Problem 1.   The above figure (um, it's in midterm 2) shows the labor market for a country, with labor measured in workers. Currently the price level is P = \$10. Wages and prices are fully flexible (so, we are talking about the long run). Suppose that the price level increases by 5%. Then, the real wage will change to *not change.*

The real wage W/P is on the y-axis. This means that a change in P will be a movement along the curves, rather than any sort of shift. Therefore in equilibrium, the economy will go right back to the intersection of the curves so the real wage will remain at 10.

Shifts in Labor Demand.   *At the existing real wage*, the amount of capital and advances in technology both shift labor demand to the right. (Note that both are increases in labor productivity.)

Shifts in Labor Supply.   Any factor that causes households to supply more or less labor to business firms *at the given real wage* would cause a shift in the function. An increase in population is such a factor. Moreover, if for any given population size a larger share of that population decides to work, then the supply of labor will increase.

Problem 2. Arbitrage would ensure that two assets that are identical in terms of risk, liquidity, and tax treatment, *will have the same expected rate of return.* To see why they might not have the same price or future payout, consider the following two bonds that have the same risky, liquidity, and tax treatment:

- Bond A: buy for $100 today, receive $110 in a year,

- Bond B: buy for $1000 today, receive $1150 in a year.

The Bond A has an interest rate of 10%, whereas Bond B has an interest rate of 15%. This seems odd—if the bonds are otherwise identical, then you would expect that buying ten Bond A would have the same payoff as buying one of Bond B. But in this case, people would rather buy Bond B and sell Bond A. When people buy a lot of Bond B, it will bring up the price of Bond B. When people dump Bond A, it will lower the price of Bond A. This is arbitrage. Ultimately arbitrage will ensure that the market looks something like

- Bond A: buy for $97.78 today, receive $110 in a year,

- Bond B: buy for $1022.22 today, receive $1150 in a year,

in which case both bonds will have an interest rate of 12.5%.

Problem 3.   The above graph (um, not here, look at the midterm itself) shows some labor market data for the two years 2005 and 2015. Which of the following set of events could have caused the labor market to move from the 2005 point to the 2015 point (assume that these were the only possible events)?

Choice A.   No matter how you draw the supply and demand curves, you'll end up with the real wage falling, so this can't possibly be right—it could not have possibly cause the equilibrium to change from the 2005 point to the 2015 point.

Choice B.   No matter how you draw the supply and demand curves, you'll end up with labor increasing, so this can't possibly be right—it could not have possibly cause the equilibrium to change from the 2005 point to the 2015 point.

Choice C.   You can draw this in certain ways in which it won't exactly conform to the picture; but there are *some* possible ways it would match the graph. So this *could* have caused the change seen.

Problem 4. The table below shows production and expenditure data for three countries.

	Country 1	Country 2	Country 3
C	12	10	16
I	4	8	6
G	10	12	7
EX	6	5	3
IM	2	4	6
Y	30	35	25

In Country 2,

(a) the goods market is in equilibrium

(b) there is excess demand for goods and services

(c) there is excess supply of goods and services

(d) there is an unplanned decrease in inventories

(e) none of the above

Answer 4: c.   Actual demand is equal to

$$C + I + G + EX - IM = 10 + 8 + 12 + 5 - 4 = 31,$$

where as output is

$$Y = 35.$$

This means that more is being produced than people want to buy—there is excess supply of goods and services. This causes an unplanned increase in inventories of $35 - 31 = 4$. Firms will ultimately respond by producing less stuff so that their production matches demand.

Problem 5. Which if the following sequences of events is one of the explanations for the slope of the AD function?

(a) $P \downarrow \implies$ Real Wealth $\uparrow \implies C \uparrow \implies AD \uparrow \implies Y \uparrow$

(b) $P \downarrow \implies$ Real Wealth $\downarrow \implies C \uparrow \implies AD \uparrow \implies Y \uparrow$

(c) $P \downarrow \implies$ Real Wealth $\uparrow \implies C \downarrow \implies AD \uparrow \implies Y \uparrow$

(d) $P \uparrow \implies$ Real Wealth $\uparrow \implies C \uparrow \implies AD \uparrow \implies Y \uparrow$

Answer 5: a. If the price level goes down, then all else the same, real wealth goes up—it costs less to buy things so you're relatively wealthier. Thus you will consume more, which causes an increase in Y via C. This is the **wealth effect**.

Problem 6. Which if the following sequences of events is one of the explanations for the slope of the AD function?

(a) $P \downarrow \Longrightarrow (EX - IM) \downarrow \Longrightarrow AD \uparrow \Longrightarrow Y \uparrow$

(b) $P \uparrow \Longrightarrow (EX - IM) \uparrow \Longrightarrow AD \uparrow \Longrightarrow Y \uparrow$

(c) $P \downarrow \Longrightarrow (EX - IM) \uparrow \Longrightarrow AD \uparrow \Longrightarrow Y \uparrow$

(d) $P \uparrow \Longrightarrow (EX - IM) \downarrow \Longrightarrow AD \uparrow \Longrightarrow Y \uparrow$

Answer 6: c. If the domestic price level (i.e. "our" price level) goes down, then two things happen:

- we buy more domestic goods and import less

- foreign people buy more of our goods and therefore we export more.

