

# Final Study Guide

May 4, 2012

The final exam on Tuesday, May 8th will cover material from the entire course. Use this study guide for extra practice problems and other suggestions to guide your preparation for the exam.

## Resources

Office Hours: Instructor (2:00-4:00 PM Wednesdays and 10:30AM - 12:30PM Friday, May 4th in Hanson Hall 3-128), TA (3:30-5:30 PM Wednesday)

Sufficient to study: Lecture Notes for topics 1-16, Knowledge Assessments 1-5, Data Analyses 1-5, the Practice Final, and these extra calculation problems. You can also find extra problems to work through in your weekly recitation materials; answers for the practice questions included in every week's recitation outline are available online.

Suggestions for preparation: Study the material and work through these practice problems. When you are comfortable, take the practice final UNDER REAL TEST CIRCUMSTANCES, i.e. delete the answers from the word document, print, and give yourself 120 minutes to complete the whole thing. However, there is **a lot** of material from this course and so there is a very large pool of questions. To ensure that you do well, you need to *understand* the material and be able to answer questions that are not simply on old exams or the practice final.

## Test Composition

The test was written by another instructor and more closely reflects the practice exams available online. Questions are generally shorter, but focus on the same type of material. Material we covered only in our class will not be on the final, including: the Solow Model (though you should understand how savings and investment can promote economic growth), and the demographic dividend. I cannot give you a page-by-page breakdown of the test, but here are general characteristics:

1. Approximately 50 questions
2. Pages broken down by topic like on our tests
3. There are simple calculations, graph manipulation, data questions, definitions, and short answer questions
4. There are no multiple choice questions
5. Most pages have replacement points like on our tests
6. ONLY NON-PROGRAMMABLE CALCULATORS ARE ALLOWED (in caps to draw your attention since I have not cared about this during our exams); pens are required for a regrade opportunity

# Practice Questions

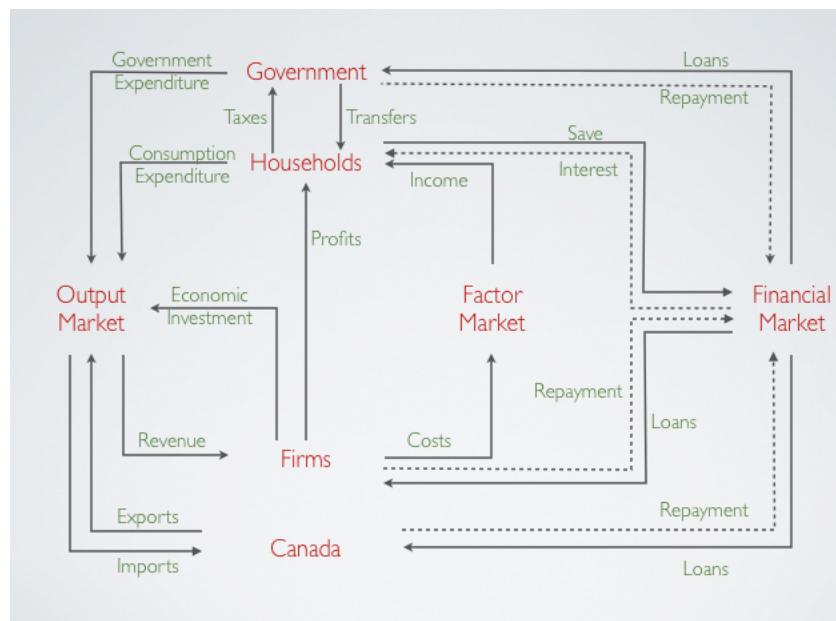
- 1) Suppose Macland is in long-run equilibrium, then a growing demand for Android products from North Korea drives up imports. Depict this shock on an AS-AD diagram and explain how the economy could return to long-run equilibrium.

