Appendix: Answers to review questions

Chapter 1

1 (a) A downsloping line joining 15 shirts and 20 cakes. (b) 20. (c) All points below the frontier. (d) 1.33 cakes. (e) No.
2 Informationally, too costly to plan for, deliver to and monitor individuals.
3 Wages will fall for jobs for which students wish to offer themselves.
4 (a) P. (b) N. (c) P. (d) N.
5 (a) Macro. (b) Micro. (c) Micro. (d) Macro.
6 (a) Positive economics can be tested against evidence. (b) Beginning from an inefficient point, efficiency gains yield a free lunch. (c) Can use scientific method to study human behaviour.
7 (a) High prices are also an incentive for cartel members to cheat on the collective agreement to restrict output – an individual producer that raises its output gets much higher income. Chapter 10 explains how Saudi Arabia disciplined other OPEC members to keep them in line, which was possible only because of the large oil reserves and cheap production costs of Saudi Arabia compared with oth er OPEC members. (b) It would fail because the UK would simply be swamped by cheap textile imports.
8 (a) Would be close to $50/barrel. (b) Yes. (c) Increase.
AB 1   (a) Healthcare largely rationed by price – if you could not afford it, you could not buy it. (b) NHS still rationed healthcare via (i) waiting lists, and (ii) not making some procedures available.

Chapter 2

1 (a) Cross-section data, e.g. by county, for crime, unemployment. (b) Collect other data to control for income, policing, inequality, urban or rural; and use econometrics to disentangle.
2 Upsloping line: rise by 1 in RPI associated with extra £1300 in house prices; time series.
3 Upsloping line: higher income associated with higher consumption of similar amount.
4 Weights reflect relative importance, so capital usually much less than rest of country.
5 Downsloping curve.
6 (a) Theory organizes facts by providing a simple framework in which to interpret them. (b) Many sciences (e.g. astronomy) cannot conduct laboratory experiments. (c) Molecules individually random but collectively predictable. People's individual whims cancel out in larger groups.
7 Higher interest rates make borrowers feel poorer, but they also make lenders feel richer. In part these two effects cancel one another out, so the effect of interest rates on overall spending (and saving) may be smaller than you had expected. Notice too that consumer spending is equivalent to around 70 per cent of national output and income, so that any induced change in consumer spending also tends to change household income within a short time, so that the relationship between the two is less affected than you might have thought.
8 Generally, our conventional wisdom at any time is a set of theories that have not yet been disproved by the evidence. If we set the bar too high, the random quirks in our particular set of

data may make us reject a theory that was in fact correct, discarding it permanently from our conventional wisdom, perhaps never to be rediscovered. Conversely, if we set the bar too low, we may fail to reject theories that should indeed have been rejected, but because they remain for now in our conventional wisdom, we will probably test them again later and get another chance to discover our mistake. Wrongly rejecting correct theories is therefore more dangerous than wrongly failing to reject theories that are in fact incorrect. Statistical testing generally sets the bar around a 5 per cent chance of falsely rejecting a theory that is in fact correct, erring on the side of making it hard to reject a theory.

AB 2 (a) 3.5. (b) 2.33. (c) Sarah. (d) Possible explanations include: Sarah is cleverer, concentrates more effectively and has a better memory; Gordon's mind is always on politics no matter how hard he studies.

Chapter 3

1. Equilibrium price £17; quantity 6.5.
2. (a) Excess demand = 5, and price rises. (b) Excess supply = 3, and price falls.
3. Demand curve for toasters shifts down. Equilibrium price and quantity of toasters fall.
4. Same as 3.
5. Drought, disease, wild dogs all shift supply curve down. Price falls move farmers down given supply curve, not a fall in supply.
6. Controlling for how much the good impresses your friends, lower prices raise your demand.
7. (a) A low enough price can fill any stadium. (b) It shows a price floor for farm goods. (c) It offers low rents to the lucky people who get housing but also reduces total supply and causes a shortage.
8. (a) You cannot be excluded from the benefit, so you get it for nothing. (b) If nobody else subscribes, your contribution will make little difference on its own. (c) Hence the private market will not exist, since everyone will decline to pay. (d) Government can co-ordinate everyone paying most easily by compulsory taxation and state provision of the police service.
9. In the long run, speculation is profitable only if it is stabilizing. However, in the short run, nobody is quite sure what the equilibrium price is – that is why armies of bright economics graduates are employed in financial services to try to use the latest information to outguess their rivals. Since nobody is quite sure what everyone else knows, this often leads to herding, where everyone copies everyone else in case they have superior information. This leads to bandwagons that induce significant and sustained departures from the equilibrium price until everyone comes to their senses and there is a sharp adjustment of prices.

AB 3 (a) As European and Chinese labour markets are unified, the huge addition of Chinese labour makes the labour supply schedule shift to the right, reducing equilibrium wages. (b) With the Chinese economy growing rapidly, the demand for raw materials such as coal is enhanced worldwide. The demand curve shifts up. (c) Demand curve for Bentleys shifts down.

Chapter 4

1. (a) Vertical supply, downsloping demand. (b) To sell 10 per cent fewer baskets, raise the price 20 per cent to £1.20. Vertical supply curve now at 90 baskets.
2. (a) Inelastic. (b) More elastic. (c) More elastic still.
3. Where demand elasticity is −1. Below that point on the demand curve, demand is inelastic: higher prices add to revenue. Above that point, demand is elastic: lower prices add to revenue. If the stadium is free to operate, maximizing profits means maximizing revenue.

4   Vegetables: inelastic, necessity. Catering: elastic, luxury.
5   These data are for nominal not real spending on bread, which fell as real income rose.
6   (a) Necessity is a statement about income elasticity not price elasticity of demand. At high enough prices, demand may be price elastic. (b) If bad weather hits all farmers, it raises prices and helps incomes: 'good' weather needs insurance! (c) Not when they make inferior goods.
7   (a) Above some tax rate (and price of cigarettes) the quantity demand is likely to fall so much that further tax rises reduce tax revenue. (b) –1. (c) Cut the price to get more revenue. (d) Set a higher price than that which maximizes tax revenue because the higher price also reduces quantity of cigarettes demanded and makes people healthier.
8   (a) Income elasticity >1. (b) USA and Australia – rich countries with arid climates and hot summers. (c) Rises, rises, rises. (d) Unchecked, eventually global warming would have adverse effects on income and living standards; feeling poorer, people might then demand fewer air conditioners, other things equal. In practice, governments are likely to take action before then (higher taxes on air conditioners, dearer electricity and other measures).

