

IAS 107 Lecture Outline

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U.C. Berkeley
IAS107 Lecture Notes

http://delong.typepad.com/berkeley_econ_101b_spring/

February 8, 2011

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What We Will Do

- Logistics
- Problem Sets
- Readings
- Recapitulations
- Introduction to “depression economics”
- Say’s Law
- Breaking Say’s Law
- The income-expenditure framework
- The investment-savings relationship
- The liquidity-money relationship
- The financial wedge

Logistics: IAS 107

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Office Hours

- Today after class
- Wednesday
- Friday—if there is sufficient demand...

Problem Set 3

- Growth economics review
- Due on Th Feb 10 at the beginning of lecture
- Erratum: Question 2 now says: “Suppose that in question (3) were the same...” It should read “Suppose that in question (1) all parameters were the same except for...”
- Note: we are now working toward an early March first midterm...

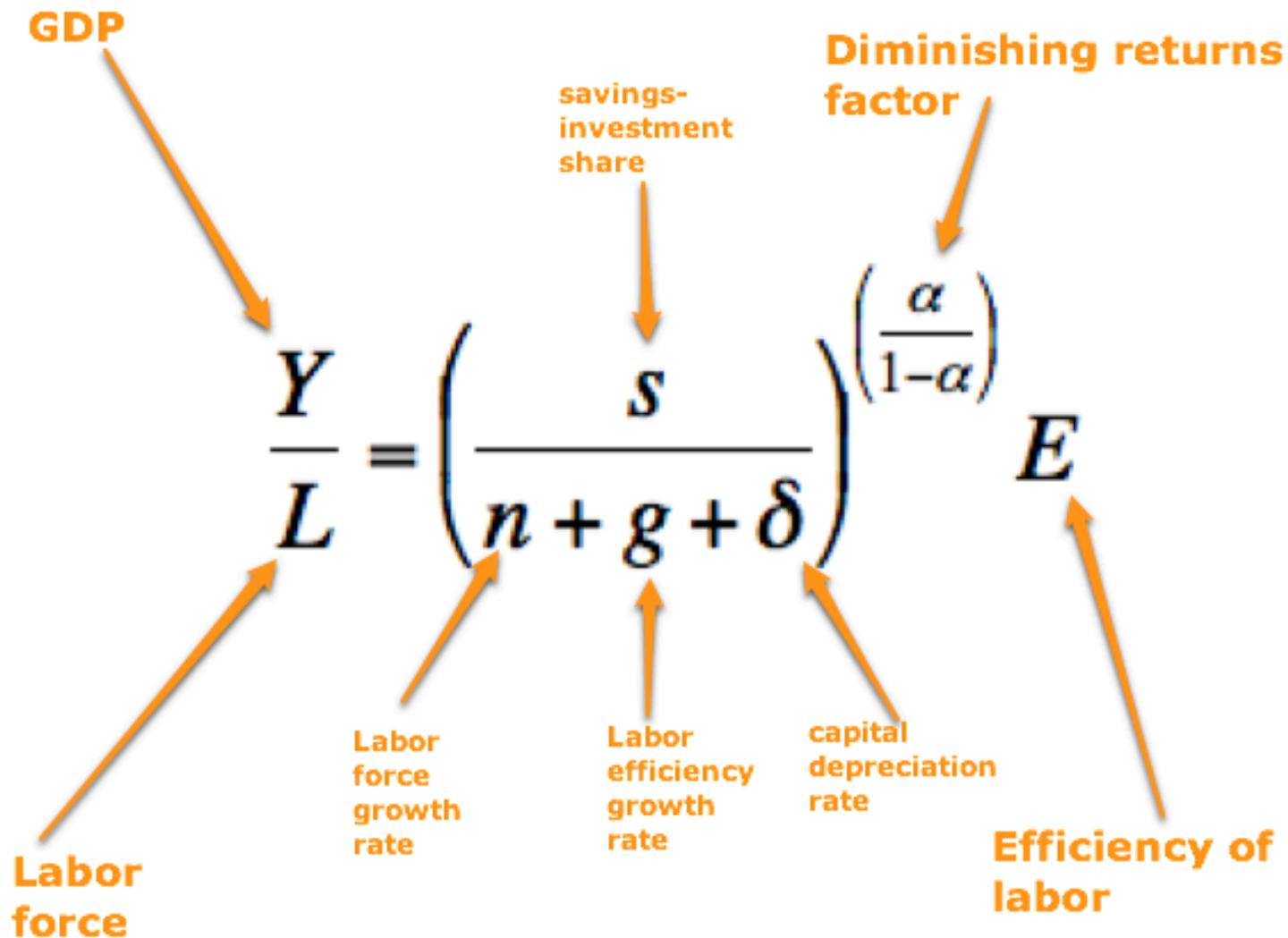
Let Me Do One of the Problems...

- Since 1960 South Korea's savings-investment share of GDP has averaged 27.5%.
- Since 1960 the United States's savings-investment share of GDP has averaged 20%.
- Today South Korea has a GDP per worker level of \$40,000.
- Suppose that today the United States has a GDP per worker level of \$90,000.
- Since 1960 South Korea's and the United States's population growth rates have both averaged 1%/year.
- Assume that the depreciation rate on the capital stock has been constant at 5%/year.