*Your graph could depict an increase in the aggregate supply (there could be an impact on aggregate demand, but that would require knowing whether the growth in C or the decline in NX because of higher imports would have a bigger impact on AD). So if aggregate supply shifts right, the economy is overheated; prices are lower than before and quantity is higher. The economy could return to equilibrium by any of the contractionary monetary, fiscal policies we discussed in class. Left to its own devices, the economy would likely continue to deviate from equilibrium as lower prices yield lower wages in the longer run which shifts AS even further left. Eventually, we hit a resource constraint (fixed amount of labor), and wages might increase as labor becomes scarce relative to demand from firms. Only then might AS move back left and shift the economy toward equilibrium. Like with cost-push inflation, government intervention makes the process of returning to equilibrium much faster, at least in the theory here.*

- 2) Suppose Macland is in long-run equilibrium, then many workers strike demanding better labor conditions. Depict this shock on an AS-AD diagram and explain how the economy could return to long-run equilibrium (and not through resolving the strike).

*There are a number of ways to interpret the scenario. In one, a strike could lower aggregate demand as income of these agents drops (another alternative that I will not work through is that short-run aggregate supply shifts left because a smaller labor force producing more will earn a higher wage on average). If aggregate demand shifts left, then prices fall and quantity falls. The economy could return to equilibrium by any of the expansionary monetary, fiscal policies we discussed in class or on its own. If we allow the economy to return to equilibrium on its own, firms will force lower wage contracts on the labor force in the long-run, which will shift supply back to the right.*

- 3) Draw and completely label cash flow in a circular flow diagram for the United States with four agents—households, firms, the government, and Canada—and three places of exchange—output market, financial market, and input market.



- 4) Depict how the introduction of a binding minimum wage might impact the aggregate economy in the

short-run, through an AS-AD diagram. (Note that you can interpret the impact in a few ways.)

*If the minimum wage is binding, this implies that the average wage (in the sense that we stuff all of labor across industries into one simplistic market) must be higher than it was before. If wages are higher, then aggregate supply will shift left in the short-run since to produce a given quantity of goods, firms must pay a higher cost than before the implementation of the wage.*

**Questions 5 - 6 require use of the following data:**

Employment Statistics						
Children under 16	Employed	Not employed, Not seeking job	Not employed, Seeking job	Striking, Employed	Imprisoned	Retired
20	36	5	12	15	50	12

5) What is the size of the labor force?

*Labor force includes non-retired, non-child, non-institutionalized individuals who are looking for work. Note that this means, children, the imprisoned (who are institutionalized by definition), the retired, and those not looking for work (discouraged workers) should not be counted. There is one more trick here; people striking and employed have already been counted under the category of employed. So the labor force is  $36 + 12 = 48$ .*

6) What is the participation rate of this country? Unemployment Rate?

*The participation rate is the size of the labor force over the population. The total population is  $20 + 36 + 5 + 12 + 50 + 12 = 135$  (remember the 15 strikers have already been counted) so the participation rate is  $\frac{48}{135} * 100 \approx 35.56\%$ . The unemployment rate is population of unemployed looking for work over the labor force. So the unemployment rate is  $\frac{12}{48} * 100 = 25\%$ .*

**Questions 7 - 12 require use of the following data:**

Year*	Bottles of Water	Price of Water bottle	Bottles	Price of Bottle
2003 = Base	2,000	\$1.25	5,000	\$0.50
2004	3,000	\$2.00	6,500	\$1.00
2005	4,000	\$2.25	7,000	\$0.75
2006	5,000	\$2.25	7,100	\$1.25

\*Note that 1 bottle is used in the production of 1 bottle of water

7) What is the real GDP in 2005?

*Real GDP is the value of production measured in base year prices. AND remember that GDP does not count the value of intermediate goods. So final goods produced in 2005 include 4000 water bottles and 3000 bottles were left over for sale as final goods after 4000 were used as intermediate goods in the production of water bottles. So  $4000 * 1.25 + 3000 * .50 = \$6500$  is the real GDP in 2005.*

8) What is the GDP Deflator in 2005?

*To calculate the GDP deflator, remember that the formula of the deflator is  $\text{Deflator} = \frac{\text{NGDP}}{\text{RGDP}} * 100$ . Since we can calculate nominal GDP in 2005 using 2005 prices, we can figure out the deflator.  $\text{NGDP} = 4000 * 2.25 + 3000 * .75 = \$11250$ . So the deflator in 2005 is  $\frac{11250}{6500} * 100 \approx 173.08$ .*

9) What is the inflation rate between 2005 and 2006?

