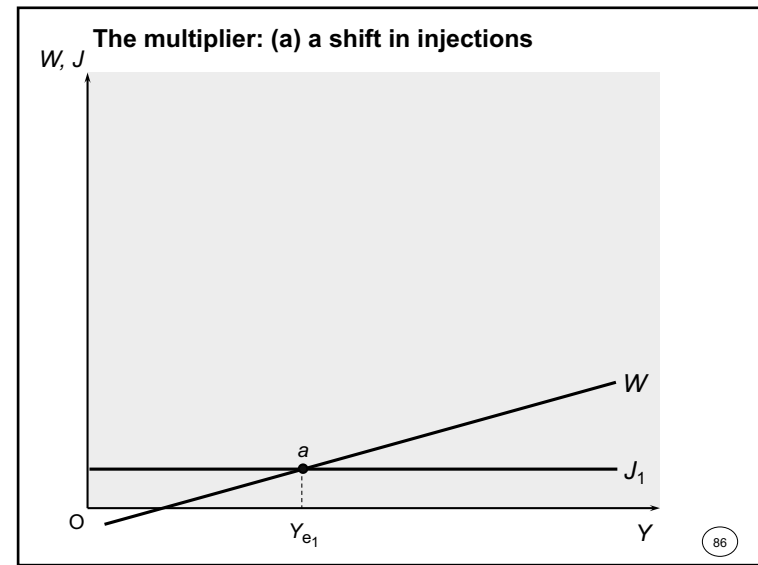


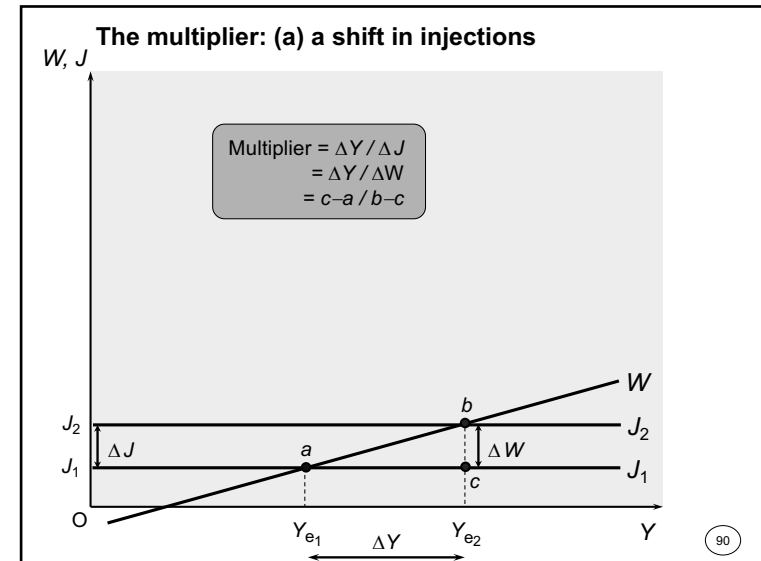
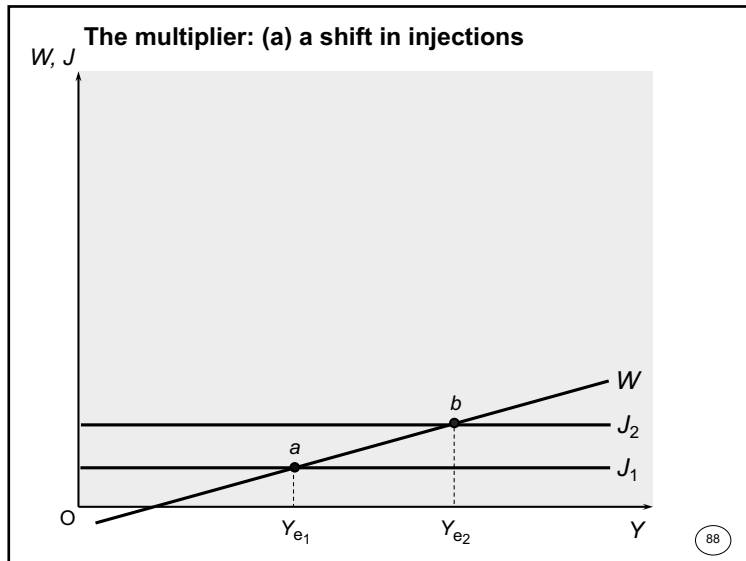
THE DETERMINATION OF NATIONAL INCOME