Let Me Do One of the Problems...

- Assume that the diminishing-returns parameter in the production function $\alpha=0.5$.
- Assume that the rate of improvement of the efficiency of labor in the United States has averaged 2% per year.
- Assume that the rate of improvement of the efficiency of labor in South Korea has averaged 5% per year.
- Assume that both South Korea and the United States today are on their balanced growth paths.

Let Me Do One of the Problems...



Part a: Ladies and Gentlemen, to Your i>Clickers...

- **What is the efficiency of labor in South Korea today?**
- A. \$75,000/year
- B. \$250,000/year
- C. \$60,000/year
- D. \$16,000/year
- E. \$40,000/year

Part a...

- What is the efficiency of labor in South Korea today?
- $s/(n+g+d) = 2.5$; $a/(1-a) = 1$
- $\$40000 = 2.5 \times E$; $E = \$16000$

Part b: Ladies and Gentlemen, to Your i>Clickers...

- **What is the efficiency of labor in the United States today?**
- A. \$75,000/year
- B. \$36,000/year
- C. \$60,000/year
- D. \$16,000/year
- E. \$4,000/year

Part b...

- What is the efficiency of labor in the United States today?
- $s/(n+g+d) = 2.5$; $a/(1-a) = 1$
- $\$90000 = 2.5 \times E$; $E = \$36000$

Part c: Ladies and Gentlemen, to Your i>Clickers...

- **What will output per worker be in the United States in 2100?**
- A. \$90,000/year
- B. \$36,000/year
- C. \$500,000/year
- D. \$1,000,000/year
- E. \$2,000,000/year

Part c...

- If the efficiency of labor in the United States continues to grow at its long-run trend pace of 2% per year, what is your forecast of the level of output per worker in the United States in 2100?
- $\$90000 \times 1.02^{90} = \$535,000$

Part d: Ladies and Gentlemen, to Your i>Clickers...

- **What will output per worker be in South Korea in 2100?**
- A. \$90,000/year
- B. \$3,230,000/year
- C. \$500,000/year
- D. \$1,000,000/year
- E. \$2,000,000/year

Part d...

- What is your forecast of output per worker in South Korea in 2100?
- $\$40000 \times 1.05^{90} = \$3,230,000$
- But can South Korea's efficiency of labor continue to grow at 5% per year indefinitely?
- Probably not.
- If South Korea's efficiency of labor stops growing at 5% per year when it catches up to the United States, then SK's efficiency of labor in 2100 will be \$214,000.
- With a savings rate of .275, a population growth rate of 1%, a depreciation rate of 5%, and a g of 2% after it catches up, we have a capital-output ratio of 3.5475
- We then have \$735,000

All the Devils Are Here

- For sections between Th Feb 10 @ 12:30 and Th Feb 17 @ 11:00: Skim chapters 1-5 on “securitization”: how it was that people thought that taking a whole bunch of mortgages, mashing them together, and selling the results as bonds made sense...
- For sections between Th Feb 17 @ 12:30 and Th Feb 24 @ 11:00: Read chapters 6-8 on “policy”: why the American government decided at the end of the 1990s to back off of financial regulation, and let the financial sector “experiment”...
- For sections between Th Feb 24 @ 12:30 and Th Mar 3 @ 11:00: Read chapters 9-15 on the bubble in subprime mortgages: how mortgage companies, banks, and investors concluded that diversified investments in even risky mortgages carried very little risk indeed...

All the Devils Are Here

- For sections between Th Mar 3 @ 12:30 and Th Mar 10 @ 11:00: Read chapters 16-19 on how the smart guys go short: how the more clever of the investment banks began to figure out ways to profit from the forthcoming housing crash, but how the bulk of investment and commercial bankers were not so clever...
- For sections in the last week before spring break: Read chapters 20-Epilogue on the slow-motion panic that was the impulse that generated our current economic downturn...

Recapitulations: Things You Really Should Know

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February 3, 2011

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#1: You Got This

- **About how much bigger is total world GDP now than it was 10,000 years ago?**
 - A. About 14 times bigger
 - **B. About 17000 times bigger**
 - C. About 1200 times bigger
 - D. It's a silly question: you cannot possibly make such comparisons.
 - E. It's a silly question: what the answer is depends on what your tastes and preferences are, and everybody is different.

#2: Ladies and Gentlemen, to Your i>Clickers...

- **What is the unemployment rate?**
- A. 9.4%
- B. 9.1%
- C. 9.0%
- D. 8.2%
- E. 9.8%

#3: You Got This...

- **Why is Say's Law—Jean-Baptiste Say's claim back in 1803 that if there was deficient demand for some goods and services there was equal excess demand for others—wrong?**
 - A. Because wages are sticky downward
 - B. Because people spend their incomes not just on currently-produced goods and services but on financial assets
 - C. Because financial panics disrupt the web of credit on which full employment depends
 - D. Because adverse supply shocks render important pieces of the capital stock valueless
 - Because overinvestment renders important pieces of the capital stock valueless

#4: You Got This...

