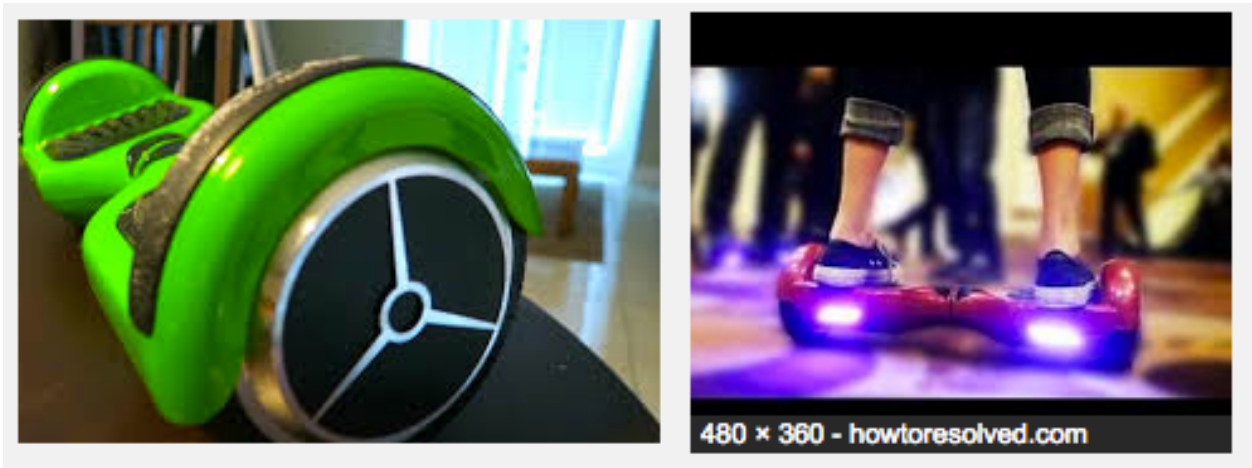


Assignment #1

1. You win the lottery. You have the option of accepting the up-front \$17 million cash payout OR you can take the 25 annual installments of \$1 million with the first payment happening immediately.
Congratulations. Before you up and drop out of school, what is the PV difference between the two options given an annual inflation rate of 2% and nominal interest rate of 5%.
2. In an effort to save for University, on his 16th birthday Johnny purchases a bond in the primary market. The risk free interest rate is 3% and the risk premium on the bond is 5%. The bond has a 10 year maturity, \$1000 face value and annual coupon payments paid out on the day of his birthday (starting from his 17th birthday). Johnny spends his first coupon payment at the Ryerson pub.
The day before his 18th birthday, Johnny sees this thing:



and decides to sell his bond immediately. Enid is willing to purchase the bond from him but in the meantime the risk premium has risen to 8% so she makes Johnny a fair offer for his bond. The price of the IO-hawk is \$1000 and Johnny's sole asset is the bond. How much money will Johnny need to borrow from his unfortunate friends to get that thing in the picture?
(ps. If you have one of those, please come see me after class ... and bring it with you)

3. Prove that the present value of a perpetuity with an income stream, Z , that is growing at a constant rate 'g' is equal to $Z/(i-g)$. Note, the first payment is Z and occurs at time $n=1$.
Hint: You may want to use following identity: $1/(1-X) = 1 + X + X^2 + X^3 + X^4 + \dots$, but in order to do so you must **prove** the identity first.

4. Suppose there are two large economies in the world, the United States (u) and Europe (e). First assume that both countries are closed economies. Their respective desired national savings and desired investments curves are given by:

$$S_u^d = 85 + 25r_u \quad \text{and} \quad I_u^d = 91 - 15r_u$$

$$S_e^d = 72 + 40r_e \quad \text{and} \quad I_e^d = 76 - 20r_e$$

Where r denotes the real interest rate.

Find the equilibrium real interest rates, desired savings and investment for each of the closed economies.

5. Continuing from Q#4, suppose the United States government decides to decrease its spending so that the new U.S. desired savings curve becomes $S_u^d = 89 + 25r_u$. What is the new equilibrium interest rate, savings and investment for the United States?

- i) The concept of 'crowding out' can be used to describe how increases in government borrowing can lead to decreased level of investment spending. Explain how this might relate (or not) in this case.
- ii) According to the concept of Ricardian Equivalence, consumers would respond to a change in lump-sum taxes by adjusting their savings behavior, not by altering their consumption decisions (the rationale being that a tax break today would only lead to a tax hike down the road, and the reverse would be true as well). If Ricardian Equivalence holds, would an increase in the lump sum value of taxes (an increase in T) have achieved the same result here as the decrease in government spending? Explain.

