

3E1 - BUSINESS ECONOMICS 2015

- 1 (a) Explain and illustrate what is meant by the terms perfect substitutes and perfect complements in consumption. [20%]

The student is expected to base their definition on the concept of marginal rate of substitution (MRS), which measures the rate at which a consumer is willing to substitute a small amount of one good for another and is equal to the (absolute value of) the slope of an indifference curve. In the theory of consumption two goods are perfect substitutes if the consumer is always willing to substitute one good for the other at a *constant rate* (the relevant utility function takes the form: $u = \alpha x_1 + \beta x_2$). Perfect complements are instead goods that are always consumed together in fixed proportions (the relevant utility function takes the form: $u = \min\{\alpha x_1, \beta x_2\}$).

- (b) Using an appropriate diagram, explain why the long-run supply curve of a perfectly competitive firm is its long-run marginal cost curve. [25%]

A good answer should demonstrate an understanding of the characteristics of perfect competition and its implications. The student should identify a set of infinitely elastic demand curves (firms are price takers) and consider the typical U-shaped set of cost curves. The thought experiment involves considering different prices, which give us different profit-maximising levels of output. The supply curve will join together the points at which the firm maximises profits for each price level and will be the upward sloping part of the marginal costs curve above the average total costs curve (points below the ATC curve are not possible for a viable business).

- (c) “Pollution is harmful, and hence the Pareto efficient level of pollution is zero.” Discuss this statement and illustrate your arguments with an appropriate diagram. [25%]

A good answer can be based on an Edgeworth box framework, considering for example the right to clean environment and money income, and/or a market diagram comparing the private and social cost of pollution. An equilibrium point that is Pareto efficient is reached if the property rights (to the clean environment) are clearly assigned and trading is possible. Then in equilibrium the price ratio between clean environment and income is equal to marginal rate of substitution between clean environment and income for the two individuals or firms that may be considered in the model. As long as rights are clearly defined, and individuals or firms are willing to trade off pollution against money, trading can take the economy to an efficient outcome. This will in general involve nonnegative amounts of pollution.

(d) Explain the probable current consumption and saving behaviour of a student aged 21 if the student was behaving according to:

(i) The life cycle hypothesis; [15%]

(ii) The permanent income hypothesis. [15%]

The life cycle hypothesis (LC) shows that although income varies over an individual's lifetime, individuals try to smooth their consumption based on expected lifetime incomes that vary systematically with age. The student's actual income should be significantly less than their long-term income. Therefore according to the LC hypothesis they should spend more than current income and borrow. The better students will be able to analyse the role of wealth, annual income, propensity to consume, number of years until retirement and lifetime in years in the model. Milton Friedman's permanent income hypothesis provides a different modelling framework, not emphasising consumers' age, but instead distinguishing primarily between permanent and transitory income. The implications for the student's consumption and borrowing behaviours are however the same. Either formal models or diagrams are perfectly acceptable for this question. The better answers will include both.

2 (a) Define the marginal rate of technical substitution of labour for capital and explain why it is equal to the factor price ratio when a firm is in equilibrium. [25%]

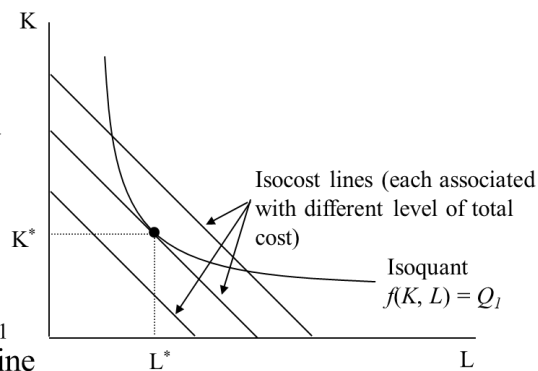
The marginal rate of technical substitution (MRTS) measures the rate at which a firm is able to substitute one input for another while holding output constant. It corresponds to the slope of an isoquant and usually varies along an isoquant. Modelling isoquants as strictly convex implies diminishing MRTS. The problem of cost minimisation can provide a very clear illustration of the required answer. An isocost line shows combinations of inputs which have the same total cost (C). $C = wL + rK$ and $K = C/r - (w/r)L$, where C is cost, K is capital, L is labour, w is labour's wage and r is capital's rental rate (the factor prices). The cost minimisation problem can be phrased as the problem of finding the point on an isoquant that has the lowest possible isocost line associated with it. This identifies a tangency solution where the marginal rate of technical substitution is precisely equal to the factor price ratio. Graphically (Lecture 3):

- K^* and L^* is the lowest cost way of producing output Q_1

- Note optimal choice of inputs is characterised by a tangency solution:

$$MRTS = -(w/r)$$

- The total cost of producing Q_1 can be read from the isocost line



- (b) Outline the Prisoners' Dilemma game and briefly discuss an economic problem that can be represented by this game. [25%]

The Prisoners' dilemma game is a normal form game that has broad applications in contexts of strategic interactions. The students should provide a representation of the game as a payoff matrix that summarises players, their strategies and the possible payoffs to each player. A good answer should contain a clear definition of dominant strategy equilibrium and a note about the assumptions that players should be rational and know the 'rules of the game'. The students can use the game to model, for example, oligopolistic strategic decisions. Appropriate original examples can be worth extra points.