- **What is the single equation you should use most often to analyze long-run economic growth?**

A. $\frac{Y}{L} = \left(\frac{s}{n+g+\delta} \right)^{\left(\frac{\alpha}{1-\alpha} \right)} E$

B. $\frac{Y}{L} = \left(\frac{n+g+\delta}{s} \right)^{\left(\frac{\alpha}{1-\alpha} \right)} E$

C. $\frac{Y}{L} = \left(\frac{s}{n+g+\delta} \right)^{\alpha} E$

D. $\frac{Y}{L} = \left(\frac{K}{Y} \right)^{\left(\frac{\alpha}{1-\alpha} \right)} E$

E. $\frac{Y}{L} = \left(\frac{K}{L} \right)^{\alpha} E$

#5: Ladies and Gentlemen, to Your i>Clickers...

- From the equation that was the solution to our growth model: $Y/L = (s/(n+g+\delta))^{\alpha/(1-\alpha)}E$;
- Suppose $E=\$30000/\text{year}$, $s=0.28$, $n=0.01$, $g=0.02$, $\delta=0.04$, and $\alpha=1/2$; what then is Y/L ?
- A. $\$75,000/\text{year}$
- B. $\$250,000/\text{year}$
- C. $\$60,000/\text{year}$
- D. $\$90,000/\text{year}$
- E. $\$120,000/\text{year}$

Introduction to Depression Economics

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#3: You Got This...

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 - Because overinvestment renders important pieces of the capital stock valueless

Jean-Baptiste Say in 1803:

- *Treatise d'economie politique:*
 - [T]o say that sales are dull, owing to the scarcity of money, is to mistake the means for the cause; an error that proceeds from the circumstance, that almost all produce is in the first instance exchanged for money, before it is ultimately converted into other produce: and the commodity, which recurs so repeatedly in use, appears to vulgar apprehensions the most important of commodities, and the end and object of all transactions, whereas it is only the medium. Sales cannot be said to be dull because money is scarce, but because other products are so. There is always money enough to conduct the circulation and mutual interchange of other values, when those values really exist. Should the increase of traffic require more money to facilitate it, the want is easily supplied, and is a strong indication of prosperity—a proof that a great abundance of values has been created, which it is wished to exchange for other values. In such cases, merchants know well enough how to find substitutes for the product serving as the medium of exchange or money...

Jean-Baptiste Say in 1829

- *Cours complet d'économie politique pratique:*
 - The Bank [of England], legally obliged to redeem its banknotes in specie, regarded itself as obliged to buy gold back at any price, and to coin money at a loss and at considerable expense. To limit its losses, it forced the return of its banknotes, and ceased to put new notes into circulation. It was then obliged to cease to discount commercial bills. Provincial banks were in consequence obliged to follow the same course, and commerce found itself deprived at a stroke of the advances on which it had counted, be it to create new businesses, or to give a lease of life to the old...

Jean-Baptiste Say in 1829

- *Cours complet d'économie politique pratique:*
 - As the bills that businessmen had discounted came to maturity, they were obliged to meet them, and finding no more advances from the bankers, each was forced to use up all the resources at his disposal. They sold goods for half what they had cost. Business assets could not be sold at any price. As every type of merchandise had sunk below its costs of production, a multitude of workers were without work. Many bankruptcies were declared among merchants and among bankers, who having placed more bills in circulation than their personal wealth could cover, could no longer find guarantees to cover their issues beyond the undertakings of individuals, many of whom had themselves become bankrupt...

Jean-Baptiste Say in 1829

- A financial crisis
- Financiers and firm get scared that the debts owed to them won't be repaid
- Financiers and firms get scared that the debts they owe will not get rolled over
- Financiers and firms stop spending as they try to build up larger cash reserves
- As people stop spending, inventories of unsold goods rise
- Businesses start firing people so that inventories of unsold goods don't rise any higher
- But the people who are fired lose their jobs and their incomes, and they stop spending too...