Inflation can be measured through the growth in the deflator, here  $\text{Inflation}(2005 \text{ to } 2006) = \frac{\text{Defl}_{2006} - \text{Defl}_{2005}}{\text{Defl}_{2005}} * 100$ . The deflator in 2005 is 173.08 from the last problem. Repeat the same process as in question 8 to get the deflator for 2006. So  $\text{NGDP}_{2006} = 5000 * 2.25 + 2100 * 1.25 = \$13875$  (notice again that 5000 units of bottles are intermediate goods).  $\text{RGDP}_{2006} = 5000 * 1.25 + 2100 * .50 = 7300$ . So the deflator in 2006 is  $\frac{13875}{7300} * 100 \approx 190.07$ . So we can calculate inflation is  $\frac{190.07 - 173.08}{173.08} * 100 = 9.81\%$ .

- 10)** Suppose the market basket for this country is 2 bottles of water and 1 bottle. What is the CPI in 2005 and 2006?

Remember that  $\text{CPI}_{\text{year}} = \frac{\text{COL}_{\text{year}}}{\text{COL}_{\text{base}}} * 100$ , where COL is the cost of living in the year or the price of the market basket. So for the base year  $\text{COL}_{2003} = 2 * 1.25 + 1 * .5 = \$3$ . In 2005 the  $\text{COL}_{2005} = 2 * 2.25 + 1 * .75 = \$5.25$ , and in 2006  $\text{COL}_{2006} = 2 * 2.25 + 1 * 1.25 = \$5.75$ . So  $\text{CPI}_{2005} = \frac{\text{COL}_{2005}}{\text{COL}_{2003}} * 100 = \frac{5.25}{3} * 100 = 175$ .  $\text{CPI}_{2006} = \frac{\text{COL}_{2006}}{\text{COL}_{2003}} * 100 = \frac{5.75}{3} * 100 \approx 192$ .

- 11)** What is CPI inflation between 2005 and 2006? How does this compare to the general inflation rate?

Calculating CPI inflation is similar to general inflation using the deflator.  $\text{CPI Inflation}(2005 \text{ to } 2006) = \frac{\text{CPI}_{2006} - \text{CPI}_{2005}}{\text{CPI}_{2005}} * 100 = \frac{192 - 175}{175} * 100 \approx 9.71\%$ . So the general inflation rate was slightly higher from 2005 to 2006 than the CPI inflation, i.e. the prices the average consumers face did not rise as quickly as the prices of the general economy.

- 12)** Suppose Steve earned \$100 in 2005 and \$150 in 2006. In real terms has his income increased or decreased from 2005 to 2006?

We use CPI to figure out the real value of our wages, specifically we can express values in the future by applying the inflation index, so wage in base year dollars = wage in T year dollars \* inflation index. The inflation index is equal to  $\frac{\text{CPI}_{\text{base}}}{\text{CPI}_{\text{yearT}}}$ . Let's take 2005 as our base now, note that we do not have to change the CPI's we already calculated, though. So 2006 wage in 2005 dollars =  $\frac{175}{192} * 150 = 136.72$ . So Steve's real wage—his wage in 2005 terms—is \$136.72, which is higher than the amount he earned in 2005. So his real income has increased.

- 13)** What is the present value of a prize in which you receive \$1000 tomorrow when interest rates are 60%? Give an intuitive interpretation to this number.

$PV = \frac{\text{Amount}}{(1+i)^T}$ , where T is the years between today and the time you get that amount (assuming interest rates are constant over this time period. So in this case the amount is \$1000 and only one period ahead, so the present value is  $\frac{1000}{(1+0.6)^1} = \$625$ . The interpretation is that I would have to set aside \$625 today in order to get \$1000 tomorrow with interest rates at 60%. So the higher the interest rates, the lower the present value.

- 14)** Suppose you can choose one of the two options each at a cost of \$1000: i) a risk-free 5% interest rates, ii) a risky option that returns 100% interest with 1% probability, 5% interest with 90% probability, -10% interest with 9% probability. with Assuming you want the option that will give you the most money, which would you choose?