AB 4

	a	b	c	d	e
(1) Initial P & Q	$P=1$ $Q=10$	$P=2$ $Q=8$	$P=2$ $Q=8$	$P=4$ $Q=4$	$P=5$ $Q=2$
(2) New P & Q	$P=2$ $Q=8$	$P=3$ $Q=6$	$P=1$ $Q=10$	$P=3$ $Q=6$	$P=6$ $Q=1$
(3) % change in P	$100*(2-1)/1=100$	$100*(3-2)/2=50$	$100*(1-2)/2=-50$	$100*(3-4)/3=-33$	$100*(6-5)/5=20$
(4) % change in Q induced	$100*(8-10)/10=-20$	$100*(6-8)/8=-25$	$100*(10-8)/8=25$	$100*(6-4)/4=50$	$100*(1-2)/2=-50$
(5) $PED=(4)/(3)$	–0.2	–0.5	–0.5	–1.5	–2.5

Chapter 5

1   Budget line joins points of food = 10, films = 25. Fall in food price has income and substitution effects. Both raise demand for food. For films, income effect raises demand, substitution effect reduces it. When film price falls, film demand rises, food demand could go either way. Putting two price cuts together. Between e and e'' there is no substitution effect: relative prices are the same. Since both goods are normal, e'' is north-east of e since real income is higher.
2   First three statements correct. Fourth may not be. For other goods, there is a substitution effect towards them (unless, like cutlery, they are complements of food), but since real income is lower, demand for normal goods can go either way. Demand for inferior goods *must* rise.
3   Films increase as budget line moves out, transport declines.
4   (a) Both effects reduce demand. (b) Demand curve shifts down: equilibrium price and quantity fall.
5   (a) Just a device to mimic what people do instinctively. (b) Budget line unaffected.
6   (a) Quantity of coconuts and fish on the axes. Can attain the point (5 coconuts and 5 fish). Budget line slopes down through this point but kinked at the point – left of it, negative slope is flatter, right of it negative slope is steeper. (b and c) Hence indifference map likely to mean that highest indifference curve is one that touches the kink point. (d) Small change in slopes means kinked point still best and behaviour unchanged.

7   Amazingly, it is not certain that you will invest more in the risky asset when its expected return rises. The reason is substitution and income effects. With a higher relative expected return than before, the substitution effect leads you towards demanding more of the risky asset. But do not forget the income effect. To the extent that you were tempted to invest in the risky asset to improve your target income, when the expected return on this asset improves you do not have to risk so much to get any particular target income. That is the income effect. In this case, it makes you demand less of the risky asset. Whether or not you end up investing more in the risky asset depends on the relative strength of the income and substitution effects, which pull in opposite directions in this case.

AB 5   (a) Not a Veblen good if the behaviour simply reflects new information about product quality; is Veblen good if people simply responding to what is fashionable. (b) Veblen good (unless people think Madonna has the best financial advisers in the world!). (c) As in previous answers, depends whether people think Rick Stein is certifying quality based on his expertise, or whether he is certifying that other people like you will also think it is trendy.

Chapter 6

1   (a) Expenses higher and pre-tax profits lower by £70 000. (b) Accounting profits change; economic profits unaffected since firm charges the opportunity cost of the money tied up in owning the office (the rental it could have got!). (c) More revenue and hence more profits.

2   Opportunity cost of owner is £40 000 and of money tied up is £24 000.

3   (a) Inventories are extra assets, extra borrowing is liability. (b) Interest on loan is a cost.

4   (a) Maybe, if we mean profits over a long period. But since managers can only be monitored imperfectly, they have some scope to pursue other aims. Profit-related bonuses and fears of takeover help keep this in check. (b) Some of these may be sound investments. Some may not. Firms tend to sponsor things popular with the board not the shareholders.

5   With an extra fixed cost of £40, 6 is still the best output level in the short run. MC and MR are unaffected. In the long run the firm is losing money and should close down.

6   (a) MR is horizontal at £13. MC is as in Table 6.4. (b) 7 units.

7   (a) They may not cover opportunity costs. (b) $MC = MR$ whenever a firm succeeds in maximizing profits. (c) Sales maximized when output expanded till $MR = 0$. Last units then fail to cover marginal cost.

8   The demand curve is kinked at an output of 50 and a price of $50 million, being flatter to the left of this point and steeper to the right of it. The corresponding marginal revenue schedules lie below these respective demand schedules but at an output of 50 the MR schedule from the left-hand demand schedule lies above the MR schedule from the right-hand demand schedule. Hence, as the firm increases output, its MR experiences a discontinuous downward jump at the output of 50. For more on the kinked demand curve, see Chapter 9.

9   (a) No change. (b) No change. (c) By reducing future total profits, a future tax reduces the payoff to investing in costly measures today in order to shift cost curves down in the future. If cost curves are different from what they would have been, profit-maximizing output is likely to be affected in the future.

AB 6   (a) A way to maximize post-tax profit is to maximize pre-tax profit – no effect on chosen output. Same answer if examine marginal profit from increasing output. At optimum output, marginal profit is zero so profit tax has no marginal effect and hence no effect on the profit-maximizing output. (b) With higher marginal cost at each output, at the previously optimal output, $MC > MR$ and hence tax makes firm reduce output.

APPENDIX: Answers to review questions

Chapter 7

1 (a) Maximum output obtainable from specified bundles of inputs. (b) Also need to know prices of inputs and of output.

2 (a) Falling *LAC*. By spreading fixed costs. (b) Columns 1, 3 and 6 are cheapest way to make 4, 8 and 12 units of output. Total costs are 33, 64, 96. Average costs are 8.25, 8 and 8. (c) There are scale economies in raising output from 4 to 8, and constant returns to scale in going from 8 to 12.

3 (a) Column 1 more capital-intensive than column 2; column 3 more than 4; column 5 more than 6. (b) Away in this example.

4 (a) At output of 4, would switch from column 1 to 2. (b) Both must rise (life is harder).

5 (a)

Q	0	1	2	3	4	5	6	7	8	9
MC	0	15	13	11	9	10	10	11	13	16
AC	–	27	20	17	15	14	13.3	13	13	13.3

(b) At $Q = 8$, minimum AC = MC. (c) Short run. In the long run, the cost of a zero output is zero.

6 (a) If covering variable costs in short run. (b) No, it exits.

7 (a) May cover short-run variable costs. (b) Not if diseconomies of scale. (c) Not if economies of scale.

8 They must be expected to make profits in the future sufficient to cover any losses today. They are borrowing or receiving injections from shareholders. Possible reasons for optimism about the future – lower oil prices (?!); opportunities in China and India; taken over by private equity who can run the companies better (?); too big to fail, and government will have to help them write off their debts at some future stage.

9 If $MC = 0$ forever, no limit on the size of the firm since no disadvantage in getting ever bigger, so one firm likely to break away from the others and become a giant monopoly. Once it has sufficient market power and customer advantage, it may be able to prevent others entering the industry and prevent excess profits being competed away. In which case, price can be set above MC by the eventual survivor. Alternatively, MC begins to rise with large scale and so do prices, and industry equilibrium allows all surviving firms to cover all their costs.

AB 7 (a) In period 2, the cost of the machine is a sunk cost and should not enter calculation of marginal cost. (b) Since the machine ties the two periods together, the smart way for the firm to think in period 1 is not to make a single-period decision but to make a decision over the two-period horizon, foreseeing how it will itself behave once period 2 arrives and it then has a low MC schedule because the machine by then is a sunk cost. Forecasting its own period-2 behaviour, it can decide in period 1 what the marginal benefit of the machine is over the two periods and choose output and investment accordingly in period 1. Tough question!

Chapter 8

1 (a) Industry demand shifts down, price and quantity fall, firms lose money but may cover short-run variable costs. Eventually, enough firms leave the industry to restore original price at lower aggregate output. (b) Now industry *LRSS* curve slopes up too. In long run, higher cost firms leave the industry, and equilibrium has lower price, fewer firms, lower total output.

2 Supply curve shifts up in short run, raising price and reducing quantity. In the long run, new entry reverses these shifts.

3 (a) Imports if domestic supply and demand intersect above world price, exports if they intersect below it. (b) Domestic price rises, so domestic output rises, domestic demand falls, and imports fall.

4

Q	1	2	3	4	5	6
P	8	7	6	5	4	3
TR	8	14	18	20	20	18
MR	8	6	4	2	0	−2

Monopolist has Q = 2, P = 7. Competitive industry Q = 4, P = 5.