- (c) Why is the provision of public goods usually carried out by governments rather than markets? Provide and discuss two suitable examples. [25%]

Public goods constitute a case of market failure where governments can intervene. Since public goods are non-rival (consumption by one person does not reduce the amount available for consumption by any other person) and non-excludable (once it has been produced it is not possible to exclude any person from consuming any amount of it), given the individual consumers' incentive to 'free-ride' and the market's inability to aggregate individual preferences, they would be underprovided if left to private incentives. The better students should be able to include a diagram illustrating the demand and supply of a public good. Examples may include education, some public services, basic research etc.

- (d) What is the economic rationale for the single European market? What are its advantages and disadvantages? [25%]

The students should address the problem of exchange rate regimes and the economic rationale for international policy co-ordination (externalities and reputation or credible commitment effects). They should discuss the prospects of enhanced productivity via a more

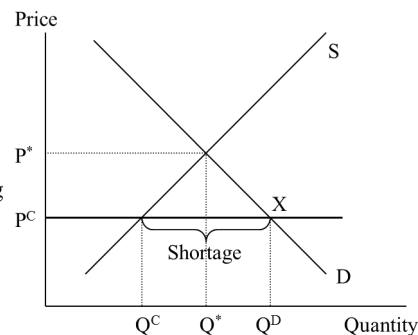
efficient allocation of resources, the benefits (and costs) of increased competition, economies of scale, international competitiveness, and potential welfare gains (and costs) of free movement of capital and labour. The better students will be able to discuss the problems of optimal currency areas, asynchronous business cycles and European fiscal policy.

3 (a) Define the effects of the introduction of a price ceiling and a price floor in a competitive market. [25%]

A good answer should start by profiling a suitable demand and supply framework to define a price ceiling as a maximum legal price that sellers can charge (e.g. rent controls) and a price floor as a minimum legal price that sellers can charge (e.g. minimum wages, Common Agricultural Policy). The students can use the following illustration for price ceilings.

- To be effective, a price ceiling (P^C) must lie below the original equilibrium price (P^*)

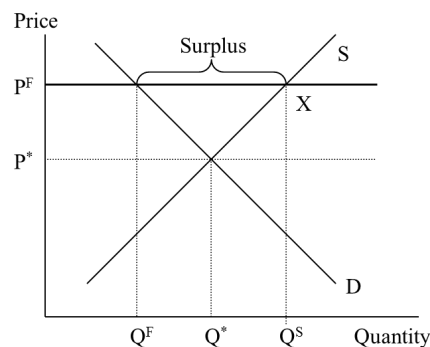
- Initially, Q^* units sold at price P^*
- With price ceiling, Q^C sold at price P^C
- The result is a shortage of $(Q^D - Q^C)$ units, requiring some form of rationing
- In effect, the demand curve is now the line $P^C X D$



The following illustration can be used for price floors.

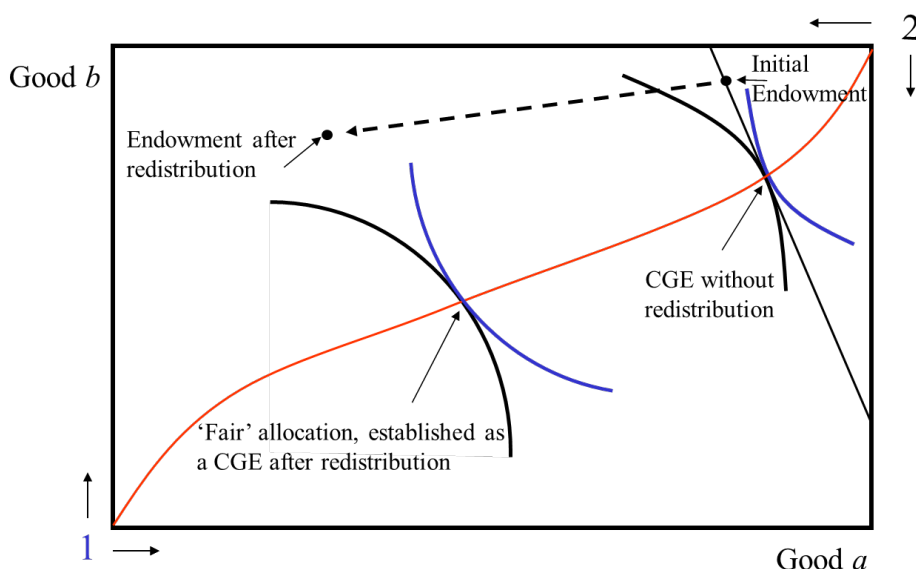
- To be effective, a price floor (P^F) must lie above the original equilibrium price (P^*)

