ECON 110, Professor Hogendorn

Problem Set 7

1. *Movies*. Let's guess that your parents were kids in 1978 and your grandparents were kids in 1948. Let's see what has changed since they were young.

   First, some data: with 1967=100, the CPI was 72.2 in 1948, 196.0 in 1978, and it is 721.2 in 2016.

   (a) In 2016 the typical cost of a movie was $8.60. If movie prices follow the CPI, how much did your parents pay in 1978 and your grandparents in 1948?

   (b) What are the CPIs for 1948, 1978 and 2016 setting 2016 = 100?

   (c) Actually, the real movie price in 1948 was $0.36 and in 1978 it was $2.34. What was the approximate yearly percentage inflation between 1948 and 1978, and 1978 and 2016, using the CPI? Using the actual movie prices? (Hint: the answer for 1948 to 78 is found using this formula:

   $$P_{1948}(1+\pi)^{30} = P_{1978}$$

   where π is the unknown inflation rate you are looking for. It's raised to the 30th power because there are 30 years between 1948 and 1978.)

   (d) Why do you think that movie ticket prices don't increase at the same rate as the CPI?

2. *SpanishBonds*. Suppose the Spanish government sold a bond.

   (a) Suppose each bond has a coupon of €3 and a face value of €100. The first coupon payment is 1 year from now, and the

second payment is in 2 years. The bond matures in 2 years. It turns out that today the bond yields 3.46%. What is its price today? Show the full formula before solving.

(b) If an average US consumer takes out a 3-year loan to pay for a new car, the interest rate they pay is 3.16%. It's strange that the yield on the 2-year Spanish government bonds is higher than that. How can this be?

3. *SW25.2* Down Home Savings Bank has the following assets and liabilities: $6 million in government bonds and reserves, $40 million in deposits, $36 million in outstanding loans. Draw up the balance sheet for the bank. What is its net worth?

4. *AIG.* AIG is the world's largest insurance company, and it got into deep financial trouble in the 2008 financial crisis. As of September 30, 2008, AIG's simplified balance sheet looked approximately like this (all figures in billions):

Assets	Liabilities
$400 financial securities	$913 general liabilites
	$38 government loan
$622 other assets	$71 net worth
$1022	$1022

(a) By late fall 2008, things had gotten worse. It turned out that $50 of the other assets were distressed, and could no longer be counted as assets. Rewrite the balance sheet, and find the new net worth.

(b) Things got worse still. There was a decline of 10% in the financial securities. Also, AIG had a new liability of $35 in credit default swaps. Again rewrite the balance sheet and show the net worth.

(c) Finally, the government announced a bailout plan. One thing the government did was buy the $50 in distressed assets at their full face value by giving AIG $50 in cash. Show how this changed the balance sheet.

(d) The other terms of the government plan were to lend AIG $60 (a new liability). AIG took this cash and paid off the credit default swap liability. Separately, the government bought $40 in shares in the company (again, giving AIG cash). How does this change the balance sheet?

Review Problems only, not to turn in:

5. *Niko.* In 2001, Niko bought four video game consoles: one from Microsoft for $300, one from Sony for $300, and two from Nintendo for $200 each.

   In 2006 Niko checked out the prices for systems from each manufacturer. A new console from Microsoft cost $280, a new console from Sony cost $400, and a new console from Nintendo cost $250.

   (a) Suppose we treat each console as an unchanging good, e.g. a 2001 console from Microsoft is the same as a 2006 console from Microsoft. Assuming all Niko buys are the consoles mentioned above, calculate a consumer price index for 2006 with 2001=100.

   (b) All three systems are upgraded with many new and better features: Microsfot Xbox to Xbox 360, Sony Playstation 2 to Playstation 3, Nintendo GameCube to Wii. Given this, is Niko worse off from the inflation?

   (c) Recall the three characteristics of money. Would Sony's Playstation 2 from 2001 make a good money?

6. *SW25.1* Which of the three traits of money do the following assets have, and which are they missing: a house, a day pass to an amuse-

ment park, Euros held by a resident of New Haven, CT, a painting, gold.

7. *Benetton.* Benetton has a stock market capitalization of $1.2 billion and trades at a price-earnings ratio of 6.5. Hennes & Mauritz, the parent of H&M, trades at a price-earnings ratio of 18.3.

   (a) What are Benetton's yearly earnings? Does the stock market expect them to rise faster or slower than H&M's?

   (b) Benetton's costs as a percentage of sales are 54%, while H&M's are 39%. Does this help to explain the difference in price-earnings ratios?

8. *Lula.* Suppose there is a Brazilian government bond with a face value of R$100 (i.e. 100 reals, the currency of Brazil). The bond has a coupon of R$5 and matures in 1 year.

   (a) If the bond's current price is R$80, what is its yield?

   (b) Many investors thought that if Lula da Silva were elected president of Brazil, Brazilian debt would become more risky. Explain what probably happened to the price of Brazilian government bonds when Lula won.