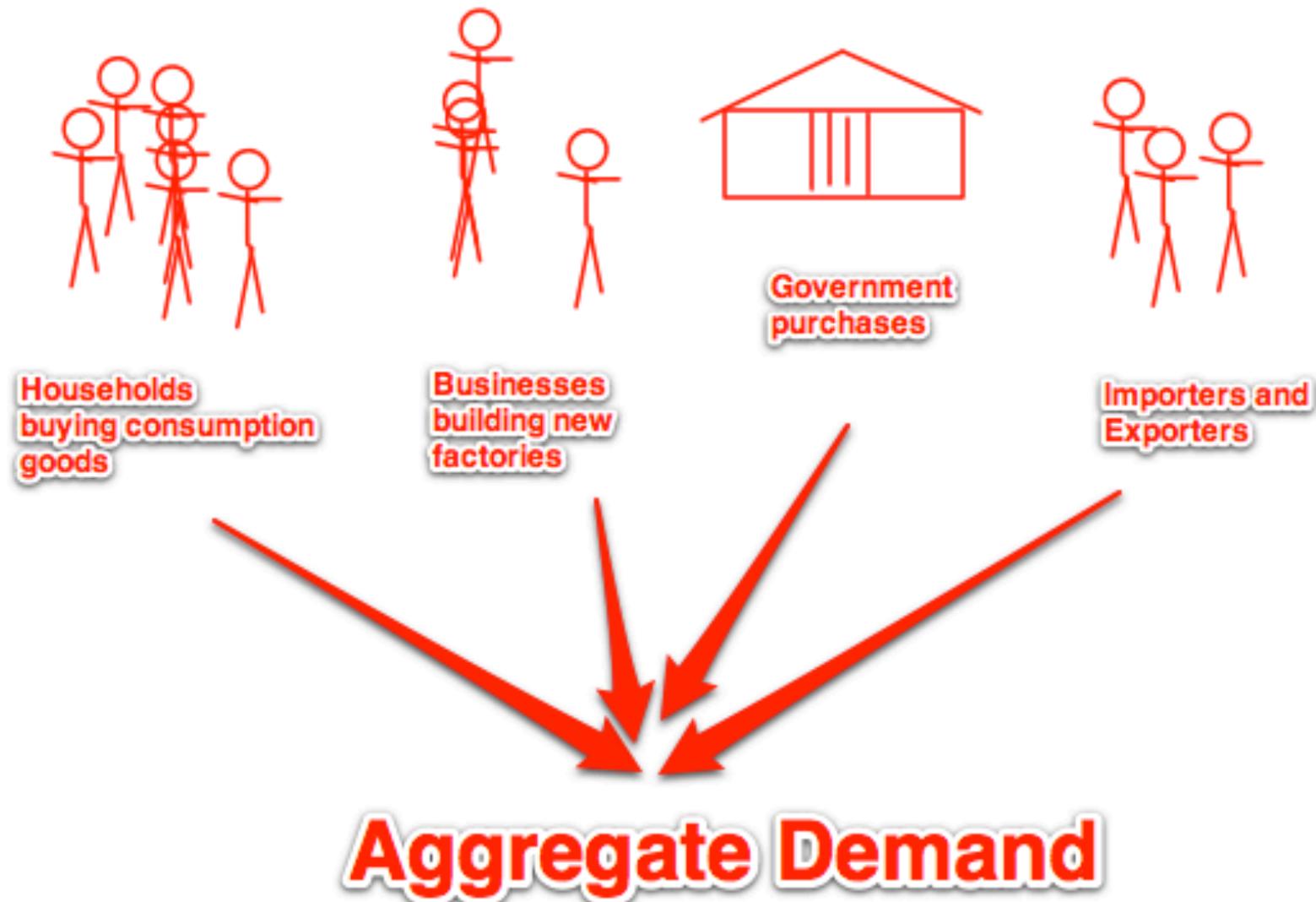
Depression Economics

- For some reason, people feel short of cash and stop spending as they try to build up larger cash reserves
- Inventories of unsold goods rise, and businesses start firing people so that inventories don't rise any higher
- But the people who are fired lose their incomes and stop spending too
- What are the cures?
- #1: If the private sector won't spend, have the government buy stuff directly...
- #2: Have the government flood the zone with cash...
- #3: Get "the confidence fairy" to get businesses eager to spend their cash yet again...

We Are Going to Build a Model

- This is a very different model than the Solow growth model we have been doing
- So wipe it from your minds (except for problem set 3, and for the midterm, and the final)
- We are going to build up the Keynesian income-expenditure model

The Income-Expenditure Model in Stick Figures



The Income-Expenditure Model in Algebra

- By the circular flow principle, income, spending, and output are all the same thing
- We use the letter “Y” for all of them...
- C: consumption spending by households
- I: investment spending by businesses
- G: government purchases
- $NX = GX - IM$: net exports