Option 1 gives us a return of  $\$1000 * (1.05) = \$1050$ . We need to compare this two option 2. In general the expected return is  $\sum_{\text{event}} \text{Pr}(\text{event}) * (1 + i(\text{event})) * \text{InitialInvestment}$ , where  $\text{Pr}(\text{event})$  is the probability some event happens and each i interest rate is tied to some event. So in this case expected return is  $.01 * (1 + 1) * 1000 + .90 * (1 + .05) * 1000 + .09 * (1 - .1) * 1000 = \$1046$ . So the expected return of option 2 is lower than the return of option 1, so we will choose to go with option 1.

**Questions 15 - 21 require use of the following data:**

RGDP: \$4500	NRO: \$5000
Money Demand = $1000 - 6000i$	Loanable Funds Demand = $1500 - 5000i$
Initial Deposits = \$50	MPC = .5
Reserve Ratio = .2	

- 15) What is the initial change in spending in the output market that would return this economy to long-run equilibrium?

*First, figure out what the GDP gap is. Remember that GDP gap is equal to RGDP - NRO, so in this case  $4500 - 5000 = -500$ . So we need to increase GDP by \$500 to return to the long-run equilibrium. With the goal for  $\Delta GDP = 500$ , remember how spending relates to this change in GDP. Spending in the output market is returned to households in the form of firm profits, and then households continue to spend the money in the output market, which yields the multiplier effect cycle. See the class notes to understand how we derive  $\frac{1}{1-MPC}$  as the multiplier. So  $\Delta GDP = \frac{1}{1-MPC} * CISOM$ ,  $500 = \frac{1}{1-.5} * CISOM$ , so the initial change in spending in the output market that returns the economy to equilibrium is  $CISOM = \$250$ . This will be useful going forward since  $\Delta C$ ,  $\Delta G$ ,  $\Delta I$  are all changes in spending in the output market.*

- 16) Suppose the government wanted to close the GDP gap using taxes. How (increase/decrease) and by how much should it change taxes?

*With taxes we are affecting consumption, but remember the change in taxes is not one-to-one with change in consumption. E.g. if I give you a \$100 tax rebate, with an MPC of .5, you will only consume \$50 of it. So  $\Delta C = \Delta T * MPC$ , since  $\Delta T$  is the extra income going to the household. Equivalently, ask yourself, ‘how much money should I receive to consume \$250 (the desired initial change in spending). So here  $250 = \Delta T * .5$  so  $\Delta T = 500$ . Obviously, we need to increase household wealth, so taxes decrease by \$500.*

- 17) Suppose the government wanted to close the GDP gap using government spending. How and by how much should it change spending?

*You solved this in question 15. Change in government spending is CISOM so it should be \$250.*

- 18) Calculate the new level of investment required to close the gap if the government had done nothing.

*You partially solved this in question 15. Change in investment is CISOM so it should be \$250. But to work with monetary policy we actually need to figure out the new level of investment, not just the required change. So first figure out initial investment.*

*The logic here is that we can pin down money supply through the money multiplier and the deposits in the banks. With money supply we can figure out interest rates from the equation from money demand, since the two are equal in equilibrium (think about the money graph, if you know the money demand slope, and you figure out money supply, you could pin down interest rates). With interest rates we can figure out investment through the loanable funds demand. Remember loanable funds demand is equal to investment in a closed economy (in an open economy it is  $I + NCO$ ). Now the math*

*$MS = \frac{1}{RR} * Deposits = 5 * 50 = 250$ .  $MS = MD \implies 250 = 1000 - 6000i$  so  $i = .125$ . Then  $I = 1500 - 5000 * .125 = 875$ . So initial investment is \$875, and we want to increase it by \$250. Therefore, new investment to close the gap is worth \$1125.*

- 19) Calculate a monetary policy using the reserve ratio the Federal Reserve could implement to achieve that level of investment and close the gap.