■ **The multiplier: a graphical illustration**

- the circular flow of income and effects of changes in injections
- The multiplier effect
- definition of the multiplier: $\Delta Y / \Delta J$
- graphical analysis: shift in the J line

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THE DETERMINATION OF NATIONAL INCOME

■ **The multiplier: the withdrawals and injections approach**

- The increase in Y is bigger than the increase in J why is that?
- graphical analysis: shift in the J line
- the formula: $1 / mpw$
or: $1 / (1 - mpc_d)$

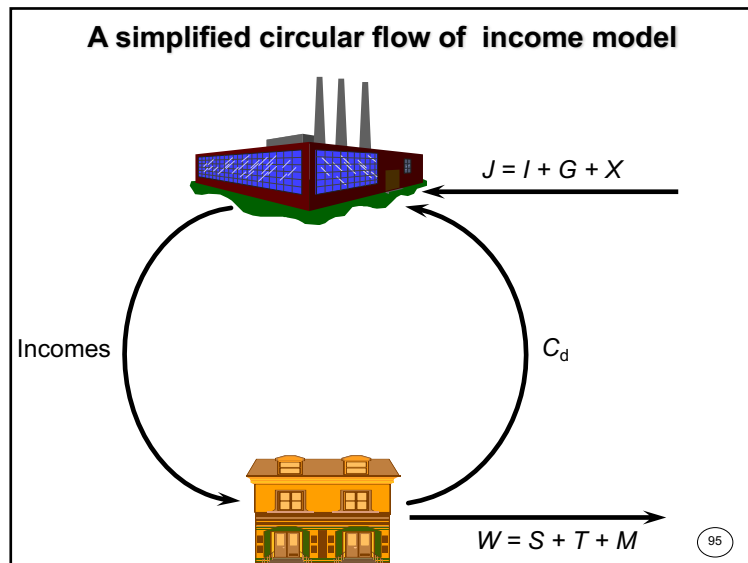
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THE DETERMINATION OF NATIONAL INCOME

■ **The multiplier: the withdrawals and injections approach**

- graphical analysis: shift in the J line
- the formula: $1 / mpw$
or: $1 / (1 - mpc_d)$
- numerical illustration
- Before the numbers, remember income is created by a circular flow through the economy. This takes several rounds.

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THE DETERMINATION OF NATIONAL INCOME

- numerical illustration – does ΔY depend on the mpc?

Period	ΔJ	ΔY	ΔC	ΔW	MPC =	0.5
1	160	160	80	80		
2	0	80	40	40		
3	0	40	20	20		
4	0	20	10	10		
5	0	10	5	5		
6	0	5	2.5	2.5		
		315	158	158		

