

Institute of Actuaries of India

November 2011 EXAMINATION

CT7 - Business Economics

INDICATIVE SOLUTION

1. C [1.5]
2. C [1.5]
3. C [1.5]
4. C [1.5]
5. B [1.5]
6. D [1.5]
7. D [1.5]
8. B [1.5]
9. D [1.5]
10. B [1.5]
11. D [1.5]
12. C [1.5]
13. D [1.5]
14. C [1.5]
15. A [1.5]
16. B [1.5]
17. C [1.5]
18. D [1.5]
19. A [1.5]
20. C [1.5]
21. A [1.5]
22. A [1.5]
23. D [1.5]
24. C [1.5]
25. A [1.5]
26. C [1.5]
27. C [1.5]
28. C [1.5]
29. A [1.5]
30. B [1.5]

31. The money supply will:

- I. be unaffected (because the public's cash is withdrawn from the banks and the government spends it so it is redeposited in the banking system)
- II. increase (because there will be more cash deposited in the banks, which they can use to create credit)
- III. decrease (because the banks hold more in cash and liquid assets, so less can be lent to customers)
- IV. decrease (because the central bank will sell the foreign currency in exchange for the domestic currency, *ie* it will buy the domestic currency with its foreign exchange reserves, thus leaving less of the domestic currency available on the foreign exchange market).

[4]

Note: Award full marks even if just increase/decrease/unaffected is mentioned without the reasoning

32.

- I. The Natural Rate of Unemployment and the NAIRU are two related but separate concepts within macroeconomics.

The Natural rate of Unemployment is the unemployment which occurs when the labour market is in equilibrium. It is supply side unemployment, such as frictional and structural unemployment. (In other words demand deficient unemployment is absent)

According to this view of macroeconomics, if unemployment is reduced below the natural rate, there is risk of inflation occurring.

This is because to reduce the rate of unemployment below the natural rate of unemployment requires an increase in demand and economic growth, which raises the rate of inflation.

However, Monetarists use a slightly different concept called the NAIRU. This is the non-accelerating inflation rate of unemployment, that is the unemployment rate consistent with a constant inflation rate.

At the NAIRU the upward and downward forces on price and wage inflation are in balance, so there is no tendency for inflation to change. It is the lowest unemployment rate which can be sustained without upward pressure on inflation.

Monetarists argue that reducing unemployment below the NAIRU will only cause inflation and the fall in unemployment will be temporary. Therefore, to keep unemployment below this natural rate requires an ever increasing rate of inflation.

Note : No marks for just illustrating a graph (Phillips Curve). The key points to be highlighted are : - what does the Natural rate of unemployment and NAIRU mean? How do they relate to inflation /How would change in unemployment levels affect inflation under both theories?

- II. Reducing the Natural rate of unemployment or NAIRU involves the use of supply side policies and increased productivity. This reduction in unemployment will not cause inflation and will be permanent.

[7]

33. *Securitisation:*

- I. It is the process of pooling assets, such as loans or mortgages, into marketable securities, such as bonds.
- II. The assets are sold by a bank to a Special Purpose Vehicle (set up by the bank), which funds its purchases by the sale of bonds (known as Collateralised Debt Obligations) to investors (other banks and financial institutions).
- III. Securitisation reduces risk for the banks because it means that any illiquid assets that they hold can be sold for cash. This may enable them to operate on a lower liquidity ratio and an increased maturity gap, so increasing profitability.
- IV. Securitisation also enables banks to grow. By allowing the sale of assets for cash, it provides banks with liquidity and enables them to engage in further lending, so increasing profitability.
- V. Investors of these bonds issued by the SPV earn risk free return plus risk premium
- VI. The SPV collects payments from the end customers (mortgage customers/credit card customers) and the default risk rests with the investors

- VII. In addition, by allowing the pooling of assets, securitisation reduces the cashflow risk for investors and therefore encourages financial investment.
- VIII. However, by causing a lower average liquidity ratio throughout the banking system, securitisation might lead to an excessive expansion of credit.
- IX. Also, a moral hazard problem occurs, in that banks might be tempted to take greater risks in their lending, eg by making it easier for higher-risk borrowers to borrow because the risks are being passed on to other financial institutions.
- X. Of particular concern is the increased risk of banking collapse because the fortunes of the banks become even more intertwined. Ultimately, many different financial institutions may end up being exposed to the risk of the original bank's lending policy.

[6]

34. Yes we can, but the cure would be far worse than the disease.

If we print more currency without raising the value of the whatever backs that currency, the value of the currency drops. That's called devaluation of money — we'll need more and more rupees to buy the same amount of wheat and that may lead to inflation.

