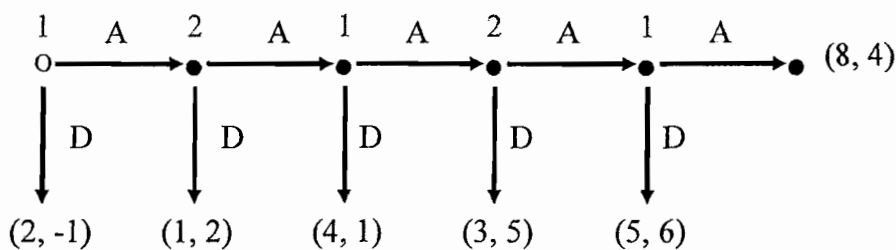


BUSINESS ECONOMICS  
 2007 CRIBS

1 (a) What is meant by backwards induction in game theory? [15%]

Backwards induction is a solution concept for sequential move games (of perfect information). It involves working out the choices that players will make at decision nodes lying at the end of the game and then working backwards, using this information to work out what players at earlier stages of the game are likely to do. The technique assumes that players are rational and that there is common knowledge of rationality (as well as common knowledge of the rules of the game).

(b) In Figure 1 shown below two players (1 and 2) take turns to choose whether to move across or down. What does game theory predict will happen in this game? Explain your answer carefully. [30%]



Known as the centipede game, backwards induction predicts that this game will end with Player 1 choosing to move down at the start. To see why, consider the final decision node at the right hand side of the extensive form. Player 1 can either choose across and gain a payoff of 8, or choose down for a payoff of 5. The rational choice is across. Now consider the previous decision node. Player 2 can either choose across, knowing that Player 1 will then choose across leaving Player 2 with a payoff of 4, or Player 2 can choose down, gaining a payoff of 5. The rational choice for player 2 is therefore down. Continuing this logic back up the game tree (i.e. using backwards induction), we find that Player 1 will choose to end the game by choosing down at the initial node

(c) Using the concept of the multiplier, explain how a reduction in the rate of income tax could increase national income. [25%]

If there is an injection into the circular flow such a reduction in income tax, there will be an increase in output (Y) as a result of a "multiplier" relationship between equilibrium output and the autonomous components of spending. In a closed economy with no taxes the multiplier is:

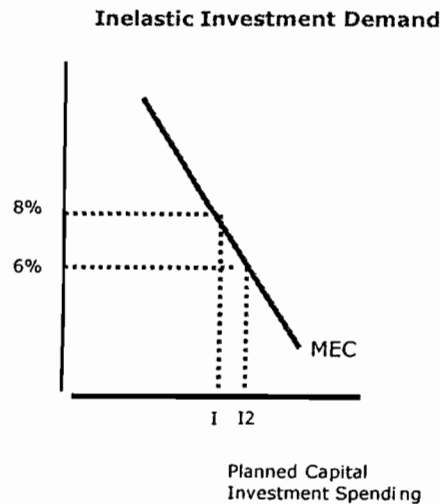
$$1/(1-c) \text{ or } 1/s$$

where  $c$  is the marginal propensity to consume and  $s$  is the marginal propensity to save. Thus the larger the marginal propensity to consume and the smaller the marginal propensity to save the bigger the impact on national income. In an open economy with government additional leakages will include the marginal tax rate and the marginal propensity to import.

(d) Explain, with the use of an appropriate diagram, the impact of a reduction in the rate of interest when investment is relatively inelastic to the rate of interest.

[15%]

When investment is relatively inelastic, changes in interest rate will only have a minor impact on investment as shown in the diagram below. Investment may be interest inelastic as the main drivers may be income changes and expectations.



(c) Describe the Accelerator model of investment and outline its main weaknesses. [15%]

The Accelerator model suggests that total capital investment in an economy varies directly with the rate of change of output i.e. investment is largely income-induced. The basic accelerator model assumes:

Given technological conditions

Given relative prices of capital and labour

A fixed size of capital stock needed to produce a given level of output

If the level of output changes, then the desired size of capital stock will also change.

Net capital investment is the amount by which the required capital stock changes. It follows that the amount of investment depends on the size of the change in output.

When the rate of growth of demand is strong, the size of the capital stock needs to be increased - boosting demand for capital goods.

If the capital stock  $K$  is at full capacity and the capital/output ratio  $v$  is constant, then net investment  $I_n$  may be expressed in the following way:

$$I_n = v(Y_t - Y_{t-1})$$

$$I_n = v Y_t$$

Basic criticism of the Accelerator model include:

The capital-output ratio is not fixed – technological change will alter the amount and cost of capital required to produce a given output.