5 No effect. MC and MR unaltered, and profits still positive.

6 (a) Normal profit rewards all inputs properly. (b) Not if lose scale economies and raise costs.

7 Free entry and exit allow us to think about each period separately. Once exit is costly, the firm has to make a long-run decision from the outset. Even though profits are available during the period after an entrant joins the industry, the entrant has to think about how many periods it will be in the industry and whether the cumulative profit is sufficient to pay the costs of exit at the end. Clearly, entrants may not bid profits down to zero in the long run. Existing firms therefore have a degree of monopoly power. Perfect competition is no longer possible.

8 It turns out that the absolute value of the inverse of the price elasticity of demand *PED* equals $(P - MC)/MC$. The more inelastic is the demand curve that it faces, the larger the monopoly power of the firm. The easiest way to prove this is mathematically. $MR =$ change in $PQ = P + Q \, (dP/DQ)$ where the second term is the reduction in existing revenue caused by having to cut prices to sell more output. Noting that $MC = MR$ at profit-maximizing output, we have $MC/P = 1 + (1/PED)$. Hence $(MC - P)/P = 1/PED$. Remember, price elasticities are negative, we can multiply both sides by −1 to get the result. For readers without knowledge of calculus, remember this was a harder question! We do not use calculus anywhere in the text. The intuitive idea that a more inelastic demand curve allows a firm to raise prices more above marginal cost makes perfect sense even without all the maths.

AB 8 (a) No real difference. (b) If overt price discrimination undermines the ability to charge premium prices to premium customers, a monopolist will always reconsider the wisdom of price discrimination in different markets. (c) Not interesting to look at profit margins on drugs that do succeed, since these successes need to pay for all the failures or the firm will leave the industry. Better measures are overall profits over a sustained period, or perhaps the long-run performance of the share price relative to the stock market as a whole, which should reveal what the market thinks the answer to this question is.

Chapter 9

1 (a) $Q = 4$, $P = 7$. (b) Same again. (c) Because each firm has $MC = 3$, but will face $MR > 3$ if it alone expands: price will not fall so much since other firm not expanding too.

2 (a)

Q	1	2	3	4	5	6	7
P	8	7	6	5	4	3	2
TR	8	14	18	20	20	18	14
MR	8	6	4	2	0	−2	−4

Z makes Q = 3, whereas in 1(b) dividing the market in half, Z made Q = 2.

3 Certification by a reputable agency saves customers the cost of checking themselves. For mechanics, after a bad experience, you can go elsewhere. Reputation helps solve the information problem. (b) For doctors, you might be dead after a bad experience.

4 A few convey new information. Many erect entry barriers.

5 Agreeing policy with a second parent may have this effect, since you then look silly if you depart from the agreement.

6 (a) Cannot police cheating on the collective agreement. (b) Deterring entry raises profits on existing output.

7 The only smart guesses about rivals' responses are ones that are profit-maximizing for them. This rules out many guesses about how they might react. Sometimes, it leaves only one guess.

8 Governments can (a) adopt and invoke international rules, such as EU or World Trade Organization prohibitions on subsidies; (b) adopt and invoke budget rules that make it harder for them to find the money; or (c) build a reputation for being tough by being seen not to bail out in other situations

AB 9 (a) No. (b) Yes. (c) Yes.

Chapter 10

1 (a) Other inputs are fixed. (b) Shifts labour demand curve up.

2 (a) Substitution effect means work more, but income effect means work less since leisure a normal good. (b) More people join labour force.

3 Industry has to pay extra to attract workers from other industries.

4 (a) Top golfers in scarce supply, but big demand. (b) Economics students have more human capital relevant to high-paying jobs.

5 (a) Since people like it, demand is high; and nobody else can supply it. (b) Income effect means want more leisure.

6 In a competitive labour market, a minimum wage below the equilibrium wage has no effect. Above the equilibrium wage, the higher the minimum wage, the higher the point on the labour demand curve and the lower the level of employment. In a monopsonistic labour market, a minimum wage above the intersection of labour demand and the marginal cost of labour to the firm simply moves the firm up its labour demand curve and again reduces jobs. A minimum wage set at a level between *MC* of labour and the wage needed to elicit that level of labour supply will actually increase equilibrium employment. A minimum wage sufficiently low simply reduces labour supply again (see Box 10.5).

7 People who pass tough degrees reveal that they are smart and work hard, general skills that are of use to many employers. University may also allow people to develop valuable networks of friends and contacts of like-minded people that will prove valuable later on. None of this says that if you *also* study for a subject of direct use to a future employer you will not be even more valuable!

AB 10 (a) Since students will increasingly find themselves working for global companies, learning about and learning in other countries may well be valuable. (b) US universities have a long tradition of fundraising that has built up endowments that can be used to support scholarships. The culture of giving is much less developed in Europe where the state has played a larger role in funding education. (c) Institutions such as the Bank of England should attract talent from as broad a pool as possible. Sometimes, for example in the Ministry of Defence, there may be more sensitivity about nationality.

Chapter 11

1 Lose £30 000 while training. Future salary of £23 000 for 30 years repays this.
2 Restrict entry by tough exams and insisting on long working hours.
3 Yes.
4 Wages fall if less monopoly profit for unions to chase after. Larger unions would help restore workers' bargaining power but might prevent gains from competition being realized.
5 (a) Not if there are systematic reasons for women to acquire fewer attributes valued by firms. (b) Neglects the opportunity cost of wages forgone while in education. (c) Not if poor are disproportionately represented in unions in the first place.
6 For the same initial reward, you prefer general skills because they have more applications and it is less risky to be dependent on one particular firm. Firm needing specific skills could pay for training or pay a wage premium each year to the trained. Should prefer the latter since the firm too faces risks (e.g. you might have a car accident, making it impossible for the firm to recoup the cost of training).
7 (a) People in Vanuatu may consume high quantities of environmental goods that are unmeasured and excluded from conventional GDP. Proper data on environmental capital and consumption of environmental services might mean that Vanuatu was richer than you thought. Same for leisure, of which they also have lots. (b) If people care about relative incomes, then general income rises do not create extra utility and happiness. Suppose this is true. It would take higher *relative* wages to get people to work harder. Just as we get an arms race when it is relative military power that counts, a free market would lead to wage escalation as each firm tried to outbid the rest only to discover that, once all workers had high wages, nobody wanted to work after all since nobody had wages that were high relative to others. The government might then have to step in to organize multilateral wage reduction!

AB 11 (a) Adverse selection. (b) Signalling. (c) Screening. (d) Screening. (e) Signalling. (f) Signalling.

Chapter 12

1 (a) Some flows of consumption services are provided most efficiently by buying consumer durables. (b) The laundrette costs £104 a year. Buying costs £52 a year + £40 interest forgone. Better to buy.
2 You make 20 on every 90 you put in, about 22 per cent a year.
3 (£3600 × 0.91 = £3276) + (£12 600 × 0.83 = £10 458) × £13 734. Buy it!
4 It raises the present value of the existing stream of rentals, raising the incentive to build more capital assets. This slowly reduces the equilibrium rental on capital until long-run equilibrium is restored.
5 The land demand is a derived demand. If supply is fixed, only a rise in demand for land can bid up land prices. Tenant farmers face higher rentals but extra income from their crops is what started the process. Farmers lose in land prices and rentals bid up by higher demand for housing.
6 (a) It also makes future nominal income rise. (b) Higher labour productivity and wage income also raise the demand for goods. (c) True if only one possible user. Competition between users is what bids up the price.
7 Generally, by fostering trade and demand, the derived demand for land will rise, implying an increase in the price of land and other commodities (e.g. metal ores, oil) in relatively fixed supply.