The Income-Expenditure Model in Algebra II

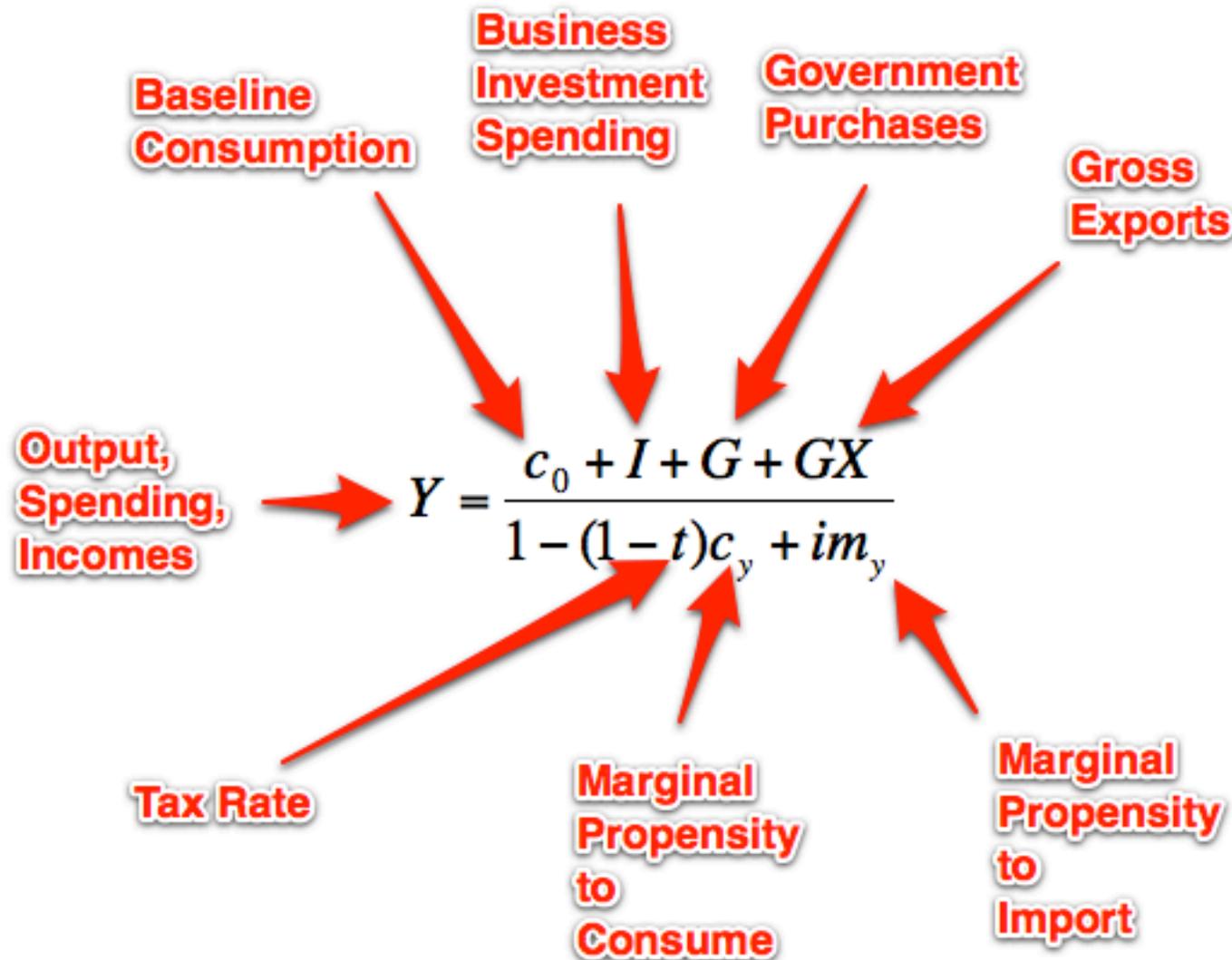
- $Y = C + I + G + NX = C + I + G + (GX - IM)$
- $C = c_0 + c_y(Y-T) = c_0 + c_y(1-t)Y$
- $IM = im_y Y$
- One again: there is the “Y” that influences consumption spending and imports (i.e., the incomes of households)
- Once again: There is the “Y” that determines the level of production (i.e., aggregate demand plus inventory adjustment)
- By the circular flow principle, they are the same

The Income-Expenditure Model in a Little More Algebra

- $Y = C + I + G + (GX - IM)$
- $C = c_0 + c_y(1-t)Y$
- $IM = im_y Y$
- $Y = c_0 + c_y(1-t)Y + I + G + (GX - im_y Y)$
- $(1 - (1-t)c_y + im_y)Y = c_0 + I + G + GX$

$$Y = \frac{c_0 + I + G + GX}{1 - (1 - t)c_y + im_y}$$

The Magic Equation for Depression Economics



Some Computations...

$$Y = \frac{c_0 + I + G + GX}{1 - (1 - t)c_y + im_y}$$

- Normally, $I = \$2$ trillion, $G = \$2.5$ trillion, $GX = \$1.7$ trillion, $im_y = 0.15$, $c_y = 0.5$, $t = 0.2$, $c_0 = \$3.9$ trillion...
- What is Y going to be?
- Denominator: $1 - (1 - 0.2)0.5 + 0.15 = 0.75$
- Numerator: $\$2 + \$2.5 + \$1.7 + \$3.9 = 10.1$
- Total $Y = \$10.1 / 0.75 = \$10.1 \times 1.33 = \$13.5$ trillion

Ladies and Gentlemen, to Your i>Clickers...

- **What does “C” stand for?**
- A. Credit
- B. Capital
- C. Consumption

Ladies and Gentlemen, to Your i>Clickers...

- **What does “Y” stand for?**
- A. Income
- B. Spending
- C. Production
- D. Aggregate Demand
- E. Aggregate Supply

Some More Computations...

$$Y = \frac{c_0 + I + G + GX}{1 - (1 - t)c_y + im_y}$$

- Suppose $I = \$2$ trillion, $G = \$2.5$ trillion, $GX = \$1.7$ trillion, $im_y = 0.25$, $c_y = 0.5$, $t = 0.2$, $c_0 = \$3.9$ trillion...
- What is Y going to be?

To Your iClickers...

$$Y = \frac{c_0 + I + G + GX}{1 - (1 - t)c_y + im_y}$$

- Suppose $I = \$2$ trillion, $G = \$2.5$ trillion, $GX = \$1.7$ trillion, $im_y = 0.25$, $c_y = 0.5$, $t = 0.2$, $c_0 = \$3.9$ trillion...
- What is Y going to be?
- A. \$13.5 trillion
- B. \$10.1 trillion
- C. \$20.2 trillion
- D. \$15.3 trillion
- E. \$12.8 trillion

The Income-Expenditure Model in Words

- There is income on the one hand, and there is production and spending on the other
- When spending is less than income and people are trying to build up their stocks of financial assets...
- Businesses see their inventories rising, and fire workers...
- Who lose incomes...
- And the process repeats...
- Until incomes have fallen so low that spending is no longer less than incomes...