Both effects will increase Y. This is the **foreign trade effect.**

Problem 7.   Which if the following sequences of events is one of the explanations for the slope of the AD function?

(a) $P \downarrow \implies$ Demand for Money $\uparrow \implies R \uparrow \implies AD \uparrow \implies Y \uparrow$

(b) $P \downarrow \implies$ Demand for Money $\downarrow \implies R \downarrow \implies AD \uparrow \implies Y \uparrow$

(c) $P \downarrow \implies$ Demand for Money $\downarrow \implies R \uparrow \implies AD \uparrow \implies Y \uparrow$

(d) $P \uparrow \implies$ Demand for Money $\uparrow \implies R \uparrow \implies AD \uparrow \implies Y \uparrow$

Answer 7: b.   If the price level goes down, demand for money will decrease. This will cause a decrease in the interest rate R. Lower R will make borrowing cheaper so people and firms will be inclined to borrow and thus spend more. This increases AD and Y. This is the **interest rate effect**.

Problem 8.   Which of the following events will cause a shift in the aggregate demand function? If there will be a shift, indicate the direction in which aggregate demand will shift.

(a) An increase in taxes

(b) An increase in transfer payments

(c) Expected increase in future real disposable income

(d) Increase in the nominal interest rate

(e) Increase in expected inflation

(f) Increase in nominal wealth

(g) Increase in investment spending

(h) Increase in expected future profits

(i) Uncertainty about future profits

(j) Increased government purchases

(k) Increase in net exports

(l) Increase in foreign prices

(m) Increase in foreign income levels

Answer 8.   Anything that changes components of $C + I + G + EX - IM$ that were not caused by a change in the price level will shift the AD curve.

(a) An increase in taxes reduces peoples' disposable incomes, and therefore reduces the C component of AD. So AD shifts to the left.

(b) An increase in transfer payments increases peoples' disposable incomes, and therefore increases the C component of AD. AD shifts to the right.

(c) An expected increase in future real disposable income will cause people to consume more—they will be more inclined to borrow today—so C will increase. This shifts AD to the right.

(d) An increase in the nominal interest rate would make people less inclined to borrow money and thus spend less on consumption; AD will shift to the left.

(e) An increase in expected inflation benefits borrowers, so anyone with a loan will suddenly be wealthier in real terms and thus will spend more. AD will shift to the right.

(f) An increase in nominal wealth, given constant prices, will also increase real wealth. An increase in real wealth means people will consume more, so AD shifts to the right.

(g) An increase in investment spending causes the I component of AD to increase, so AD shifts to the right.

(h) An increase in expected future profits means firms will be more inclined to borrow now and

thus invest more, therefore increasing the I component of AD and shifting AD to the right.

(i) Uncertainty about future profits would make firms more cautious about borrowing and thus I would decrease, therefore decreasing the I component of AD and shifting AD to the left.

(j) Increased government purchases increases the G component of AD, which shifts AD to the right.

(k) Increase in net exports means $EX - IM$ is bigger, so therefore AD is bigger and AD shifts to the right.

(l) An increase in foreign prices means domestic goods are relatively cheaper, so foreigners will import more domestic goods and therefore domestic EX increases. This increases AD and therefore it shifts to the right.

(m) Increase in foreign income levels means foreigners will import more domestic goods and therefore domestic EX increases. This increases AD and therefore it shifts to the right.

Problem 9. Economists and policymakers are interested in the behavior of investment spending because

(a) Even though it is not the largest component of aggregate demand, it is the most volatile one

(b) It is the largest and most volatile component of aggregate demand

(c) It is the largest component of aggregate demand

(d) It is under the direct control of the government

(e) None of the above

(f) All of the above, including (e)

Answer 9: a. C isn't very volatile because, say in a recession, people still have to buy groceries and pay rent and stuff—so C can't become zero. G isn't very volatile because politicians take forever to do anything and they determine G.

There is no reason, however, that a firm cannot simply have zero investment if they deem that level appropriate. So investment is allowed to change more than C, and it can change more quickly than G can.