6. Continuing from Q#4 (not #5), suppose that the United States and Europe are both large open economies (they are the only two economies in our simplified model world). They can freely trade with each other with no barriers or transaction costs, and borrowers and savers in both countries have unfettered access to international financial markets. Use the savings and investment functions from Q#4 to solve for the Net Capital Outflow for each country. Use the Savings/Investment graphs of both economies, side by side, to illustrate the net foreign lending and borrowing of the two economies.

7. Explain what happens in the Canadian economy (a small open economy with Net Capital Inflow and no risk premium) in the LF model presented in class (keep the all-else-equal assumption)

Note: I'll do the first, you solve the remainder:

- a) Technological innovation in Canada. Ans: I^d in Canada shifts right, Net Capital Inflow increases
- b) Investor's confidence in the Canadian economy increases.
- c) Canadian consumption spending falls.
- d) The Cad government budget deficit decreases.
- e) World savings demand increases.
- f) The world interest rate rises.
- g) Large recession in the U.S.
- h) Large drop in global commodity demand (Note: Canada is a commodity exporter).

8. Consider the following information for a closed economy:

$$Y = 120$$

$$C^{\text{desired}} = 20 + 0.3(Y-T) - 50r$$

$$G = 20$$

$$S^{\text{GOVT}} = 0$$

$$I^{\text{desired}} = 83 - 250r$$

- a) Find the equilibrium values of C^{desired} , S^{desired} , I^{desired} , and the real interest rate, r , and illustrate your results using a savings/investment diagram.
- b) Now supposed the economy described above becomes a small open economy and $r^{\text{WORLD}} = 0.06$ (6%). Find the new equilibrium values of C^{desired} , S^{desired} , I^{desired} , and Net Capital Outflow, NCO. Illustrate your results using a savings/investment diagram.
- c) Continuing from part (b), suppose the government increases its expenditure by 20. With no change in T , briefly describe the effect of the government's expansionary fiscal policy on the level of NCO, and on S^{GOVT} . (Note, the value of NCO is also the value of NX , as shown in class, and the value of Current Account, as will later be shown in class. When there is a Net Capital Inflow ($NX < 0$), it is often referred to as a 'Current Account deficit'. In this case, we are analyzing how an increase in government spending affects the 'twin deficits': the current account deficit and the government budget deficit.) Find the values of S , I and NCO. Sketch the graph.

9. The Liquidity Function is given by $L(Y,i) = Y^5/(10i)^5$. The real interest rate is 4%, the expected rate of inflation is 2.4%, the price level is 4 and the nominal money supply is 50.

a) What is the equilibrium level of real GDP in the economy.

b) What is the value of 'real money' in the economy (Note: the real wage is $w=W/P$, and real income is $Y^{\text{REAL}} = Y/P$)? What is the level of velocity in the economy (velocity is the average number of times a unit of currency is used in transactions in the economy. It measures the speed of circulation of a currency. For instance, if nominal GDP is 10,000 and there are 1000 one-dollar bills, then each dollar bill would be used ten times, on average.)

10. As a Canadian Saver, you have \$1000 to invest in either of the two following investments (both have the same risk and liquidity):

1) A Canadian bond which pays $i=3\%$ in one year

2) A Greek bond which pays $i=7\%$ in one year

The current nominal Cad-Euro exchange rate is $e_{\text{CAD}} = 0.7$ (euros per dollar). Before the pay-out next period, you expect the euro to depreciate relative to the Cad\$ to a new nominal exchange rate, $e^{\text{future}} = 0.79$

a) Based on your forecast, what is the expected rate of return (% yield) on each investment? What is the better investment? (assume zero transaction costs)

b) Your grandma thinks the Greek parliament will abide by the austerity measure and that the European economy will rebound. As well, she believes the U.S. economy will stagnate, the Trans-Canada pipeline will be stalled for political ends, and for a number of other reasons the Cad-Euro nominal exchange rate will fall rather than rise (the Euro will appreciate). Of course your grandma is always right and you change your expectations such that you now believe that the Cad\$ will depreciate 5% against the euro. What is your expected yield on the investment in the Greek bond? Which is the better investment in this case?