However, there are also losers from globalization. Suppose Chinese textiles, based on cheap labour in China, displace European textile production from regions such as Lancashire. Other things equal, the demand for Lancashire land, and hence its price, falls.

8 (a) Running the pension scheme is easy when there are lots of young workers paying contributions and few retired people making claims. (b) Contributions must rise, pensions fall, or both. (c) Extending the retirement age would mean more workers paid in for longer and there were fewer retired people to support. Otherwise, the government has to live with the situation or increase taxation on some population group to finance the gap between contributions and payments.

AB 12 (a) Use a zero discount rate on future utility. (b) A unit of additional future consumption yields less benefit than a unit of current consumption: using a positive discount rate for future consumption reflects this. Conversely, if the burden of global warming reduces the utility of future generations below that of current generations, the consumption of future generations should then carry more weight than current generations (a negative discount rate!). (c) At least as high a rate of return on environmental investments as investment in physical or human capital.

Chapter 13

1 A is risk-neutral, B risk-loving, C risk-averse. C insures most.
2 High. Adverse selection. Low-risk people are happy to be screened.
3 (a) Yes. (b) No. (c) Yes.
4 Negative beta: you do well in a slump, when other shares are doing less well. Your shares have high price and low expected return.
5 Fear of moral hazard – being exploited by people with better information – prevents *others* from dealing in shares.
6 (a) If all available information is already in the price, by definition only new, as yet unavailable information, can change the price. (b) Risk-pooling reduces the premium they need to charge. (c) Volatile shares are valuable if they have a negative beta!
7 You buy insurance because its payout is negatively correlated with other risks that you face, thereby reducing your total risk; you occasionally buy lottery tickets for fun despite knowing that this is an unfair gamble; and you may be tempted into risky investments either because they have low beta or because, despite their risk, their expected return is so high that it compensates for the extra risk that you take on.
8 If risk did not matter, the only equilibrium in which people would hold gold and equities is if they had the same expected return. Buying gold today at £100 you would need to expect the price next year to be £105 if this was to be as good as buying equities with an expected return of 5 per cent. (b) If gold has a negative beta, then including some gold as well as equities in your portfolio reduces the total risk of your portfolio. Since gold performs this valuable function it can pay a bit less than 5 per cent expected return and still leave you happy to hold it. So a good answer is that next year's expected gold price is, say, £103 or £104.

AB 13

Outcome	Asset price			Portfolio value		
	(a) FTSE index	(b) Low beta asset	(c) High beta asset	A ½ of (a) + ½ of (b)	B ⅓ of (a) + ⅔ of (b)	C ½% of (a) + ½ of (c)
Boom	120	90	150	105	100	135
Normal	100	100	100	100	100	100
Slump	80	110	50	95	100	65

Chapter 14

1 All three.

2 Bundling.

3 SEAT, Skoda, VW, Audi (all the same firm); regular and executive lounges in airports; standard and luxury Christmas pudding.

4 Output is higher, and those previously unwilling to pay the uniform price now do better. Those willing previously to pay it do worse, since face a higher price.

5 Cartel makes a standardized product. Strategic alliance makes a range of products that have strong complementarity.

6 (a) $MC = 0$ so price should be low. Some free pricing also to entice people into usage before prices then raised. Advertising may also support free prices, as with ITV. (b) Total benefit to consumers rises because larger area under the demand curve when output expands. (c) High share prices could reflect expectations of high future profits.

7 You must have argued that the benefits of scale economies, incentive to invest and hence cost reduction outweigh the abuse of monopoly position (high prices, making access difficult for competitors who need to make use of Microsoft platforms); and that the threat of a future investigation would be sufficient to prevent Microsoft taking too much advantage of its market power.

8 (a) Even though everyone benefits if everyone joins, individuals may fear others will not join (because they fear others will not join) – hence two possible equilibria: everyone joins or nobody does. (b) Subsidy of 1 per person would be sufficient, since then nobody loses by switching, whether or not anyone else switches. (c) Now problem complicated by fact that men have no gain from switching. May need to subsidize them by more than 1. (d) Might offer contingent contracts that become binding *only* if everyone switches. Then in principle could make extract a payment from women (for whom benefit of switch is large) in order to bribe men to switch.

AB 14 (a) Versioning. (b) Versioning but also different MC of supply (cheaper when gym not congested). (c) Versioning. (d) Different MC. (e) Bundling.

Chapter 15

1 (a) Efficient, not equitable. (b) Neither efficient nor equitable. (c) Both efficient and equitable. (d) Not efficient nor very equitable. (e) Efficient not equitable. Equitable asks 'How fair is distribution?'.

2 (a) 1 film worth 5 meals to consumer utility. (b) MC of films five times that of meals. (c) MP_L in meals five times higher than in film. Equilibrium equates MSC and MSB.

APPENDIX: Answers to review questions

3 Yes to all questions.

4 No. By insuring boilers they certified removed any incentive to be bribed to falsify certificates, reducing moral hazard.

5 (a) Such activities waste scarce resources. (b) Yes.

6 (a) For further pollution reduction, marginal cost exceeds marginal benefit once pollution already low. (b) Monopoly, externalities, etc. are important market failures. (c) Government failures also occur.

7 Climate change does not affect a single individual, but rather a region or the entire planet. We discuss public goods in the next chapter. Essentially, if everyone gets the same quantity of the good then we need to sum the individual marginal benefits to get the total marginal benefit. And we need to add these up across current and future generations, discounting the future as we think appropriate.

8 The general principle is that things in inelastic supply or inelastic demand should be taxed more heavily for efficiency reasons. Hence (a) low, (b) high, (c) average, (d) high, not merely because of inelasticity but also because redressing an externality. Taxing some foods may be a bad idea on equity grounds, but that is a separate matter.

AB 15 (a) Separate nation states may free ride, hoping others save the planet. A world government can internalize all the benefits of costly action. However, governments need consent to rule. Outbreaks of nationalism, from Scotland to Kurdistan, remind us that large remote governments can also run into difficulties. (b) Externalities made it hard to establish markets in pollutants, though governments are now working hard to remedy this; and missing markets for future goods mean that future generations cannot express their purchasing power today. (c) Depends a lot on whether, despite global warming, future generations will be richer or poorer than us because of other technical and productivity advances – the richer they are relative to us, the harder it is to make the case for our bearing a lot of pain; conversely, if some aspects of climate change are irreversible (e.g. if Greenland melts) the case for action today is high because future welfare will be low otherwise. (d) Quotas achieve the outcome but inefficiently since there is no mechanism to equate marginal cost of cutbacks across different polluters; taxes or an induced market for carbon might be more efficient but create uncertainty about whether the overall target is achieved. Best may be tradable quotas (see Section 15.6).

Chapter 16

1 All except d.

2 Education a merit good (people do not know what is good for them); externalities (we like educated people to interact with); equity (helps promote equality of opportunity).

3 Vertical equity says take from the rich and give to the poor, but should not assess just income: ideally want to redistribute from the person getting more of all goods that they care about. Horizontal equity says treat all sunworshippers in a similar way.

4 All progressive except tax on beer, which is a larger share of poor people's income.

5 18, 24, 28.8 per cent. It is progressive, and more so the higher the exemption level. With an exemption of £1 million, the tax would only hit the rich!

6 (a) What about finance of public goods, offsetting externalities, provision of social insurance, redistribution? (b) Marginal taxes usually create distortions. (c) We can analyse the incentives for politicians to choose particular policies and for voters to elect particular parties, and hence analyse political equilibrium.