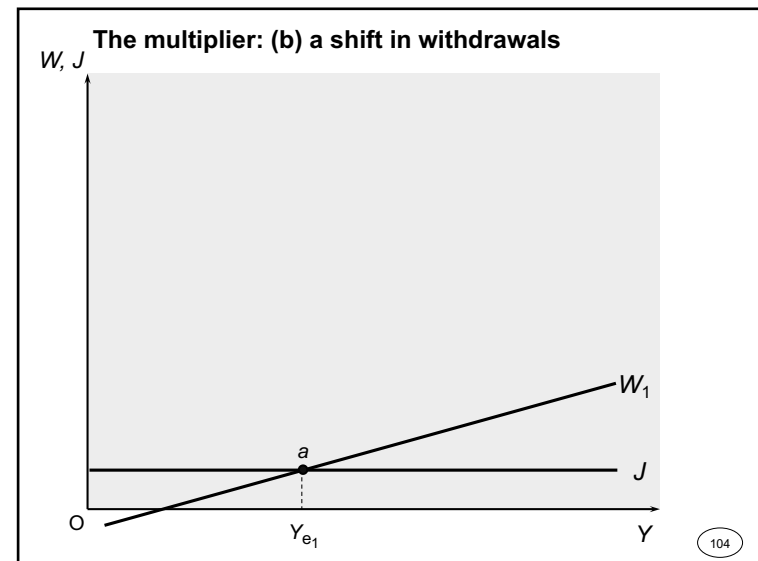
- Of course the total increase in Y is 315 after 6 rounds, with further rounds the total increase in Y will reach 320 which is the initial increase in E of 160 times $1/mps = 320$

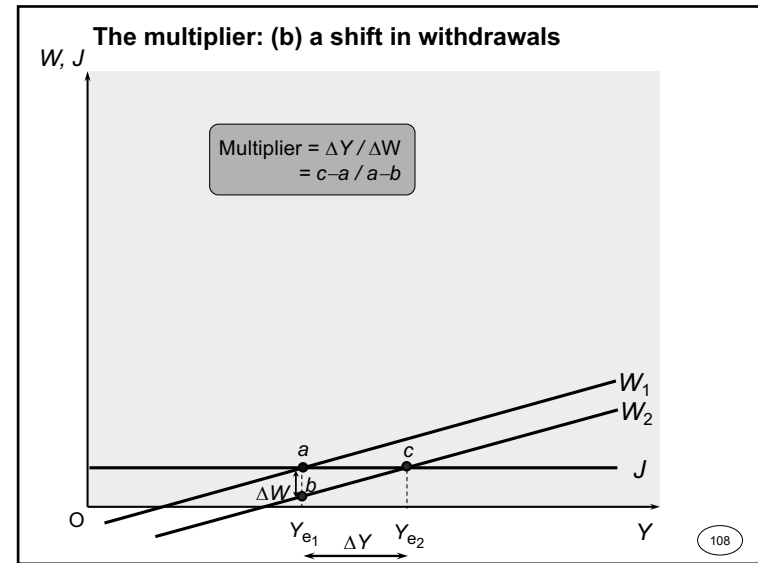
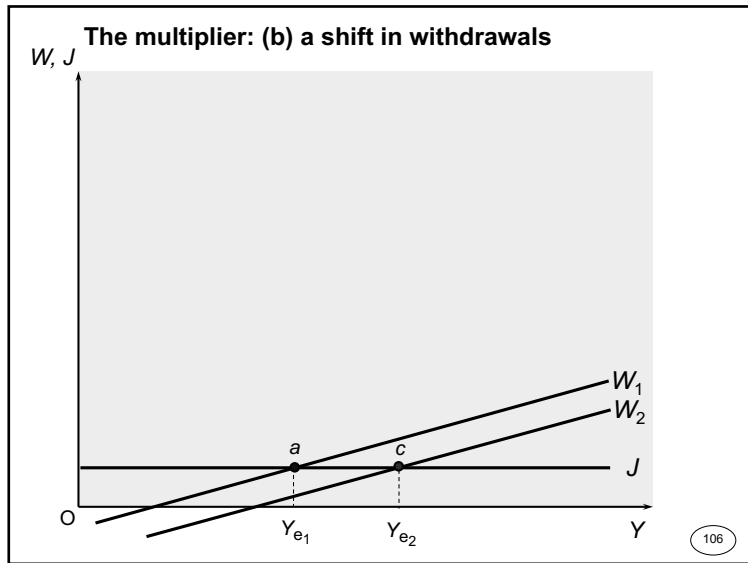
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THE DETERMINATION OF NATIONAL INCOME