Problem 10.
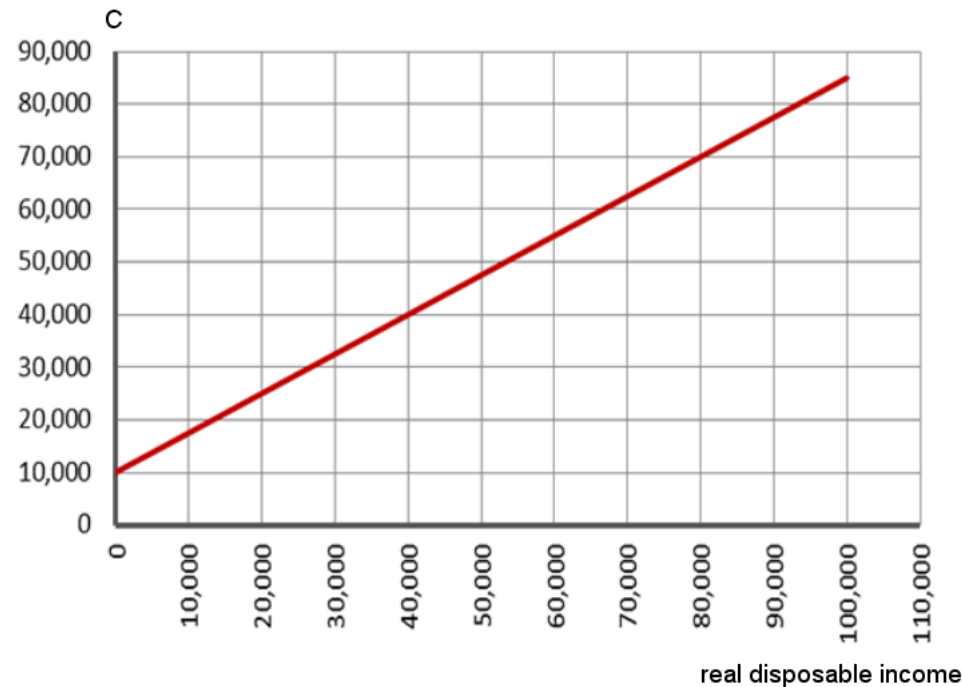
The graph below shows a linear consumption function for a country. What is the marginal propensity to consume, MPC, for this country? What is the marginal propensity to save, MPS?

(a) $MPC = 0.75$, $MPS = 0.25$

(b) $MPC = 0.80$, $MPS = 0.25$

(c) $MPC = 0.90$, $MPS = 0.10$

(d) $MPC = 0.95$, $MPS = 0.10$

(e) none of the above

Answer 10: a. The MPC is just the slope of the line. I'll pick two points the line up nicely with the grid: $(0, 10000)$ and $(40000, 40000)$. Rise over run.

$$MPC = \frac{30000}{40000} = 0.75.$$

What this means is that people will spend 75 cents of every additional (i.e. marginal) dollar of disposable income they have. Note that what is not consumed is saved, so the marginal propensity to save is

$$MPS = 1 - MPC = 0.25$$

Problem 11. If the marginal propensity to consume is 0.90, and investment spending increases by 10 units, then the magnitude of the shift in the aggregate demand function will be

(a) 9

(b) 10

(c) 90

(d) 100

(e) none of the above

Answer 11: d. The expenditure multiplier is

$$\frac{1}{1 - MPC} = \frac{1}{0.10} = 10.$$

Therefore an increase in I of 10 causes AD to shift by $10 \times 10 = 100$.

Problem 12.   The government purchase of goods and services increases, financed by raising an equal amount of taxes. The effect of this can be represented as

(a) a movement down and to the right along the AD function

(b) a movement up and to the left along the AD function

(c) a rightward shift in the AD function

(d) a leftward shift in the AD function

(e) none of the above

Answer 12: c. I'll give a specific numerical example first. Suppose $\Delta G = \Delta TX = 100$, and suppose $MPC = 0.90$. The increase in G causes Y to increase by

$$\Delta G \times \frac{1}{1 - MPC} = 100 \times 10 = 1000.$$

Now taxes. Because disposable income is $Y_d = Y - TX + TR$, by increasing TX by 100, we are decreasing Y_d by 100. This means that consumption will decrease by $0.90 \times 100 = 90$, causing an overall change in Y of

$$\Delta C \times \frac{1}{1 - MPC} = -90 \times 10 = -900.$$

So, both effects combined, we have $\Delta Y = 1000 - 900 = 100$.

It might seem kind of strange that if the government increases purchases, funded entirely by new taxes, that Y would still increase. The idea is that people were only spending 90% of the $100 that was taxed, whereas the government spends all of that $100. That's why, according to this model, Y would indeed increase.

Notice that the final increase is exactly the same amount as the initial increase in G. This idea is that the increase in taxes ultimately cancels out the multiplier effect, so only the initial increase in G, in this case 100, is maintained in the long run.

General Answer. Let $\Delta G = \Delta TX$ be the increase in government spending and taxes.

- From ΔG, the change in Y via the expenditure multiplier effect is

$$\Delta G \times \frac{1}{1 - MPC}.$$

- Now recall that disposable income is $Y_d = Y - TX + TR$. When taxes are increased, we have $\Delta Y_d = -\Delta TX$. Therefore the change in consumption is

$$\Delta C = MPC \times \Delta Y_d = MPC \times -\Delta TX.$$

Via the multiplier effect, this causes a change in Y of

$$\Delta C \times \frac{1}{1 - MPC} = MPC \times -\Delta TX \times \frac{1}{1 - MPC}$$

We are assuming that $\Delta G = \Delta TX$, so we can actually write

$$\Delta C \times \frac{1}{1 - MPC} = -\Delta G \times \frac{MPC}{1 - MPC}.$$

- Therefore the overall change in Y will be

$$\Delta Y = \Delta G \times \frac{1}{1 - MPC} - \Delta G \times \frac{MPC}{1 - MPC}$$

$$= \Delta G \times \frac{1}{1 - MPC} \times [1 - MPC]$$

$$= \Delta G.$$

18