Currency is really just a piece of paper that stands for something of value. Increasing the amount of currency without increasing the value it represents just makes the currency worth less than when you started.

In the case of a country, the value backing its currency is (roughly) the strength of its economy and the size of its GDP, or all the goods and services it produces.

Our currency used to be backed by gold; you could go to RBI (India's Central bank) and exchange your paper for precious metal.

If our economy grows, our currency stays strong compared to other country's currencies. But if we just started printing paper, the value of those rupees would fall and we'd see prices rise at the same rate.

So printing more rupees might help you pay a debt that was incurred in "old rupees," but everyone would get hurt. People holding debt would lose because they'd get paid in worthless currency. Consumers would have to go shopping with a suitcase instead of a wallet.

And the Government would have a hard time ever borrowing again. So as bad as deficits and debt are, inflation is worse.

Alternate answer :

The increase in money supply would lead to the following repercussions:

1. There is likely to be a fall in interest rates
2. This is likely to lead to a depreciation of the Rupee since the demand for rupee would fall relative to other currencies
3. Imports become expensive – leads to cost push inflation
4. Exports become cheap – this could lead to demand pull inflation

5. Lastly, according to the quantity theory of money equation $MV=PY$.
6. Assuming a constant V (velocity of circulation), any increase in M without a corresponding increase in National Income(Y), would simply translate into price increases(P increases).
7. In conclusion, the budget deficit (Difference between government spending and net taxes collected) financed by just printing more money leads to higher inflation – which is a bigger problem than deficit itself.

[6]

35. Concerns:

- I. Common monetary policy could be inconsistent with the needs of the domestic economy
- II. Exchange rate corrections due to differing shocks to different economies (e.g. oil shock can affect one economy more than the other) to iron of differences would be lost
- III. Budget deficits in one country can spill over and cause problems in other economies
- IV. Citizens of other countries may have to bear the burden of one errant economy's failure through higher taxes
- V. In a recession - cannot devalue currency to increase exports
- VI. Inconsistency between a central monetary policy and local fiscal policies
- VII. Adjusting to a common currency and monetary policy would mean a lot of costs to banks and businesses
- VIII. Structural differences between economies could cause further problems –e.g.lack of flexibility in the labour markets
- IX. One common interest rate would mean individual countries that increase their debt would increase interest rates in all other countries
- X. Overall – the cross subsidy between better and poor economies in the union may not work out well.

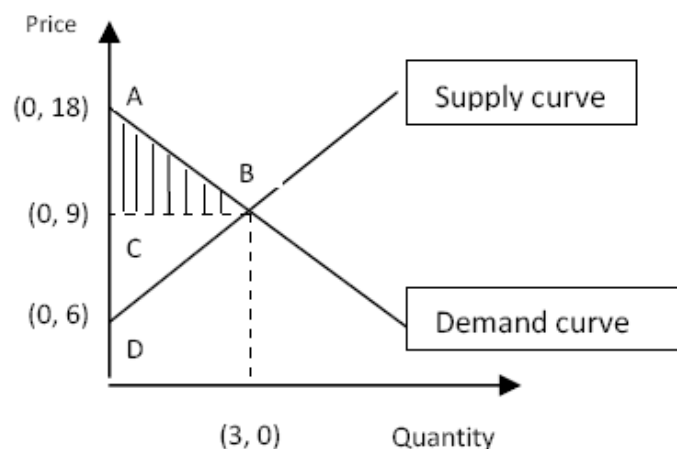
[5]

36.

- (i) Equate $P_D = P_S$, to get equilibrium quantity(q^*) and substitute the q^* in the supply or demand equation to get p^* .

$$(q^*, p^*) = (3, 9)$$

- (ii) Consumer surplus and producer surplus



Consumer surplus is given by Area of Triangle ABC = $(\frac{1}{2}) * 3 * 9 = 13.5$

Producer surplus is given by Area of Triangle BCD = $(\frac{1}{2}) * 3 * 3 = 4.5$

(iii) The new equilibrium after the subsidy is given by: $P_D = P_S - 2$

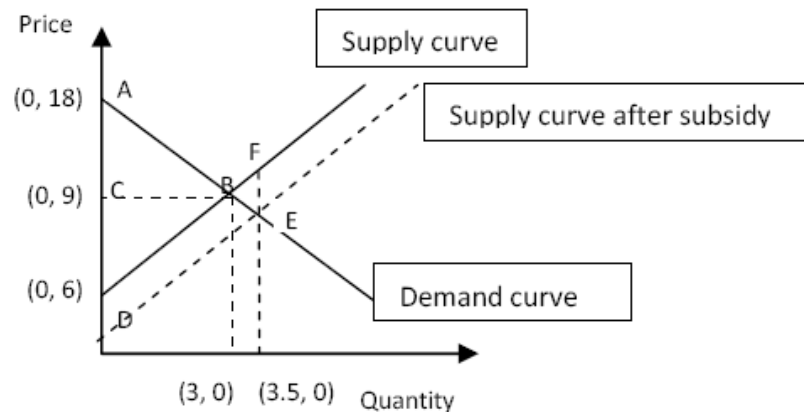
New $(q^*, ps^*, pd^*) = (3.5, 9.5, 7.5)$

[2 marks if all three results are correct, else zero]

(iv) The loss in total welfare due to government intervention in a market is called the deadweight loss.