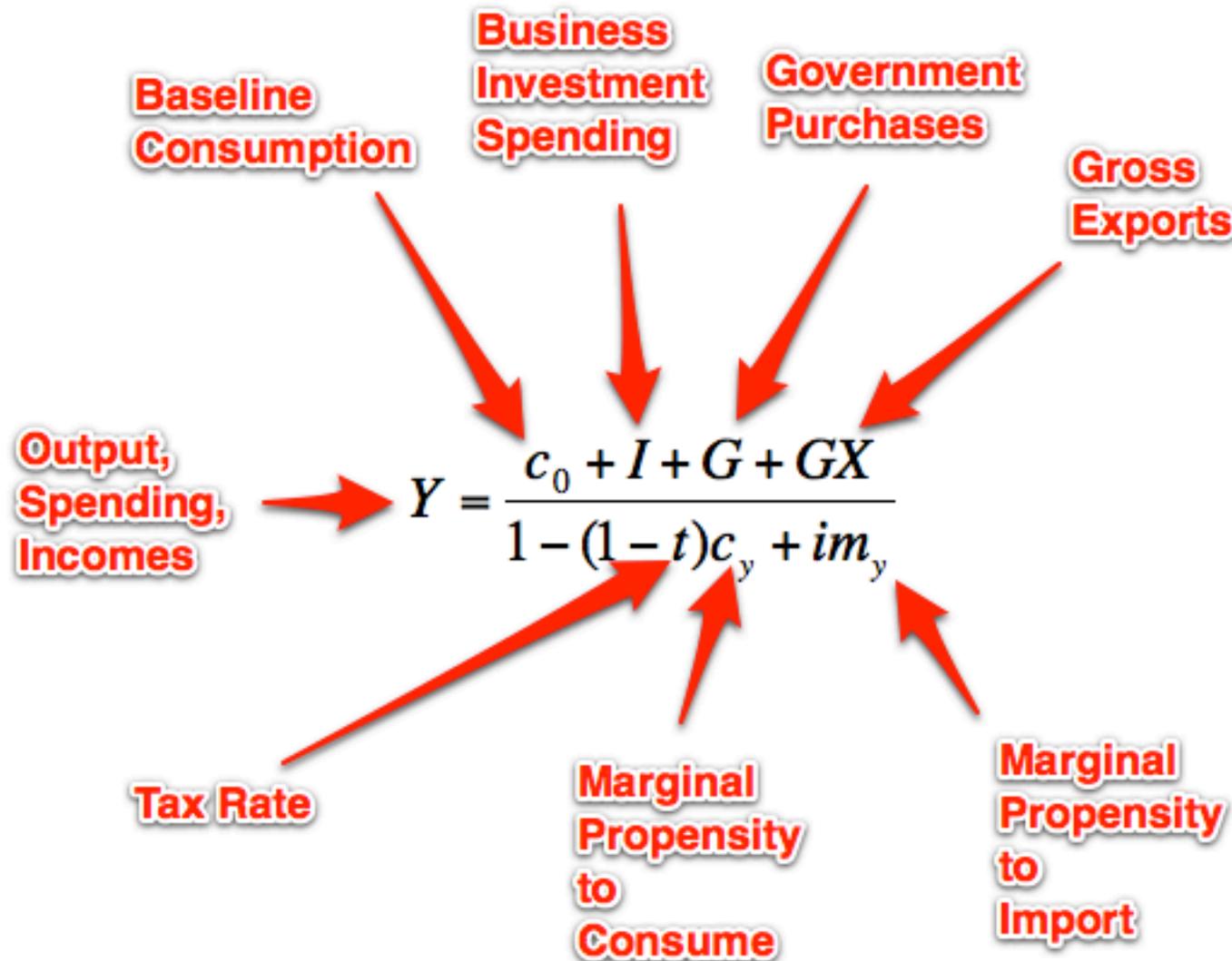
The Income-Expenditure Model in Words II

- To calculate that point to which income, production, and spending fall...
- There are the four components of autonomous spending A : investment spending I , government purchases G , gross exports GX , and this “baseline” consumption spending term c_0 ...
- There is the tax rate t , the marginal propensity to consume c_y , and the marginal propensity to import im_y ...
- Together these allow us to do a bunch of things...

Ladies and Gentlemen, to Your i>Clickers...

- **In a downturn—when people want to slow down their spending to build up financial assets—why doesn't income and production drop to zero?**
- A. Because inventories stop rising
- B. Because the marginal propensity to consume c_y is less than one.
- C. Because when incomes fall low enough and people feel poor enough, they forget about their desire to build up their holdings of financial assets

The Magic Equation for Depression Economics



Apply This to the Year 2008:II to 2009:II...