*Remember the Fed can control money supply through its various policies. To figure out what the new money supply should be, work backward through the logic of question 18. We know new investment, and through loanable funds demand can figure out the new interest rate. With the new interest rates, we can figure out money supply through the money demand equation. The math:*

$$I_{new} = 1125 = 1500 - 5000i_{new} \text{ so } i_{new} = .075. MS_{new} = MD_{new} = 1000 - 6000i_{new} = \$550.$$

Keep that number in mind since the new money supply will be useful for any monetary policy questions in this setting. So the Fed can change either the reserve ratio or OMOs to achieve the new money supply. In this case we need to change the reserve ratio. So we know  $MS = \frac{1}{RR} * Dep$ . We have  $MS$  and deposits aren't changing so  $550 = \frac{1}{RR} * 50$ .  $RR_{new} \approx .09$ .

- 20)** Calculate a monetary policy using OMOs the Federal Reserve could implement to achieve that level of investment and close the gap.

*Do the last step of question 19 again, but change deposits this time instead of the money supply. So  $500 = \frac{1}{2} * Dep$ . Therefore, new deposits must be \$100. So deposits should increase by \$50. To achieve this, the Fed can buy \$50 in bonds from the banks.*

- 21)** Assume velocity of money is 2. Using long-run equilibrium GDP and this new money supply, calculate the price level in the economy.

*Quantity theory of money suggest  $MV=PY$ . So  $M * 2 = P * 5000$ , and the new money supply  $M$  is 550. So  $P = .22$ .*

**Questions 22 - 26 require use of the following data. Note both countries only have 8 hours per day.**

	USA Production in 8 hours
Corn	12 bushels
Wood	24 logs

	Canada Productivity
Corn	1 hour / bushel
Wood	30 min / log

- 22)** Determine US productivity levels (i.e. time spent / bushel and time spent / log) in corn and wood production.

*Notice productivity can also be measured as bushel/hour or log/hour, etc. but follow what the question asks. You simply need to use the information you know to get the answer:  $\frac{8\text{hours}}{12\text{bushels}} = \frac{2}{3}\text{hour/bushel}$ , likewise  $\frac{8\text{hours}}{24\text{logs}} = \frac{1}{3}\text{hour/log}$ .*

- 23)** Which country has the absolute advantage in production of corn? In wood?

*Absolute advantage in production of good  $x$  is given to the country that can produce more of  $x$  dedicating all of its resources to its production. So if Canada dedicated all time to corn it could produce 8 bushels, and to wood 16 logs. Since the US can produce more bushels and logs in the same time period, it has the absolute advantage in the production of both goods.*

- 24)** What is the opportunity cost of corn and wood production in the US and in Canada?

*I really find it easiest to use a graph to find the OC (remember the slope of the PPF is the OC of the good on the x-axis), but you can use the productivities as well. To check yourself just remember the units want. In particular  $OC(\text{corn}) = \frac{\# \text{logs}}{\# \text{bushels}}$  and  $OC(\text{wood}) = \frac{\# \text{bushels}}{\# \text{logs}}$  because the opportunity cost tells me how much of the other good I'm giving up to produce one of this good. For  $OC(\text{corn})$  we can divide corn productivity by wood productivity (check the units if you doubt). So  $OC(\text{corn}) = 2 \text{ logs in the US, and it is 2 logs in Canada}$ . The OC of the other goods is simply the reciprocal so  $OC(\text{wood}) = \frac{1}{2} \text{ bushel of corn in Canada and the US}$ .*

- 25)** If the two countries were to trade, which would import corn?

*Trick question. If the opportunity costs of the two countries are the same, this is the one case where neither has the comparative advantage in the production of a good since comparative advantage goes to the country that can produce at the lower opportunity cost. So when opportunity costs are exactly the same,*

*there is no gain from trade. They could trade, but there would be no purpose. So your answer could be either country would be willing to import corn, or there will be no trade.*

**26)** What are the maximum and minimum terms of trade in this setting?

*Maximum and minimum terms of trade are bounded by opportunity costs of both countries. If they are the same in both countries, we can pin down the terms of trade exactly. Specifically, the terms of trade will be 1 corn for 2 logs or equivalently  $\frac{1}{2}$  corn for one log. (Even though there is no gain from trade, if the two countries were to decide to innocuously swap goods, we know it would be at this price).*