7   (a) No change in labour supplied, so no distortion triangle; burden falls on workers whose post-tax wage falls. (b) Big triangle, and firms now bear most of the tax (cost of labour rises by almost whole amount of the tax). (c) In between these cases.

8   (a) Hypothecation means that there is little welfare redistribution across groups as a result of the tax and spending policy. When politicians change things, there are winners and losers. Winners usually smile quietly, losers shout loud and make trouble. Politicians sometimes want a quiet life, or to spend their political capital on a different project. (b) Economists abstract from the political difficulties in introducing policies, and prefer to keep open the option of redistribution. Moreover, hypothecation makes no reference to efficiency since it does not assess marginal costs and benefits. The purpose of a congestion charge or tobacco tax is to reduce an activity of which too much is produced and consumed.

AB 16   (a) Party leaders prefer prospect of power to the adoption of a political position that they happen to think correct (and party members have elected leaders with these attributes). (b) Smart politicians will each locate in the centre. (c) Now locating too centrally risks losing some extremists, who will abstain from voting. How close a party should locate to the centre depends on how many votes it loses on the extreme versus how many it gains by being closer to the centre. Political equilibrium should now have some clear blue water between the two parties with neither contesting the exact centre ground. And of course all this presumes voter opinions are equally spread. If there is a big cluster of voters a third of the way from left to right, this is where the median voter will be. Parties will be trying to locate near here even though it is not halfway from left to right.

Chapter 17

1   Triangle has height of £3, and length of 200 000. Hence cost is £300 000.

2   The triangle now has height £6 and length 400 000, a cost of £1 200 000. In addition, 600 000 units are now produced at £1 more than is really necessary. Total social cost £1 800 000.

3   In essence, US presumes large size is bad, and tries to break up big firms, or regulate them if they cannot be split up. UK policy used to be on a case-by-case basis, but now increasingly emphasizes the promotion of competition.

4   Much of the promotion of small firms rests on the belief that a dynamic economic is always experiencing births and deaths, that tomorrow's successes will not all come from today's incumbents. What is the market failure? In part this might lie in the short-termism of financial markets, but the question is why governments can pick winners any better than banks and other lenders to small businesses. We would all like the consequences of successful small firms, but promoting small firms can lead to more failure as well as more success.

5   Locational externalities. But the entire cluster locates in a sensible place. High-wage Switzerland is not a good place for labour-intensive businesses.

6   (a) Profit may just reflect monopoly power. (b) Benefits of scale economies and incentive to innovate sometimes outweigh the other costs of monopoly. (c) Private benefit of mergers may include monopoly profits, which are a social cost.

7   (a) Private equity funds persuaded the market to lend to them long term (10 years at a time) so that they themselves could pursue management strategies requiring longer to pay off, thereby remedying a market failure caused by the normal failure of financial markets to be able to commit to the longer term; argued that they obtained synergies in learning how to manage portfolios of companies and projects rather than a single company; and were accused by their detractors of

breaking up viable bundles into their constituent parts for sale bit by bit. (b) Since PE funds get their finance by borrowing from the market – in effect they have much more debt and much less equity than normal companies – they are sensitive to panics in the debt market that either raise substantially the interest rate at which PE funds can borrow or impose credit rationing on PE firms.

8 (a) In principle, the UK would make a social profit if it subsidized Ferrari by anything less than the value of the beneficial externality that Ferrari's move to the UK would create. (b) Two reasons we should not expect the private sector to be as effective as the government in organizing a relocation bribe: (i) each private firm wants a free ride on the others, so none contribute, (ii) in a dynamic setting in which Ferrari's move enticed yet more inward moves, which in turn enticed yet more, not all those benefiting from the Ferrari move are incumbents, there are also future incumbents who are unrepresented today in any bribe gathering (c) If Italy has a cluster of expertise around Ferrari's current location, Italy will suffer an adverse externality if Ferrari moves; expect retaliation from the Italian government. It is partly to prevent costly bidding wars between member states that the EU generally outlaws state aid to private firms.

AB 17 (a) If scale economies matter enough, breaking Yell up means losing the advantage of lower costs. (b) You would gather evidence on whether people use *both* the internet *and* print directories, or whether internet surfers have thrown away their print directories; you would ask firms who advertise in directories, and keep track of where they get their own new customers from, about trends in their customer responses about how people first heard of them.

Chapter 18

1 Two-part tariff yields more revenue. It cannot discriminate between existing members, can at least do so between old and new ones.

2 BA faces stiff competition. OFAIR not needed.

3 Commuters travel when MC high and ideally should pay more; but big congestion externalities on rush-hour roads could easily justify cheap rail tickets. First best is to tax the externalities appropriately (properly price car use and parking).

4 Big externalities – it helps other industries that do not use the tunnel. Could be socially desirable even if privately unprofitable.

5 (a) Encourages inward investment to build cars, only some of which exported through the tunnel. (b) Social risk premium smaller than that charged by banks (better risk-pooling and risk-spreading). (c) Reduces congestion at Heathrow and Gatwick. (d) Reduces noise pollution near these airports. (e) Provides jobs for involuntary unemployed construction workers who would otherwise make nothing.

6 (a) Might have lowest possible cost curves and be pricing at marginal cost but still losing money because $MC < AC$. (b) Might have more incentive to reduce cost curves. (c) If scale economies not too important, breaking up a large company may in fact be the easiest way in which to regulate conduct by inducing effective competition.

7 Cost-plus gives less incentive to keep costs down but prevents companies getting terrified by all the risk they bear (for which they have to charge). Fixed-price makes companies bear all risk (so raising the tender price they charge) but gives them bigger incentive to keep costs down (since they get all the benefits). Former better if little prospect of cost escalation, because easy to monitor management but large 'exogenous' uncertainties.

8   The congestion part suggests it should be expensive to use bottlenecks in the rush hour, but perhaps free to use them at 3am when nobody is around. So different streets need different prices, and these prices ideally would vary by time of day too. The issue is how users would be informed. Unless they can continuously detect the price of streets, some simplification of this system would be needed. The pollution part entails two issues. First, one might want to charge different amounts for different vehicles depending on their emissions (which themselves vary between stop-start and cruising at 60 mph. Second, you might want to think about noise pollution. Congestion arguments suggest we want inner city shops to receive truckloads of goods at 3am, but if you live nearby you might object to being woken up. Your pricing scheme needs to trade off these different issues.

AB 18   (a) Paying-up front puts the whole cost in the current year budget. Using PFI/PPP means the payments are spread over many years. If the public finances used comprehensive accounting, these future liabilities would appear in current estimates of public sector debt, but in current system they do not. (b) A given set of risks can always be traded in financial markets and sold for a fair price. However, nobody will trade risks that can be affected by one of the parties that has inside information about its own behaviour. As with defence procurement, these latter risks probably need to be shared by contractor and government.