9. *AmherstBank.* The New Bank of Amherst, MA is a small start-up bank. Its balance sheet currently looks like this:

Assets	Liabilities
$2 million bonds	$10 million deposits
$8 million loans	$1 million stockholders' equity
$1 million reserves	

   On further inspection, it turns out that the investment manager for this bank put all the bond money in Greek government bonds.

The $2 million in bonds is actually the face value of the bonds when they were initially purchased. The bonds are worth only $1.5 million at today's market price.

(a) If the balance sheet is "marked to market" to reflect the new price of the bonds, how should it be changed? Does the bank need additional reserves to cover this change?

(b) Do the bonds now yield more or less than their coupon rate? Explain.

Answers to Review Problems:

5. *Niko_a.*

(a) The 2001 quantities are 1, 1, and 2. The cost in 2001 was

$$1 \times 300 + 1 \times 300 + 2 \times 200 = 1000$$

The cost in 2006 of this combination would be

$$1 \times 280 + 1 \times 400 + 2 \times 250 = 1180$$

Thus the 2006 price index (with 2001=100) is

$$\frac{1180}{1000} = 118\%$$

Note that it doesn't matter whether Niko actually purchased more consoles in 2006, we just need the base year quantities to see how much inflation there was.

(b) Presumably everyone agrees that these new consoles have better features than the old ones. If Niko values these new features 18% more than the old ones, then the inflation has no effect on Niko's welfare. If he values them more than 18% more, he is actually better off.

(c) As a unit of account, Playstation 2's aren't too bad. They currently sell for around $40 give or take, which means all current prices would need to be divided by 40 to put them in terms of PS2s. This would be reasonably convenient, so they make a pretty good unit of account.

As a medium of exchange, PS2s are pretty bulky and fragile to carry around and make exchanges with. More problematic, they cannot be divided into smaller parts without breaking them, creating a significant inconvenience in using them in exchange.

As a store of value, PS2s have a problem: they are becoming increasingly obsolete, and therefore their use value is declining. But at least no new ones are being produced, so people would have some protection against inflation caused by creating more money.

6. *SW25.1_a.* House: store of value, not a medium of exchange because it is difficult to buy a loaf of bread with a house, not a unit of account because it would be difficult and to calculate the number of houses it would take to buy a loaf of bread.

   Day pass: a store of value, provided you can use the pass for some future day, not a medium of exchange except at the amusement park itself where the pass buys you admission, not a unit of account because prices are not measured in terms of day passes.

   Euros in New Haven: a store of value, not a medium of exchange because very few people in New Haven will accept Euros in exchange for goods, not a unit of account because in New Haven the value of goods is measured in dollars.

   Painting: a store of value.

   Gold: a store of value, an imperfect medium of exchange since there are probably some people (but not many) who will accept

gold as a means of payment, not a unit of account because we do not measure the price of goods in grams of gold.

7. *Benetton_a*

   (a) Since the price-earnings ratio is 6.5, that means that

   $$\frac{\$1.2}{E} = 6.5 \Rightarrow E = \frac{\$1.2}{6.5} = \$0.18 \text{ billion}$$

   The market allows you to buy \$1 of *current* Benetton earnings for about one-third of the price of \$1 of current H&M earnings. The only way that could be an equilibrium is if market participants expect H&M's future earnings to rise faster than Benetton's.

   (b) Yes. This indicates that the total cost component of Benetton's profits is much higher than for H&M . So the implication is that any future growth in revenue will likely coincide with a much larger increase in costs for Benetton. Thus, even if the market expects both companies to have the same growth in sales (i.e. total revenue), it would still expect Benetton to have a lower increase in earnings.

8. *Lula.*

   (a) The formula to use here is

   $$P = \frac{A}{1+i} \quad R\$80 = \frac{R\$5 + R\$100}{1+i} \Rightarrow 1+i = 1.3125 \Rightarrow i = 31.25\%$$

   (b) Investors perceived Lula as risky, and they demanded a higher risk premium on Brazilian government bonds. For an existing bond, the coupon and face value have already been set, so the only way for the yield to rise was for the present value to fall, as shown in the formula above.

9. *AmherstBank_a.*

(a) The balance sheet will be marked down by $0.5 million in the assets column. To keep it in balance this requires a mark-down of $0.5 million of stockholders' equity. Since deposits have not changed, there is change in required reserve.

Assets	Liabilities
~~$2~~ $1.5 million bonds	$10 million deposits
$8 million loans	~~$1~~ $0.5 million stockholders' equity
$1 million reserves	

(b) We know that the current market price is less than the face value. The price of a bond is equal to the discounted present value of the coupon payments plus the payback of face value at maturity. For the price to fall below the face value, the rate of discounting must rise above the coupon rate. Thus the yield must be higher than the coupon rate. This makes sense since the bond have become more risky.