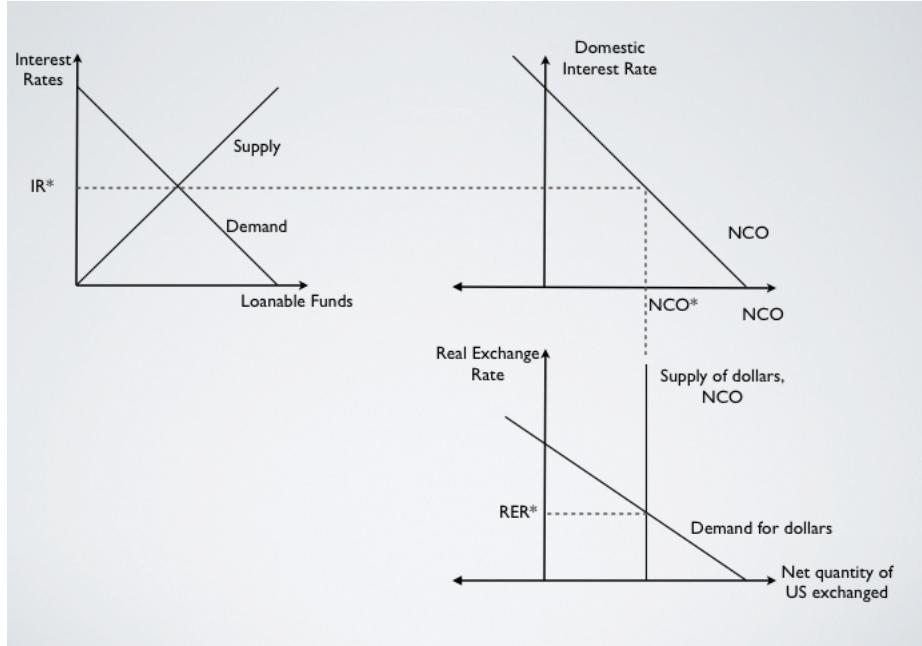
**27)** Suppose the exchange rate of Euros to USD,  $e = 5\text{€}/\$$ , and the price of coke in Germany is  $2\text{€}/\text{coke}$ . Calculate the foreign price of coke in US dollars.

*Foreign prices in US dollars are found by  $P = \frac{P^*}{e}$ , look at unit cancellation to convince yourself. So  $P = \$2/\text{coke}$ .*

**28)** Calculate the real exchange rate if  $e = 5\text{€}/\$$ , price of coke in Germany is  $2\text{€}/\text{coke}$  and price of coke in the US is  $\$1/\text{coke}$ . Does the PPP theory hold here?

*RER is  $\frac{eP}{P^*}$ , again look at unit cancellation to convince yourself. So  $RER = \frac{5*1}{2} = \frac{5}{2}$ . The PPP theory claims that  $RER = 1$ , which does not hold here.*

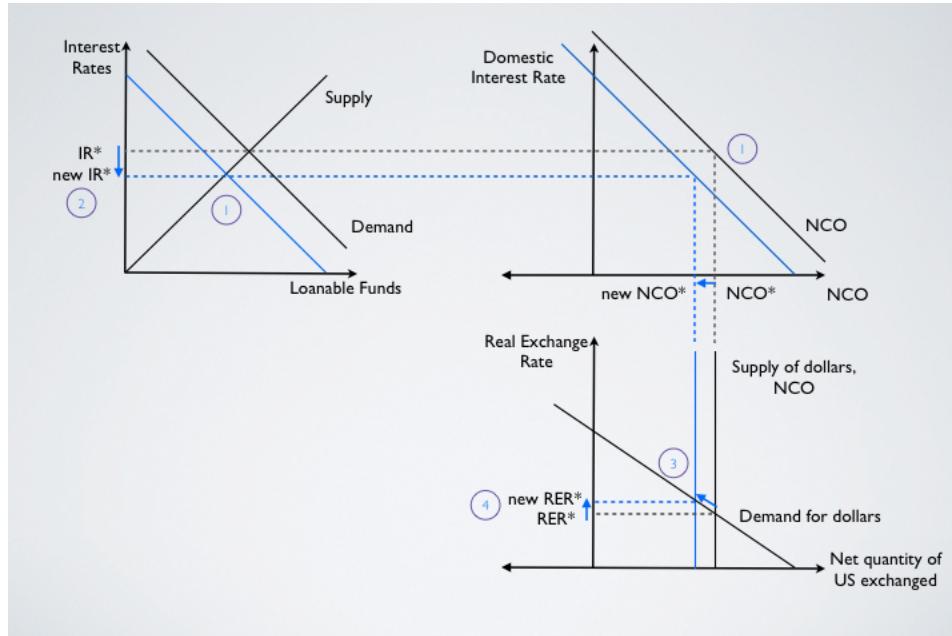
**29)** Suppose that the abolition capital tax in the United States causes a massive capital influx (think, the opposite of capital flight). First draw the three markets connecting domestic markets to the foreign exchange market in equilibrium. Then, represent this shock on the three diagrams and label the timing of each action.