Chapter 19

1   (a) $1000 - 120 = 880$.
2   (a) £250 bn. (b) National income is net national product at basic prices. Depreciation is part of the cost of producing output. (c) They reduce the purchasing power of a given gross income.
3   (a) 210. (b) 310. (c) 1870. (d) Yes, if imports exceed exports.
4   (a) 2200. (b) 10 per cent. (c) In this example, also 10 per cent.
5   (a) Leisure is lost but investment in human capital occurs. (b) No – just a transfer payment. (c) Yes. (d) Pollution should ideally be subtracted from GNP.
6   (a) Just a transfer payment, not real output. (b) Might conceivably be undesirable if achieved by very unequal income distribution. (c) Only because people compare nominal receipts. In real terms, *Gone With The Wind* wins by a mile!
7   The place to start is that by taking leisure people reveal that this is at least as valuable to them as working more, provided they have that choice in the first place. For all such people, you would have to decide how many hours a day are the fixed cost of being alive – for sleeping, eating, washing, etc. – and hence how many hours could potentially be allocated between work and leisure. Knowing something about national wage rates and hours of work, you could have a stab at valuing total leisure hours. Some complications: (a) all the people who do not have the choice of working or not – the young, the sick, those caught in a poverty trap; (b) the distinction between those working but choosing some leisure and those on benefit schemes who simultaneously get money and leisure; and (c) how to treat parents who stay at home to look after children. Even so, it would be possible to make a guestimate.
8   Disentangle some things: (a) the nominal price has been constant therefore the real price has fallen a lot; (b) quality has improved hugely over the period. To explain both of these simultaneously, there must have been a lot of technical progress. Deciding how to revalue goods because of their superior quality is just one of the headaches of a statistician working on the national accounts.

APPENDIX: Answers to review questions

AB 19   (a) It does not – that is why it is *gross* domestic product. (b) Net domestic product or net national income would include a deduction for capital depreciation. (c) Fairly rough and ready – assuming e.g. a lifetime of 5 years for a TV, 10 years for a car, 25 years for a factory, and writing the initial value off steadily over the period. (d) Would need to estimate the value of the stock of environmental capital – green fields, fresh air, temperate climate, etc. – and then decide each year whether reduction caused by humans (pollution, etc.) was more or less than investment made by humans (land improvement, lower emissions, etc.). (e) In practice, the best way to estimate the capital value would probably be to estimate the annual consumer benefit (e.g. of green fields) and then work out the present value using a suitable discount rate.

Chapter 20

1   (a) Intercept = 40, slope = 08. (b) Destocking. (c) 200. (d) Yes: $40 = 0.2 \times 200$.
2   (a) 75. (b) 45.
3   (a) Equilibrium income falls from 500 to 200. (b) $I = S = 100$. Saving is unchanged, but rises from 20 per cent to 20 per cent of income because income falls.
4   Unplanned investment (which may be positive or negative).
5   (a) 2000. (b) $200/(0.3) = 667$. Lower.
6   (a) Investment is independent of saving, and higher saving reduces aggregate demand. (b) Because $MPC < 1$, each fall in output causes a smaller fall in demand, so the process eventually comes to a halt.
7   In the simple model of this chapter, the multiplier $1/s$ is always greater than +1, since $0 < s < 1$. However, in later chapters, when we introduce leakages other than saving, the combined leakages may then be sufficient to reduce the multiplier below unity.
8   The paradox of thrift relies on output and income adjusting to restore desired injections and desired leakages. In the model of this chapter, that can always happen. Once we reintroduce aggregate supply, and in particular a maximum capacity for the entire economy, it is possible that there is an output ceiling above which output and income cannot go. The paradox of thrift might then be frustrated.

AB 20   (a) and (c) are shifts in *AD*, but (b) is a movement along a given *AD* schedule.

Chapter 21

1   (a) 120. (b) Output rises by 250 to 1250. Consumption rises by 200 to 1000. Investment is 130 and government spending 120. (c) $Y = 1250$, $C = 1000$, $I = 80$, $G = 170$. (d) $Y = 1200$, $C = 960$, $I = 80$, so $G = 160$.
2   Of each extra pound of national income, 0.6 goes in extra consumption, 0.15 in extra saving and 0.25 in extra taxes. Multiplier = $1/(0.4)$. Equilibrium income rises £15 bn. Taxes rise a quarter of this, so budget deficit increases, since extra *G is* £6 bn.
3   In equilibrium, desired leakages equal desired injections. Desired *S* and *I* equal only when no government and no foreign sector.
4   Because eventually it would be unable to afford the interest payments on its huge debt. *You* cannot pile up huge debts either!
5   (a) EU exports fall, inducing EU slump and lower EU imports. EU trade balance worsens.
6   (a) Wrong because of balanced budget multiplier. (b) As an identity, $(X - Z)$ always equals $[(T - G) + (S - I)]$.
7   Debt is a stock and a government liability; GDP a flow and a potential source of tax revenue. The

economic variable that connects real stocks and real flows is the real interest rate. If real interest rates remain constant, changes in the debt/GDP ratio do tell us what is happening to the indebtedness of the government, but if real interest rates doubled, it would take much larger GDP and tax revenue to service any given amount of debt.

8 The multiplier can be written as $1/[1 + s(1 – t) + z]$ so any values of (s, t, z) making the denominator equal to 1.5 will imply a multiplier of 2/3. For example, $z = 0.45$, $s = 0.1$, $t = 0.5$.

AB 21   (a) Because fluctuations in income alter tax revenue. (b) Could be useful, although regular IMF reports on individual countries perform some of the same function. (c) Bond markets would experience price falls and long term interest rates would rise. (d) Government investment today adds to output and potential tax revenue tomorrow, and hence is close to self-financing from a long-run government perspective. (e) Clearly it is hard to draw a line, especially if the government believes education is the most important investment that it can make!

Chapter 22

1 (a) No. Cannot be retraded indefinitely. Nor is it pure barter unless new car has same monetary value as old. (b) Watch which is then retraded, not swallowed.

2 (a) Same value. (b) More valuable as money. (c) Less valuable as money, for example because more efficient token money now used.

3 By simultaneously creating loans and deposits to match, without requiring a cash injection.

4 (a) No. They are not subsequently retraded repeatedly. (b) No. (c) They reduce your demand for money, but do not affect supply: credit card stubs cannot be reused to purchase other goods.

5 $M0 = 12 + 2 = 14$, $M4 = 12 + 30 + 60 + 20 = 122$.

6 (a) Most of money supply is bank deposits, a liability of banks. By simultaneously expanding both sides of their balance sheet, banks increase the money supply. (b) If people put less cash in banks, banks less able to multiply up reserves into deposits.

7 Small, since opportunity cost of holding bank deposits hardly affected by rises and falls in general level of interest rates.

8 Credit cards allow you to temporarily postpone when you pay – and by affecting the synchronization of receipts and payments may therefore affect the demand for money – but do not themselves affect the supply of money.

AB 22   (a) Because cash is liquid and can be used to make transactions; also riskless and hence may be valuable as an asset. (b) The key difference between debt and equity is that equity never has to be repaid and firms can vary the level of dividends that they pay each year – in a bad year the firm can make zero dividend payments. If all its financing was debt, it might (often) be unable to meet the required interest payments and have to declare bankruptcy. (c) In exchange for absorbing this degree of risk, investors in equities demand a rate of return that on average exceeds the return on debt by several percentage points a year, though because of capital gains and losses of volatile share prices this is only true on average – particular years can be much better or much worse.

Chapter 23

1 (a) Bank of England gives cheque to Barclays in exchange for cash. Bank has now fewer securities (assets) but equivalently fewer liabilities (cash in circulation). Having lost cash reserves, Barclays has a multiplied reduction in deposits, and corresponding change in loans on the other side of its balance sheet. (b) Money supply falls by more than original open market operation. (c) No difference if pay in cash (unless changes public's desired ratio of cash to deposits).

2 The money multiplier is now 1. Money supply falls only by the value of the open market operation. No additional deposit and loan contraction at Barclays.

3 If monetary policy cares about inflation and output, but takes time to affect them, then whatever things are observable today are known to be reliably correlated with future inflation and output. This includes past values of inflation and output themselves, some financial market data (which comes out fast) and survey data on business and household confidence.