$$Y = \frac{c_0 + I + G + GX}{1 - (1 - t)c_y + im_y}$$

$$\Delta Y = \frac{0 - \$630 + 0 + -\$270}{1 - (1 - t)c_y + im_y}$$

$$\Delta Y = \frac{0 - \$630 + 0 + -\$270}{1 - (1 - 0.2)(0.5) + 0.2}$$

$$\Delta Y = \frac{-\$900}{0.8} = -\$1,125 \text{ billion}$$

Actually, $\Delta Y = -\$840$ billion

The Downturn, in 2005 Dollars

- In 2008:II
- $I = \$2.03$ trillion
- $G = \$2.49$ trillion
- $GX = 1.70$ trillion
- $IM = \$2.19$ trillion
- $C = \$9.32$ trillion
- $Y = \$13.36$ trillion
- By 2009:II
- $I = \$1.45$ trillion
- $G = \$2.55$ trillion
- $GX = \$1.47$ trillion
- $IM = \$1.79$ trillion
- $C = \$9.18$ trillion
- $Y = \$12.81$ trillion

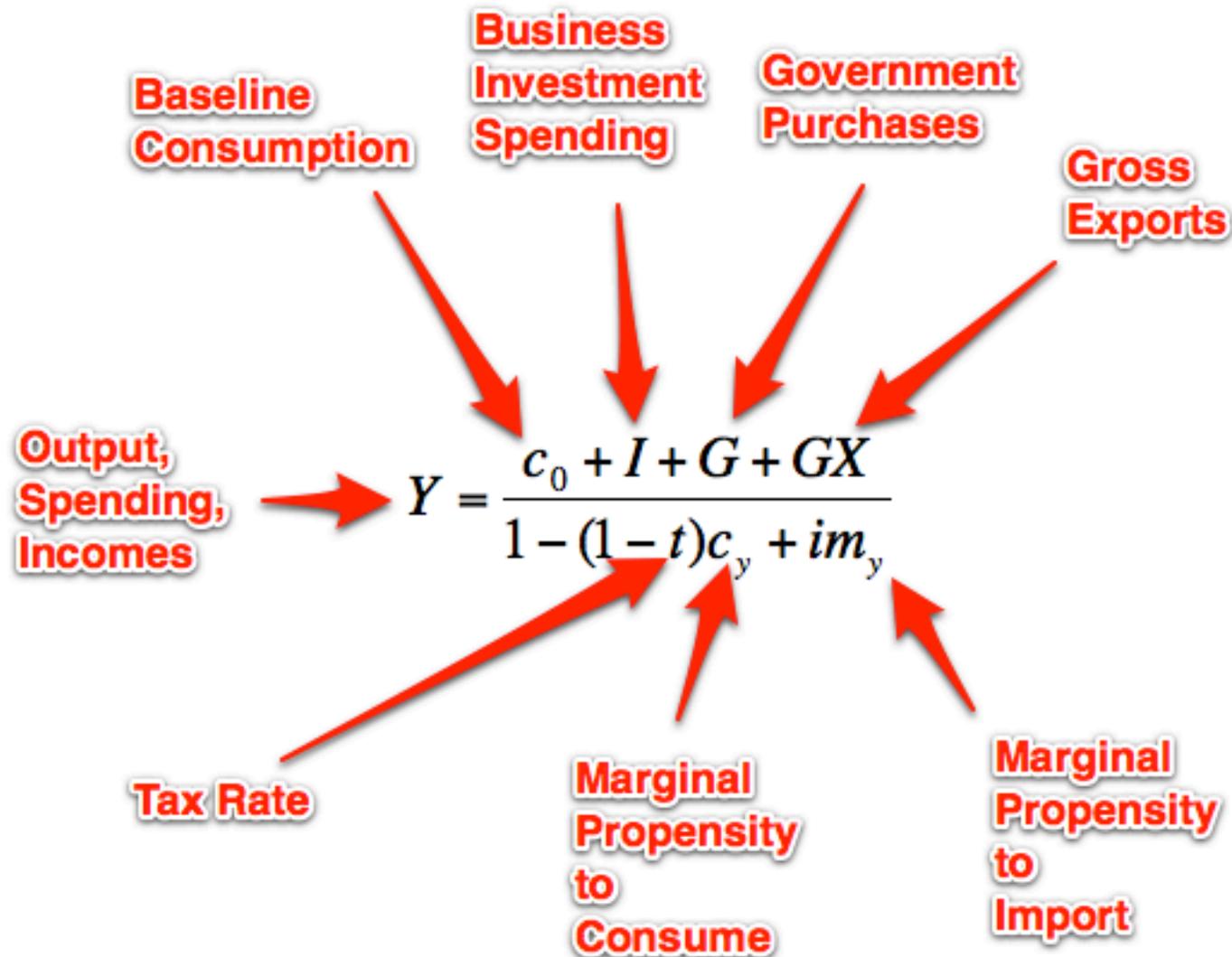
Changes and Normal Changes

- Year from 2008:II
 - $I = -\$0.58$
 - $G = \$0.06$
 - $GX = -\$0.23$
 - $IM = -\$0.40$
 - $C = -\$0.14$
 - $Y = -\$0.50$
- Over a year
 - $I = \$0.05$
 - $G = \$0.06$
 - $GX = \$0.04$
 - $IM = \$0.05$
 - $C = \$0.24$
 - $Y = \$0.34$
- Relative to trend
 - $I = -\$0.63$
 - $G = \$0.0$
 - $GX = -\$0.27$
 - $IM = -\$0.45$
 - $C = -\$0.38$
 - $Y = -\$0.84$