- Yes it does in other words the amount of the increase in income depends on the mpc. Since $1 - mpc =$ marginal propensity to withdraw then we have a way of calculating ΔY .
 - the formula: $1 / mpw$
or: $1 / (1 - mpc_d)$
 - Remember you also have a withdrawals multiplier. You can illustrate that with a shift in the W line.
 - Note: to make our examples easier we will just perform calculations using the multiplier of $1/mps$
 - Remember in the real world it is not just mps but mpw – our extra income goes in part to imports and taxes too, therefore in reality multipliers are smaller than implied by $1/mps$

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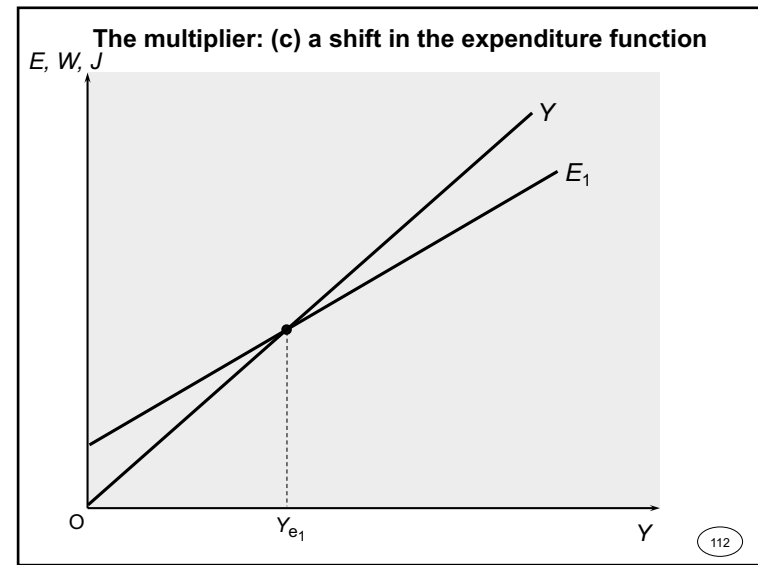


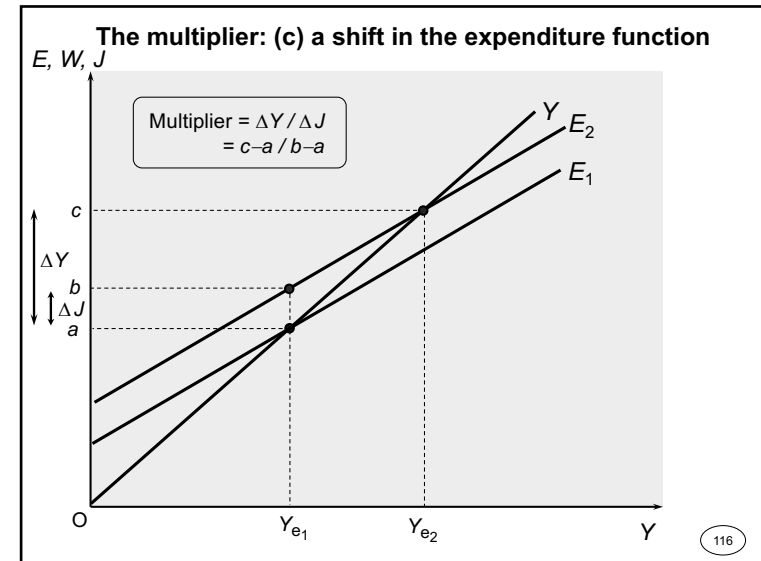
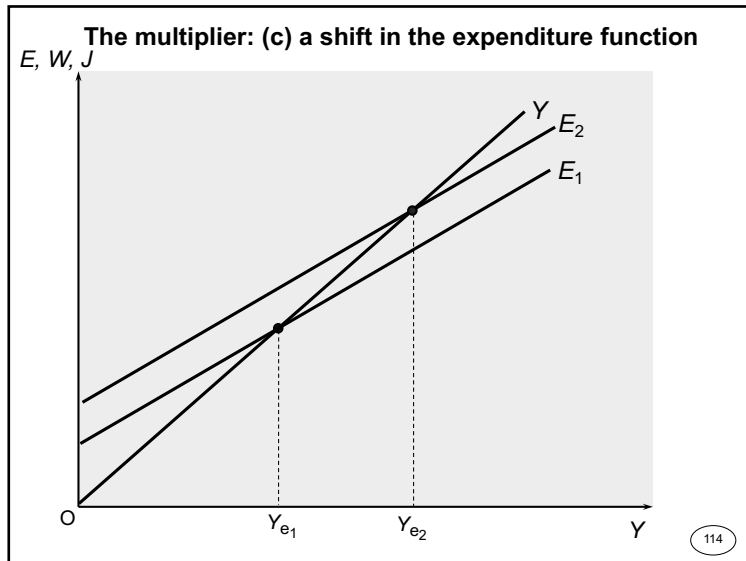


