

**Finance 462**  
**Practice Final Solutions**

1) We have the following demand for loans:

$$Q = 150 - 700r_l$$

To calculate the elasticity, we first need the derivative with respect to the interest rate.

$$\frac{dQ}{dr_l} = -700$$

Next, divide by the quantity of loans and multiply by the interest rate to get the elasticity.

$$\frac{dQ}{dr_l} \frac{r_l}{Q} = -624 \left( \frac{r_l}{Q} \right)$$

To get total revenues as a function of L, first solve the demand curve for the interest rate.

$$r_l = \left( \frac{150}{700} \right) - \left( \frac{1}{700} \right) Q = .214 - .0014Q$$

Monthly revenues equal the interest rate charged (divided by twelve) times the quantity of loans issued times \$100,000.

$$TR = \$100,000(Q) \frac{r_l}{12} = 1,783Q - 11.66Q^2$$

Marginal revenue is the derivative with respect to L

$$MR = 1,783 - 2(11.66)Q = 1,783 - 23.32Q$$

Now, take the cost function

$$TC = 12,000 + \left( \frac{.04}{12} \right) (100,000)Q = 12,000 + 333Q$$

Marginal cost is the derivative with respect to Q

$$MC = 333$$

Now, to get the optimal amount of loans, set MR=MC and solve for Q

$$1,783 - 23.32Q = 4333$$

$$Q = 62$$

Now, given Q, the interest rate can be found using the demand curve.

$$r_l = .214 - .0014Q = .214 - .0014(62) = .1272 = 12.72\%$$

Therefore,

$$TR = \$100,000 \left( \frac{.1272}{12} \right) 62 = \$65,720$$

$$TC = 12,000 + 333(62) = \$32,666$$

$$\text{Profits} = \$133,054$$

At the profit maximizing point, elasticity of demand is

$$\frac{dQ}{dr_l} \frac{r_l}{Q} = -624 \left( \frac{.1272}{62} \right) = 1.43$$

If we raise the variable costs to 6% of loans, nothing changes except that marginal costs rise from \$333 to \$500. The new profit maximizing quantity is 55 loans at an interest rate of 13.7%.

Adding a higher fixed cost has no impact on the profit maximizing interest rate. It only lowers profits by \$3,000.

2) Suppose that you are the manager of a bank. Your balance sheet is as follows:

<b>Assets</b>	<b>Liabilities</b>
Cash/Reserves: \$10,000	Checking Accounts: \$100,000
15 Year Mortgages: \$150,000	5 Year CDs: \$200,000
30 Year Mortgages: \$200,000	10 year CDs: \$300,000

The reserve requirement is 6% while the equity capital requirement is 4% of non-cash assets.

a) The bank's equity is Assets – Liabilities = \$600,000 - \$360,000 = \$240,000.  
As a percentage of non-cash assets = (240,000/350,000) = 69%.

b) The bank is required to hold 6% of checking accounts  $(.06)(100,000) = \$6,000$  in cash or reserves, The bank is currently above this.

c) The bank's duration gap is as follows:

$$\text{Duration (assets)} = (150\text{K}/360\text{K}) * 8 + (200\text{K}/360\text{K}) * 15.5 = 12$$

$$\text{Duration (liabilities)} = (200\text{K}/600\text{K}) * 5 + (300\text{K}/600\text{K}) * 10 = 7$$

$$\text{Duration Gap} = 12 - 7(360\text{K}/600\text{K}) = 8.$$

The Bank can stand an increase in interest rates of  $(69 - 4)/8 = 8\%$ .

2) Suppose that the Federal Reserve is maintaining a fed funds target of 2%. Explain how the fed would need to respond (i.e increase or decrease the money supply) to the following events.

a) GDP is projected to increase by 3%.

*Actually, the answer here depends on whether or not the projection is higher or lower than initially expected. Let's assume that this is higher than anticipated. This should increase spending as households spend their new found wealth. Interest rates will start to rise from the increased demand which would require the fed to increase the money supply.*

b) Inflation is higher than previously expected.

*This one is a little tricky. In the short run, the increase in inflation would cause households to spend more (i.e. buy now before prices increase) and raise money holdings. To keep interest rates from rising, the Fed would need to increase the money supply. However, in the longer term, the Fed would need to contract the money supply to combat inflation.*

c) Electronic banking allows households to carry less cash.

*Electronic banking lowers money demand. This will push interest rates down. Therefore, the fed should match this decrease in demand with an equal decrease in supply.*

d) What tools does the Fed have at its disposal to alter the money supply?

*Open Market Operations (Buying/Selling) securities.  
Discount Window (Short Term Loans to Commercial Banks)  
Reserve Requirement.*

4) Suppose that the Federal Reserve is following a policy of maintaining full employment. How would the Fed need to respond to the following events?

e) Consumer confidence drops by 5% (consumer confidence is a measure of the average household's feelings about the economy)

*As consumer confidence drops, household spending declines as well. Lower demand lowers employment and the economy falls below capacity. To bring the economy back to full employment, the fed must increase the money supply.*

f) President Bush offers a \$2000 per person tax cut.

*If households save the tax cut rather than spend it, the nothing is required (public savings drops, but is offset by an equal increase in private savings). However, if households spend the tax cut, demand increases, interest rates rise and the economy rises above full employment. The fed would need to decrease the money supply.*

g) High oil prices causes firms to layoff workers and scale back planned investment expenditures.

*Lower investment demand pushes interest rates down. The economy drops below full employment. The Fed needs to increase the money supply.*

h) Some FOMC members have advocated an inflation rule. That is, they would like the Fed to commit to maintaining a constant inflation rate. Is this a good idea? Why or why not?

*Rules are nice in the sense that they decrease uncertainty in financial markets (everybody knows what the Fed will do). However, there are some problems:*

- *If the Fed doesn't pre-commit itself (i.e. put something in writing in advance that forces it to stay with the rule), then the policy is time inconsistent (the Fed will want to deviate from the policy in the future)*
- *If the Fed does pre-commit, it opens itself up to potential speculative attacks (the public knows in advance how the fed behaves and could try and exploit it)*
- *A rule takes away the flexibility to respond to new situations.*