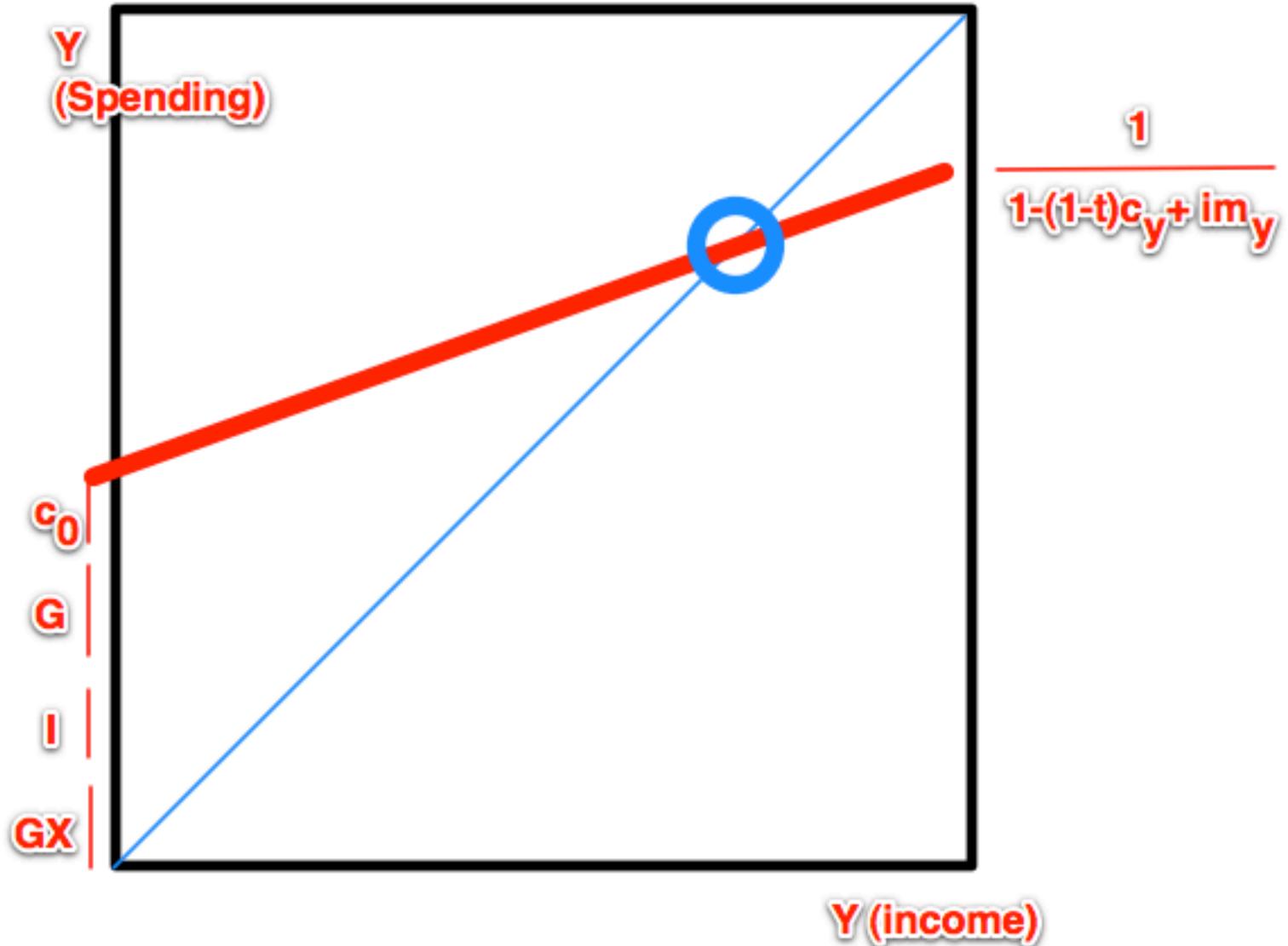
Ladies and Gentlemen, to Your i>Clickers...

- **Suppose real GDP is \$840 billion/year below its normal level, should you?**
- A. Cut government purchases because the government should tighten its belt when the private sector tightens its.
- B. Cut government purchases because only if G falls will I rise, and you need I to rise
- C. Raise government purchases by \$840 billion/year to fill in the demand gap
- D. Raise government purchases by \$630 billion/year and rely on the multiplier to fill in the rest of the gap.
- E. Boost government purchases, but also try to talk down the value of the dollar to boost exports and provide government guarantees to banks and businesses to increase business confidence so I will rise.

Some Prefer Algebra



Others Prefer Graphs



The “Excess Demand for Financial Assets” Stuff

- Suppose we started from the idea that there should be no excess demand for financial assets—that the flow of savings into financial markets should be equal to the number of financial assets created
- Financial assets created: $(G-T) + I$
- Flow of savings: $(Y-T-C) - NX$
- $(G-T) + I = (Y-T-C) - NX$
- $G + I + NX + C = Y$
- Look familiar?
- This is our equation for businesses being happy with what they produce—spending equal to income, no big unexpected and unwanted change in inventories
- This is also our equation for no excess demand for (or supply of) financial assets
- Why? Circular flow principle: as John Stuart Mill and Jean-Baptiste Say said back in 1829: an excess of demand for financial assets is a deficient demand for currently-produced goods and services