*Before drawing the shock, think about what happens. A massive capital influx means that foreign assets are flooding domestic capital and financial markets so the NCO should fall for any given interest rate. This change will be reflected simultaneously in the “NCO market” by a shift to the left of the NCO and in the loanable funds market by a shift left in demand since demand is equal to  $I + NCO$ . In normal circumstances lower demand will then push down interest rates and cause the NCO to fall.<sup>1</sup> After pinning down the new*

<sup>1</sup>Kevin pointed out that there might be extreme circumstances where we achieve the opposite result. Imagine interest rates

*NCO*, we can see it would shift supply in the exchange markets to the left so the scarcity of supply will cause the price (real exchange rates) to rise.



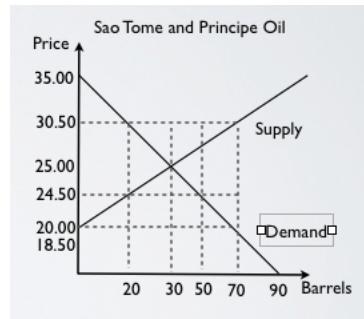
30) Does real exchange rate increase or decrease?

*Real exchange rate falls.*

31) Suppose in the previous example the government hoped to maintain a fixed exchange rate. What are two policies that would achieve that fixed exchange rate?

*Look at the graph from 29 to help answer the question. There are a number of answers you could give, but the two best answers relate to monetary policy and capital flows (you could suggest manipulating trade patterns, but as we said in class that is an extraordinarily slow tool to use compared to monetary policy and capital flows). Ultimately, to achieve the old RER we need to increase the NCO again. We can do this by capital controls from the government that either mandate that the NCO will be at the level we want, or even better the government does some massive purchase of foreign bonds to shift the NCO to the right in the "NCO market." The same goal could be achieved by decreasing interest rates further than before, which requires an expansionary monetary policy.*

Questions 32 - 34 require the following graph. Note Sao Tome and Principe is a (very) small country.



fall far enough so the NCO actually increases (perhaps because of extremely inelastic supply in the loanable funds market) For the purposes of these exercises, though, assume that everything is well-enough behaved that we get these expected results.

- 32)** Suppose that world price is \$24.50 per barrel of oil. Will the country import or export? What is the quantity of imports and exports?

*Sao Tome will import since demand is higher than supply at that price. The quantity is simply the size of the excess of demand at that price, so 30 barrels of oil.*

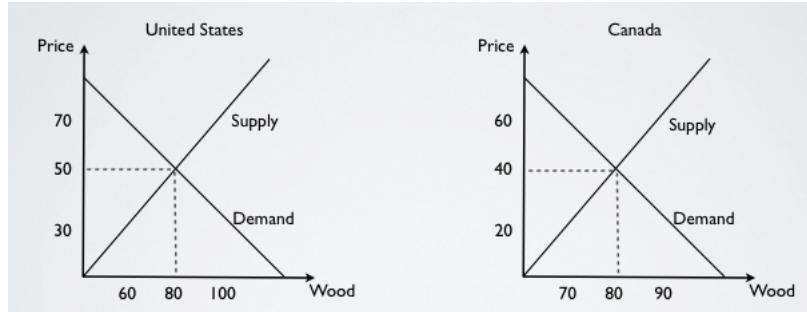
- 33)** Calculate the consumer, producer, and government surplus in the case of free trade with a world price of \$20.00. Who is better off from the autarky situation?