4 Initially, consumption function shifts up: spend more at each income. However, once debts accumulate, more income goes on paying interest and less available for buying goods. Consumption function eventually shifts down again.

5 Reduces present value of future profits, and hence benefit of investment. This is true whether financed by bank borrowing, new share issues or out of retained profit (when what changes is the opportunity cost of the funds employed).

6 (a) Can control money supply by relying on 'normal' reserve ratios banks want anyway. However, central banks prefer to set interest rate and supply the money the market then demands. (b) Cash pays no nominal interest. Its real return is simply $-\pi$ where π is the inflation rate. (c) Sensible if expected future incomes have risen sharply.

7 Households and firms may be locked into previous plans, may take time to re-evaluate decisions and may wait to see if the interest rate change is permanent.

8 Households should raise consumption only in response to rises in permanent income. In the long run, most changes in income are permanent, especially in the aggregate. In 2007 the UK was a lot richer than in 1907, and in 2008 it will be a lot richer than in 1908. In the short run, however, consumers are never quite sure whether an income increase is temporary or permanent, and hence increase consumption by less than their actual income has risen.

AB 23 (a) Provided interest rates affect aggregate demand – the subject of the next chapter – higher interest rates can be used to restore aggregate demand to its original position, whatever the initial shock. (b) Ideally, monetary policy should be looking two years into the future to anticipate what is going to happen to aggregate demand and respond in advance. (c) Yes, especially if its mandate is to put inflation first whenever this conflict arises.

Chapter 24

1 It adds little to permanent income, so consumption demand changes little.

2 (a) *IS* shifts up. (*b*) *LM* shifts right under a Taylor rule. (c) No effect under a Taylor rule.

3 Horizontal *LM*. Whatever the small country's output, European Central Bank sets the single interest rate based on whole euro area, which is hardly affected by small country. Its *LM* shifts when ECB changes interest rates.

4 For Euroland, *LM* slopes up. If small country behaves like the Euroland aggregate, its output is only high when Euroland output is high, so *LM* slopes up even for the small country.

5 (a) Automatic stabilizers work at fixed tax rates. (b) If output was lower, there would have been no reason to raise interest rates, but then there would be no reason for output to fall.
(c) Consumption and investment demand based on assessment of long run.

6 (a) An expected rise in short-term interest rates may already have been built into the long-term interest rate at which households borrowed. However, an unexpected rise in short-term interest rates – for example, because new adverse information about inflation has recently become available – will leave existing borrowers unaffected, at least until their long-term loan matures and they have to renew it. Hence any given rise in short-term interest rates has less effect on aggregate

demand. (b) Hence the central bank has to raise interest rates by more in order to have the same effect. In practice, this means less effect via consumption demand and more effect via investment demand and perhaps via exchange rate effects (see Chapter 29).

7   This means real interest rates *fall* when inflation *rises*, and hence monetary policy should exacerbate departures from the inflation target rather than correcting them. (b) If inflation is nevertheless fine, the central bank must be getting some help from somewhere else, probably fiscal policy. For example, if the tax system is not inflation-neutral, higher inflation may raise real tax revenue and dampen aggregate demand – this might occur if nominal capital gains are taxed, if higher income tax thresholds are not inflation indexed. Moreover, the fiscal authorities may either have powerful automatic stabilizers (high marginal tax rates) or be successfully pursuing discretionary fiscal policy aimed at stabilizing inflation, though this is likely to be less nimble than monetary policy.

AB 24   (a) 1998, 2000, 2007. (b) Expected future inflation. (c) Lewis Hamilton does not mind turning left and then turning right shortly afterwards; however his performance is very transparent and his skill easily assessed. Central banks need people to trust their competence, and may worry a bit more about the impact rapid reversals have on their perceived credibility. If so, they will deliberately err on the side of changing interest rates by small amounts so that the next change is likely to be in the same direction, appearing to add to their credibility. The better established their credibility, the more they might be prepared to change interest rates by a larger amount or to reverse a previous decision more quickly.

Chapter 25

1   (a) *MDS* shows how inflation affects aggregate demand via its effect on how interest rates are set. (b) Raises i^* to return *MDS* to original position. (c) Tighten monetary policy.

2   Vertical *AS* shifts right, *MDS* shifts up, equilibrium inflation unchanged. In practice, *MDS* shift likely to precede *AS* shift.

3   (a) Higher tax rate shifts it up. (b) Higher productivity shifts it down.

4   If all wages change together, in principle they could adjust quickly to a shock. When wage settlements are staggered, old wages, appropriate to old circumstances, affect where new wages are set, which in turn affect the next round of wage settlement, and so on, slowing down wage adjustment.

5   (a) With fixed nominal interest rate, higher inflation reduces real interest rate, and boosts demand: *MDS* still slopes down. *SAS* shifts up, so inflation rises and output falls. Subsequently, *SAS* shifts down when oil prices fall again, and back to full equilibrium. (b) and (c) still imply a down-sloping *MDS* schedule.

6   (a) Eventually, output restored to potential output. (b) Not in long run, unless potential output depends on inflation.

7   (a) Not unless the UK economy is so integrated with its eurozone partners that what is happening to the UK is also happening to the zone as a whole; eurozone monetary policy will react to aggregate eurozone data. (b) A UK boom, accompanied by inflation, would make the UK less competitive at its fixed exchange rate against other economies in the eurozone. Lower competitiveness would reduce net exports, reduce aggregate demand and bid down inflation. (c) If this process happens too slowly, fiscal policy could try to operate more counter-cyclically, either by designing more powerful automatic stabilizers or by discretionary changes in fiscal policy. But fiscal policy is quite difficult to adjust quickly and reversibly.

APPENDIX: Answers to review questions

8   (a) Serious supply side shocks such as higher oil prices and higher commodity prices caused by strong demand by China and other emerging market economies. (b) Not necessarily. If the Bank is never prepared to exceed the target, it will have to be ultra cautious, perhaps too much so. However, having exceeded the target, the Bank's credibility required taking corrective action strongly.

AB 25   (a) Statistical extrapolation of past trends and cycles requires only the macroeconomic data on output itself, is quickly implemented and easily conducted for many countries. An economist would think it a crude approximation. If there was a serious shock to the level of potential output, past extrapolation would stop working, but a statistician could always start a new extrapolation recognizing that other things were no longer equal. (b) A direct economic approach might try to use the level and rate of change of inflation to make inferences about the level of excess demand or supply, or might try to build up a more detailed model of aggregate supply based on inputs of capital, labour, technology, etc.

Chapter 26

1   (a) With zero inflation, in years 1–9 your income is £10 000, and interest payment is £4000. (b) In year 1, income £10 000, interest £204 000! By year 9, income £2 560 000, interest still £204 000.

2   Equal annual payments in nominal terms become declining annual payments in real terms. Inflation brings the real burden forward, may make early years impossibly difficult (later years very easy).

3   (a) When there is a change in real money demand, M/P, M and P grow at different rates. The imperfect correlation between money growth and inflation in the table reflects this. (b) In the long-run, if real money demand is fairly constant, sustained growth of money must be accompanied by sustained growth in prices and vice versa.

4   Initially, demand shock raises π and lowers U, supply shock raises π and raises U. Permanent demand shock has no permanent effect on U (since market forces or central bank restore aggregate demand to potential output), whereas permanent supply shock raises equilibrium U.

5   Those with fixed nominal income, those paying higher taxes because tax system not inflation-neutral, those lending at fixed nominal interest rate. For third group, if they anticipated inflation, they could set nominal interest rates appropriately higher.