Yes there is a deadweight loss to the society after subsidy is imposed. An imposition of subsidy leads to distortion of prices. The price paid by the consumer is less than the price received by the sellers. This is compensated by payments to the producer by government. These payments are more than the consumer and producer surplus increased by subsidy and hence results in deadweight loss to the society. [1 for graph and 1 for explanation]

Deadweight loss is given by the area of the triangle BFE = $(\frac{1}{2}) * (\frac{1}{2}) * 2$



(v) The price elasticity of demand (PED) measures the sensitivity of quantity demanded to a change in price. It is defined as:

$\% \text{ change in quantity demanded} / \% \text{ change in price}$

Percent change in price (paid by demanders) due to subsidy as a percentage of the original price is $(1.5/9) * 100 = 16.6\%$

Thus, given that cross elasticity of demand between bananas and apples is +.5 quantity of apples demanded falls by 8.3% ($16.6 * 0.5$).

[12]

37.

I. When the firms operate independently they both maximise their profits individually to arrive at equilibrium quantities.

For Fishery: Maximise profits = $4F - (F^2/100) - P$

First order condition gives $F^* = 200$ [1]

For polybags: Maximise profits = $6P - (P^2/100)$

First order condition gives $P^* = 300$ [1]

II. Socially efficient output will be given when joint profits are maximized

$$4F - (F^2/100) - P + 6P - (P^2/100)$$

The first order conditions w.r.t F and P give $(F^*, P^*) = (200, 250)$

To induce the above outputs government will have to impose a tax on polybags firm such that socially efficient output of 250 is produced. Solve for t given $P=250$ such that profits = $6P - (P^2/100) - tP$

First order condition gives: $6 - P/50 - t = 0$

Substitute $P=250$ gives $t=1$. So Rs 1 per polybag induces the socially efficient equilibrium.

[5]

38. Solutions :

- I. The supply curve in the short run is given by the marginal cost curve of the firm.
 $P=MC$. Therefore, supply curve is $P=2y+1$ or $y = (P-1)/2$
- II. Industry supply curve is the aggregate of supply curve for each firm
 $Y= 3(P-1)$ [

Note that the aggregation makes sense when quantities are aggregated for the same price and not vice-versa

- III. Equate Industry supply to industry demand
 $3(P-1) = 41 - P$, gives $P^*=11$, $Y^*=30$, Firm profit=9, Industry profit=54 [$4 * 0.5 = 2$]
- IV. The tax will change the Total costs of the firm to :
 $C(y) = y^2 + y + 16 + 4y$
Thus, the supply curve for each firm changes to $y = (P - 5)/2$ [0.5]
The aggregate supply curve for the industry is $Y= 3(P - 5)$ [0.5]
Now, using the method similar to part c) and equating demand and supply one gets:
 $P^*=14$, $Y^*=27$

[6]

Thus, in the short run, price increases and total quantity falls

39. Solutions:

- I. If she doesn't buy insurance then there are two cases: either floods happen or they don't. Her expected utility is given by
Probability of floods happens *(Utility when floods happen) + Probability of floods happens *(Utility when floods do not happen) [0.5]

$$\text{Utility when floods happen} = \sqrt{50,000}$$

$$\text{Utility when floods do not happen} = \sqrt{5,00,000}$$

$$\begin{aligned} &= .1 * (\text{Utility when floods happen}) + .9 * (\text{Utility when floods do not happen}) \\ &= .1 * 223.6 + .9 * 707.1 \\ &= 658.7 \text{ utils [0.5]} \end{aligned}$$

- II. Certainty equivalent of the above lottery is certain amount which gives the same utility as above, this is given by say e, such that $\sqrt{e} = 658.7$ [0.5]
This gives, $e = 4,33,960.5$ [0.5]
- III. The amount of insurance she will buy will be such that her wealth is equal in both states of the world when there is a flood and when there is no flood
Wealth when no flood = $5,00,000 - .1x$ [0.75]
Wealth when there is flood = $50,000 + x - .1x$ [0.75]
Equating the above we get, $x = 4,50,000$ [0.5]

[4]