*Government surplus is 0 when it is not collecting revenue (as it is not here). Consumer surplus is the area of the triangle under demand of goods consumed to the price so  $\frac{1}{2}(30 - 20) * 70 = 350$ . Producer surplus is the area of the triangle above goods produced domestically to the price so  $\frac{1}{2}(20 - 20) * 0 = 0$ . So total surplus is the consumer surplus or \$350. When a country begins importing from autarky, generally consumers are better off.*

- 34)** Suppose that world price is \$20.00 but the government of Sao Tome and Principe has introduced a \$4.50 tariff. Calculate the consumer, producer, and government surpluses with the tariff. How much smaller is the total surplus now? (Note this difference from the free trade scenario is the deadweight loss)

*The tariff raises home prices to 24.50. The consumer surplus is the area of the triangle under demand of goods consumed to the price so  $\frac{1}{2}(30 - 24.50) * 50 = 137.50$ . Producer surplus is the area of the triangle above goods produced domestically to the price so  $\frac{1}{2}(24.50 - 20) * 20 = 45$ . Government surplus is the revenue on all goods imported. In 32, you found that imports are 30 when the price is 24.50 so the government is collecting \$4.50 on 30 units so total revenue is  $30 * 4.50 = 135$ . Therefore, the total surplus is  $137.50 + 135 + 45 = 317.50$ . The total surplus is smaller by \$32.50.*

Questions 35 - 36 require the following two graphs. Note that Canada and the US are large countries.



- 35)** What is the maximum potential price in a free trade equilibrium and the minimum potential price? Explain.

*The equilibrium price needs to ensure import demand equals export supply, so the price must make the two countries indifferent to trade or ensures one exports when the other imports. The maximum potential price is \$50 because any higher and both the United States and Canada would want to export. The minimum potential price is \$40 because any higher and both the United States and Canada would want to import.*

- 36)** Find the equilibrium price. How much is the importing country importing and the exporting country exporting in equilibrium?



Normally you should be okay plotting the graph above given the information in the two graphs given to you. You would find the intersection of the import demand and export supply at some clear price, and that would be the equilibrium price since import demand equals export supply at that price. That is what you need to know how to do for the test is essentially plot the graph above.

This problem, however, is quite a bit harder because I did not play with the numbers first. **Do not worry about being able to do the following**, but if you are interested read on...

We first need to plot Canada's export supply and the US's import demand as a function of price. The first point for both is very easy, at price 50 the US will want to import nothing, and at price 40 Canada will want to export nothing. The only other information on the graph for the US is that at price 30, the US would want to import 40 wood. And Canada at price 60 would want to export 60 wood. Neither of those prices are in the possible range of equilibrium prices given what we found in question 35 so we need to derive equations for demand rather than plot points... (alternatively you could extend the graph above to include price 60 and price 30 and then create the lines that way). We will do this hard way though. Since we have one point for both US import demand and one point for Canada export supply, we simply need to figure out the slope of each to draw the complete export supply and import demand schedule. So for the US we have two points  $(Q^M, P) = (0, 50)$  and  $(Q^M, P) = (40, 30)$  so slope is  $\frac{30-50}{0-40} = -\frac{1}{2}$ . Then the equation for import demand is  $P = -\frac{1}{2}Q^M + 50$ . For Canada we have  $(Q^X, P) = (0, 40)$  and  $(Q^X, P) = (20, 60)$  so slope is  $\frac{60-40}{20-0} = 1$ . So the equation for export demand is  $P = Q^X + 40$ . We know in equilibrium prices must be the same so set the two equations equal to each other  $-\frac{1}{2}Q^M + 50 = Q^X + 40$  so equilibrium quantity is 6.667. And we can plug that back in to either equation to find equilibrium price is 46.667.

Again, you are not expected to do the paragraph above..