Changes in demand in the short term can be met by:

Using up existing spare capacity

Using up stocks of finished goods (inventory changes)

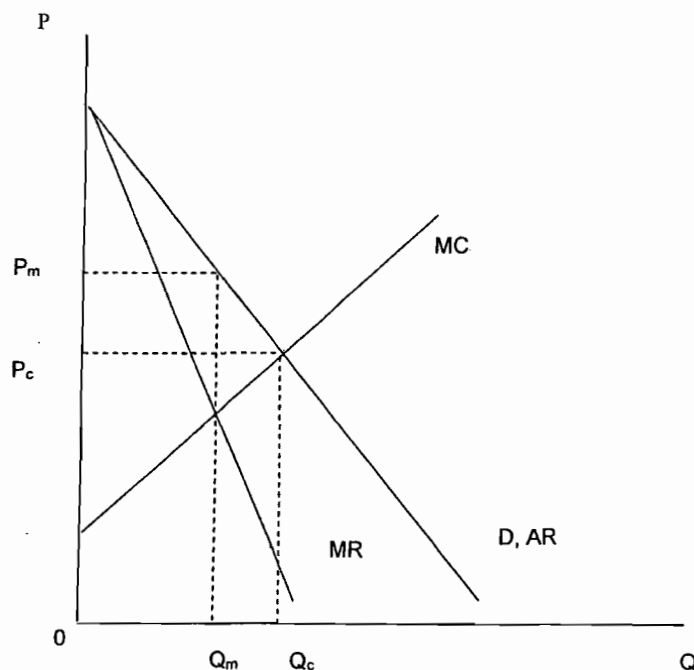
Firms do not always react immediately to a change in demand.

2 (a) What do economists mean by the term market failure? [15%]

A market failure is a state of affairs (e.g. a monopoly, externality, public good etc.) such that, without intervention, the private market outcome will be Pareto inefficient. Candidates might also usefully define Pareto inefficiency – an outcome is inefficient if it is possible to make at least one person better off, without making anyone worse off.

(b) “Allowing a monopolist to engage in first degree price discrimination may not be fair to consumers, but it will ensure that the efficient level of output is supplied in that industry.” Using an appropriate diagram, explain whether this statement is correct. [35%]

The statement is correct and candidates must take care to explain both the fairness and the efficiency point. The most helpful diagram would be a standard monopoly diagram:



Start by explaining that the (non-discriminating) monopoly outcome is  $Q_m, P_m$ . Then explain that this outcome is inefficient because for the units of output between  $Q_m$  and  $Q_c$ , the price someone is prepared to pay exceeds the additional costs of production. Therefore if traded at a price,  $P$ , such that  $AR > P > MC$ , both the firm and consumer would be better off exchanging these units. Hence a Pareto improvement is possible.

Next explain that first degree price discrimination allows a firm to charge a different price for any unit of the good. It follows that if the firm in the diagram is allowed to employ first degree price discrimination, the profit maximising output will be  $Q_c$ , with each unit sold at the highest reservation price (as indicated by the AR curve).

Finally, explain that the statement in the question is correct on both counts. The outcome under first degree price discrimination is efficient because all units for which  $AR > MC$  are exchanged. (hence the inefficiency associated with the single-price monopolist disappears). However under price discrimination there is a transfer of resources from the consumers to the monopolist, since each consumer is now charged exactly what they are prepared to pay. Hence the price discriminating monopolist extracts all the consumers' surplus.

- (c) Explain the difference between the nominal and the real exchange rate. [15%]

The nominal exchange rate is the price of one currency in terms of another currency (or in terms of 'basket' of other currencies). The real exchange rate is the real purchasing power of a currency and is the price of currency adjusted for cross-country differences in prices of goods and services.

- (d) Describe the impact of a fall in the real exchange rate on exports and imports. [35%]

It would be expected that a devaluation (fixed exchange rates) or a depreciation (floating exchange rates) would increase exports and decrease imports. But the impact will depend on firms' pricing strategies: the price elasticities of demand (Marshall Lerner condition): and the existence of sufficient capacity (supply elasticities).

In the short-run there may be a deterioration in trade performance due to the J curve effect. In the medium-run, a devaluation may increase competitiveness and aggregate demand (given that prices and wages adjust slowly). In the long run, a devaluation may not have to have much effect on the economy (if prices and wages adjust upwards returning the real exchange rate back to its initial position).

- 3 (a) Explain precisely what is meant by the term perfect substitutes in consumption. [30%]

Perfect substitutes are goods that a consumer is willing to exchange between at a constant rate, no matter how much of either she already possesses. The consumer's MRS between such goods is therefore constant. Good answers will give examples

(other than the biscuits referred to in part ii) and possibly sketch an indifference curve map.

(b) Suppose that a consumer considers two different brands of biscuit to be perfect substitutes. At his optimal choice, will the consumer's marginal rate of substitution between the two brands of biscuit equal their price ratio? [15%]

Not necessarily. The easiest way to answer this is by drawing an indifference curve map (if the candidate has not already done so for part i)). For perfect substitutes, indifference curves are parallel straight lines. Optimal choice will therefore only be characterised by the tangency condition ( $MRS = \text{price ratio}$ ) if the price ratio happens to equal the consumer's  $MRS$ . Otherwise optimal choice will occur at the boundary, with the consumer spending all her income on one good.