THE DETERMINATION OF NATIONAL INCOME

- The same analysis can be performed using the income and expenditure approach.

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THE DETERMINATION OF NATIONAL INCOME

- Any established equilibrium can be disturbed by changes in the Consumption function or any of the exogenous injections or withdrawals.
- This is because the functions have been established assuming other things remain the same – ceteris paribus.
- Here are some possible reasons for change. In other words things that are assumed to remain the same in the analysis so far but that may not stay the same in a dynamic economy.

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THE DETERMINATION OF NATIONAL INCOME

Variable	Influence	Effect
The consumption/saving function	Wealth (the value of physical and financial assets owned)	If households are (or feel) wealthier then they will spend more and save less for any given level of income. This shifts the consumption function upward.
	Expectations	If households think their jobs are in danger they may spend less. The consumption function shifts down
	Borrowing	If households are inclined to borrow. They can spend more for every level of income. This shifts the consumption function up.
	Taxes	If taxes rise then consumers have less to spend (and less to save). The consumption function shifts down

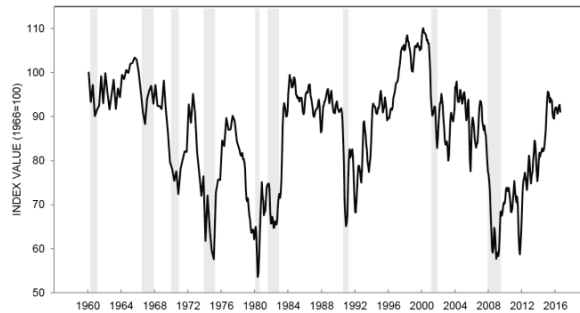
Note: these effects are often "dampened" by people's long-term views of the future. Their C functions do not usually react on a one-for-one basis to the above changes

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Consumer Expectations

University of Michigan

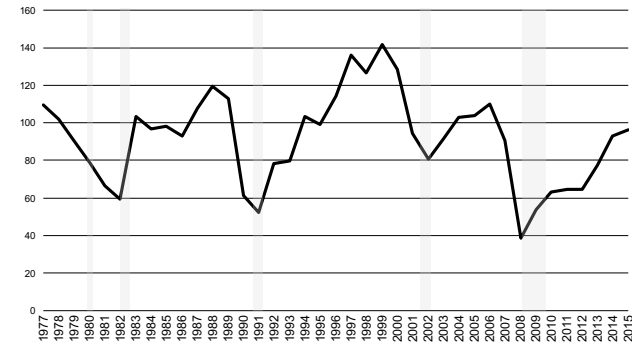
THE INDEX OF CONSUMER SENTIMENT



The data are interesting in showing the volatility of consumer sentiment over time. However studies have shown the data to have very little predictive power. Consumer confidence data from the Conference Board are rather better at predicting consumer spending. See <http://www.econ.nyu.edu/user/tudvigsons/696/bra.pdf>

Conference Board Survey of Consumer Confidence

Conference Board's Consumer Confidence Index - US (1977 - 2016)