- Initially, Q^* units sold at price P^*
- With price floor, Q^F sold at price P^F
- The result is a surplus of $(Q^S - Q^F)$ units, (possibly) requiring the gov. to purchase the excess (hence the butter, grain, wine 'mountains' associated with the CAP)
- In effect, the supply curve is now $P^F X S$



(b) The second fundamental theorem of welfare economics demonstrates that equity is compatible with efficiency. Illustrate the theorem by using an Edgeworth Box diagram. [25%]

The students are expected to construct an Edgeworth box and use it to illustrate endowments, allocations and prices. They should be able to clearly identify the mechanism (trade) that leads to optimal choices and discuss the problem of efficiency and the problem of equity (or fairness) of allocations. The theorem states that if all agents have convex preferences, then there will always be a set of prices such that each Pareto efficient allocation can be established as a competitive equilibrium given an appropriate assignment of endowments achieved via lump sum taxation. The implication is that it is possible to separate the goals of efficiency and fairness, and that both can be achieved. The following diagram (from the lectures) can be used to: summarise the main points in relation to a simple market with two good (a and b) and two traders (individual 1 and individual 2); and identify possible competitive general equilibria with and without redistribution.



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

The students are expected to demonstrate a good understanding of basic Keynesian macroeconomic principles in relation to government expenditure. They could address the question by presenting the 'Keynesian cross' with planned expenditure and national income curves. Then they should define the tax multiplier as a measure of the change in aggregate income generated by changes in government taxes. This is obtained by finding the equilibrium condition of the Keynesian cross holding G (government expenditure) and I (investment) constant. It is equal to $(-MPC/1-MPC)$, where MPC is the Keynesian marginal propensity to consume. A reduction in income tax will increase C , and increase income. If the multiplier is greater than one, a change in taxes has a multiplier effect on income. If it is

smaller than the government spending multiplier, consumers will save the fraction $(1 - MPC)$ of a tax cut, so the initial boost in spending from a tax cut is smaller than from an equal increase in G .

(d) Critically evaluate the arguments for and against protectionism. [25%]

The students should compare the potential gains from trade (derived from the theory of comparative advantage) with the economic arguments whereby protectionism can occasionally be used to: protect nascent industries in order to alter comparative advantage over time; control the growth of imports to improve the trade balance; respond to dumping and predatory pricing by overseas suppliers; off-load excess capacity at below cost-price; and protect domestic employment. They can provide examples related to tariff- or non tariff-based interventions as well as exchange rate policies.

Examiner's Comment:

Q1. The definition of perfect substitutes and perfect complements in consumption posed no particular problem. There was much more variability in the attempts to derive long-run supply curves from marginal cost curves under perfect competition. While the characteristics of the long-run were generally clear, the identification of the relevant process was met with varying degrees of success. The question about the Pareto efficiency of zero pollution levels tested the candidate's understanding of externalities and Coase's theorem. It was very useful to select out the better students. While many students had the right intuition, only the better ones provided a clear and detailed answer. Most students were able to discuss consumption behaviours according to the life-cycle and permanent income perspectives. The better students provided a clear exposition of the first principles from which they derived the correct answer.

Q2. This was the most popular question. The concept of input substitution was well understood. The least satisfactory answers provided only a superficial treatment of the firm's optimal choice; the best ones were complete with all the relevant details and precise definitions of isoquants as well as isocosts (students often failed to provide clear definitions of the latter). All candidates were able to provide at least a sketch of the prisoner's dilemma game but many did not demonstrate a clear understanding of the game's solution, even when they applied it correctly to the required empirical example of their choice. The economic foundations of the single European markets were rarely discussed at length. However, the main ideas have been absorbed. The better students were clearly able to make accurate theoretical and empirical observations.

Q3. This was the least popular question, even though the distribution of candidates' choices did not present any serious imbalance overall. Most students explained correctly the concepts of price ceilings and price floors. The better students were able to excel in the second part of the question, to which the best of them provided sharp and exhaustive answers. The macroeconomic component of the questions required some thinking. The relationship between the national income and taxation was not difficult to grasp, but its correct modelling through the multiplier stretched the students' performance. The arguments for and against protectionism offered required the students to demonstrate their understanding of trade theory. Alongside some rather superficial answers, many students showed such understanding. The better students were able to identify and present the pros and cons of the single European market briefly, correctly and by means of the appropriate technical language.