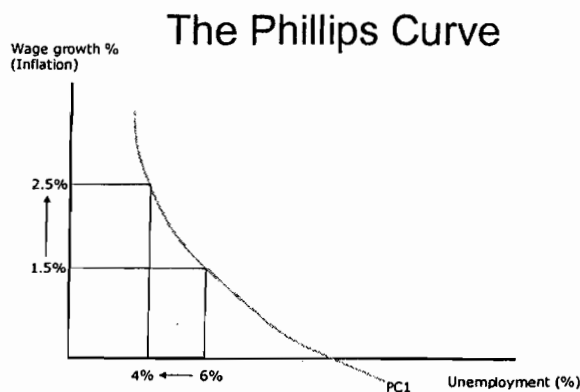
(c) "The difference between inferior goods and Giffen goods is in the sign rather than the size of the income effect." Do you agree with this statement? Explain your answer. [25%]

This is false. Both inferior goods and Giffen goods have a negative income effect (income up, demand down, or vice versa). The difference between the two cases lies in the size rather than the sign of the income effect; Giffen goods are extremely inferior, such that the income effect dominates the substitution effect (and hence price up, demand up, or vice versa). Hence Giffen goods are a type of inferior good.

Good answers should depict the Giffen good case graphically, and ideally contrast this with a non-Giffen, inferior good case.

(d) Explain the concept of the Phillips Curve. [15%]

The Phillips Curve shows an inverse relationship between inflation and unemployment. It suggested that if governments wanted to reduce unemployment it had to accept higher inflation as a trade-off.



(e) Outline the explanations for why the Phillips Curve broke down as a robust empirical relationship during the 1970s. [15%]

In the 1970s there was rising unemployment AND rising inflation (stagflation) Some Keynesians suggested that although unemployment was demand determined inflation was due to 'cost push' factors. Alternatively, monetarists suggested that inflation is demand determined – where monetary growth is excessive. Whereas, unemployment will settle at its 'natural rate' in the long-run which will be determined by how efficiently the labour market is operating. So, for monetarist, the collapse of the Phillips curve was caused by excessive monetary growth causing inflation and strong trade unions causing unemployment.

4 (a) What kinds of economic and technological conditions are conducive to the formation of competitive industries? [20%]

This comes straight from lectures. A (perfectly) competitive industry requires:

- Many small buyers and sellers;
- A homogenous product;
- Perfect information (about prices and technology);
- No transactions costs; and
- Free entry and exit in the long run.

(b) Suppose that the market for widgets is perfectly competitive and that it is currently in long run equilibrium. What is the impact on the market of a permanent increase in demand for widgets? [30%]

Candidates must distinguish between the short-run and long-run effects here. In the short-run price will tend to rise, leading to incumbent firms earning excess profits. In the long-run, prices will be pushed back down to their long-run equilibrium level (provided there are no resource constraints), because excess profits will attract new firms, thus raising supply and lowering price. Good answers will use diagrams taken from the lectures to illustrate each case.

(c) Compare and contrast the neoclassical exogenous model of economic growth with the neoclassical endogenous model of economic growth. [50%]

The assumptions of neoclassical models include that aggregate output can be represented by a production function and there are no 'inefficiencies' or 'aggregate demand failures'. The exogenous growth model assumes that the aggregate production function displays decreasing returns to any single factor

the aggregate production function displays constant returns when all factors are increased in the same proportion. The sources of growth transitions in the neoclassical exogenous model and growth in the labour force; improvements in human capital and growth in physical capital; but only technology can explain a persistent increase in the growth rate.

At any moment the capital stock is a key determinant of the economy's output but the capital stock can change and this can lead to economic growth. If the savings rate is high the economy will have a large capital stock and a high level of output but if the saving rate is low, the economy will have a small capital stock and a low level of output. Higher savings leads to faster growth - but only temporarily: an increase in the rate of saving raises growth until the economy reaches the new steady state.

A population increase will increase output. In the steady state with population growth capital per worker and output per worker are constant. But countries with high population growth (with no change in capital) will have lower capital per worker and so lower levels of output per person. Improvements in the quality of labour will increase output, even at current levels of physical capital and labour.

Only technological change can explain persistent increases in per capita growth. The simplest assumption about technological progress is that it increases the efficiency of labour – it is labour-augmenting technological progress. In this model technology is considered exogenous ('manna from heaven').

There are many alternative forms of endogenous growth theory. In the early models the key intuitive idea behind them was the absence of diminishing returns to capital (in contrast to exogenous growth models). Many later models have retained the notion of diminishing returns to a factor but have stressed the importance of externalities or spill-overs which can lead to endogenous growth.

In the exogenous model, savings leads to growth temporarily, but diminishing returns to capital force the economy to the steady state growth path that depends on exogenous technological change. In contrast, with endogenous growth, investment can lead to persistent growth. Many endogenous growth models employ a 'broad' notion of capital including knowledge. Endogenous growth models may suggest divergences in growth: with fast growth in countries that invest in the key areas (eg. education, skills, R&D and so on).