Data available at: http://future.aae.wisc.edu/data/monthly_values/by_area/998?grid=true

THE DETERMINATION OF NATIONAL INCOME

Variable	Influence	Effect
The Investment function	Costs of doing business.	If firms experience higher costs to run projects they will invest in less of those projects.
	Expectations	If firms think their customers are less willing to buy the goods a new investment will produce then they will scale back that investment.
Note businesses also "invest" in inventories. Inventory build-up is part of "I"	Business taxes	Another cost of doing business making future investments less profitable net of taxes.
	Capacity	If firms have plenty of capacity to produce more output they will not need to make further investment.
	Rate of interest	As the rate rises investment falls - why?

Note: unlike consumption, the investment function can be very volatile. Sometimes called the "accelerator theory" investment is very good when times are (or are expected to be) good and very bad when times are bad.

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Basic KEYNESIAN THEORY

1. What is the circular flow of income?
2. In equilibrium income (Y) must equal expenditure (E). In an open economy what is the five variable equation for expenditure?
3. Do consumers spend all of their income?
4. Does an increase of government spending of \$10bn result in an increase in income (Y) of \$10bn? If not, does Y go up more or less than \$10bn Why?

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Basic KEYNESIAN THEORY

- Would a decrease in tax revenues of \$10bn increase income? Why or why not? If there is an increase or decrease would it be more or less than \$10bn? Why?
- Here is an income and expenditure table for a closed economy where $G = 5$; $I = 10$; $C = 10 + 0.8Y$. Where is equilibrium?
- Where is equilibrium if G falls to \$3bn?

Y	0	40	80	100	120	125	140	160
C								
I								
G								
E								

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Basic KEYNESIAN THEORY

Lets take another example and add a tax – what happens?

Consumption function: $C = 15 + 0.6Y$

Exogenous variables: $G = 12, I = 10$

Equilibrium GDP = \$92.5bn

sheet

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Basic KEYNESIAN THEORY

We have to note that our consumption function's term Y is now after the tax: we can only consume what we receive – not Y but $Y-T$ or Y_d .

Remember $C = 15 + 0.6(Y-T)$

For a Tax of 20% on income, equilibrium GDP falls.

See the iterations in the table. We would finally reach an equilibrium of $Y = \$71.2bn$

That is $(\$92.5 - \$71.2) = \$21.3bn$ less than before the tax:

Tax effect = $(t\% * mpc\%) * (1/mpw\%) =$

Tax effect = $(20\% * 60\%) * (1/52\%) = 23.07\%$ of \$92.5

or \$21.3bn

Note: the mpw can be seen as follows: for every \$1, I spend 60% of my disposable income. My disposable income, after a 20% tax is 80% of my income. $60\% * 80\% = 48\%$. If I spend 48%, 52% must be withdrawn: 32% in savings and 20% in tax

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Final equilibrium

■ $Y = E = C + I + G$

$$C = Y - W$$

$$E = C + J$$

■ Manipulate to $Y = C + J$ substitute in:

■ $C = (C + J) - W$, cancel, terms $W = J$

■ In this case, without the tax:

■ $92.5 = 70.5 + 12 + 10$

■ Injections = $I + G = 10 + 12 = 22$

■ Withdrawals = $T + S = 0 + 22$

■ In this case, with the tax:

■ $71.2 = 49.2 + 12 + 10$

■ Injections = $I + G = 10 + 12 = 22$

■ Withdrawals = $T + S = 14.2 + 7.8$

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Final equilibrium

- You can add the $(X - M)$ term, however it is easier for now if you assume (not realistically of course) that M is exogenous. In reality, the more disposable income we have, the more we import. Even so the principles are the same.

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Assignment

- For further study of the basic Keynesian system, review McC & B Ch 10. Together with my notes this will give you a good grounding in this system
- You can also now read Ch 11 but we will cover more on some of those topics in the next lecture and leave most of the international stuff ($X-M$) to later lectures

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