6   (a) Not in long run. (b) Not if nominal interest rate adjusts to maintain real interest rate. (c) If nominal interest rate fails to keep up with inflation, real interest rates may actually be lower.

7   (a) Negative inflation of 3 per cent a year. (b) This would be first best but we live in a second-best world in which the government has few non-distortionary ways of getting the tax revenue that it needs. Rather than have heavy distortions in income tax or VAT it makes sense to keep these rates a little lower and earn a little bit on the inflation tax, thus achieving the optimal second-best compromise.

8   (a) No – could explain high prices but not continually rising prices. (b) Bankrupt government printing money to finance some activities. (c) It is far too high – in terms of Figure 26.2 the tax revenue maximizing inflation rate is that below the peak of the curve, but much higher inflation rates actually raise less and less revenue because people ditch cash itself.

AB 26   (a) The two are opposite sides of the same coin – only because there is no output-inflation trade-off in the long run can independent central banks succeed in permanently lowering inflation without reducing output. (b) For example, consider a huge adverse supply shock that temporarily wiped out a lot of supply capacity. Choice would be to cut aggregate demand

immediately in line with supply collapse, which would prevent inflation but imply a huge output fall, or to cut demand by less knowing that the result would be inflation. If the supply decrease is permanent there is no alternative to lowering demand, but a temporary supply reduction might make it attractive to be less aggressive. If half of the UK floods tomorrow, the Chancellor might authorize the Bank to exceed its inflation target for a bit.

Chapter 27

1 Pessimistic about finding a job, people leave labour force completely. Lower morale, aware that firms, rightly or wrongly, may brand them as less good because they have been unemployed.

2 No, outflow falls a lot in slump. Rising.

3 Reduced demand for some types of labour, raised demand for others. Temporary mismatch, but eventually skills and wages adjust. Millennia of technical progress would have driven unemployment to 100 per cent if there was any permanent relationship to unemployment.

4 (a) Deficient demand in economy. (b) Real wage too high, for example because of union power or generous welfare benefits.

5 Do not begin with spare capacity. Rather high equilibrium unemployment.

6 (a) Fast flow through U pool may allow better matching of skills to jobs in changing world. (b) Not if equilibrium U. (c) Exacerbates Keynesian U. Even if equilibrium U, shifting job acceptance schedule down will only eliminate some U.

7 (a) Fails – income effect of payment makes lone parents demand leisure not more work. (b) Fails – they are unlikely to be paying much income tax. (c) Succeeds if the payment set high enough.

8 Teenagers need training from scratch – lack skills and job experience; teenage wages not low enough to compensate. Additionally, many smart teenagers choose further education, so those instead going immediately to work may get stigmatized relative to their peers.

AB 27 (a) Impossible to explain with this theory. (b) Being richer, people will demand fewer hours of work in order to have more hours of leisure for which we know demand rises strongly with income. (c) By adding to the marginal cost of labour to the firm it reduces labour demand; with lower labour demand, and lower equilibrium wages, the gap between labour force and job acceptances increases, so equilibrium unemployment is higher.

Chapter 28

1 £1 = 1.40 euro, and 1 euro = £0.71. Yes.

2 Surplus of £2 bn. Rising before central bank sells this amount of sterling and buys £2 bn of forex reserves to achieve forex market equilibrium at the desired exchange rate.

3 External balance refers to current account balance, not trade balance. Japan also earns income on large foreign assets, so actually has had current account surpluses. Yes, running out of forex reserves forces adjustment faster than stockpiling forex reserves.

4 Trivially, appreciation desirable if initial exchange rate too low, undesirable if initially too high. Could assess relative to likely long-run equilibrium values.

5 Inflation means US price of $4 rises to $12, UK price of £1 rises to £2. Hence need exchange rate of $6/£ to preserve original relative prices in a common currency.

6 (a) Not if nominal exchange rate depreciates enough. (b) Financial account more important in short run since flows could potentially be huge. (c) Will *already* have appreciated to high level so expected to fall from now on, offsetting from now on the benefit of high interest rates.

7 Finding the natural resource certainly leads to a big redistribution – owners of the resource are better off and others (e.g. manufacturers) worse off. However, the higher real exchange rate is not all bad: it means that consumers can import foreign goods more cheaply, and hence their domestic incomes are now worth more in international purchasing power. Countries are generally better off by finding valuable extra supplies even if particular groups within the country are made worse off.

8 Previously, debtors who were managing to service their debt must have had very depreciated real exchange rates – they needed to run large trade surpluses in order to generate the foreign exchange to meet debt repayments. Wiping out these repayments means they do not need the trade surplus any more. So their real exchange rate should appreciate (they are relatively richer than before). Rich countries therefore experience a real depreciation against poor countries. Both this relative price change and the fact that purchasing power in poor countries has risen mean that poor countries will now demand more imports of manufactures from rich countries. A monopoly firm should have lobbied rich governments to wipe out the debt. But with many manufacturers and many governments, everyone tends to free ride on everyone else.

AB 28 (a) Yes. (b) Switzerland, Italy, Greece, China. (c) What matters for Belassa Samuelson is traded versus non-traded. Technical progress in services makes more of these tradeables: if that was the only effect, it might not affect BS much. However, if it generally raises wages and productivity in non-tradeds, it erodes the distinction on which BS is based. As yet, we are not near that point in practice.

Chapter 29

1 c, a, b.

2 (a) Nothing, since interest parity must hold from now on. (b) Rises. (c) Rises. (d) Initial gain in competitiveness boosts net exports and output. Eventually, extra inflation erodes competitiveness enough to undo this. Once competitiveness back to initial level, extra inflation stops.

3 (a) All rise by 30 per cent. (b) Nominal exchange rate is the nominal anchor now.

4 Yes, as in Question 2 above. Without devaluation, slump lowers inflation and hence prices and wages, eventually adjusting competitiveness as needed.

5 (a) Since marginal propensity to import < 1, net exports rise so need real appreciation.
(b) Speculators foresee later rise and bid exchange rate up immediately – otherwise, opportunities for foreseeable large capital gains later.

6 (a) Can if set interest rate appropriately to keep speculators happy at that exchange rate.
(b) Mainly influenced by financial account in short run. (c) Affects the interest rate response (or lack of it) to a change in fiscal policy.

7 (a) With so many investment opportunities in China, would expect net inflow on its financial account as rest of world invests in China. (b) Payments surplus because of both current and financial account. (c) Rising sharply (over $250 billion in 2006). Unless this can all be sterilized, Chinese money supply must rise. Inflationary unless Chinese money demand rises as much – with economy growing at 10 per cent a year, money demand obviously rising strongly too. Chinese inflation is about the same as in the UK!

8 The stronger is aggregate demand, the more the central bank has to raise interest rates to defend the inflation target. Hence fiscal policy does not change overall level of aggregate demand but the monetary–fiscal mix, and hence the interest rate. In this chapter, we saw how interest rates then affect the exchange rate.

AB 29   (a) Looser fiscal policy would have meant monetary policy tighter and higher real exchange rate, making UK manufacturing less competitive. Fiscal expansion to finance spending on public services is one such example. (b) By adding to demand, they force the Bank of England to tighten monetary policy; in turn, higher interest rates will cause an exchange rate appreciation and increase the trade deficit. Fiscal policy crowds out other elements of aggregate demand.

Chapter 30

1 Latter is output per person. Output grows faster unless population growth negative.

2 Compare with other countries to see if factually true that we are different. For different countries, correlate long-run growth with usual explanations (labour input, capital input, etc.) and see if extra role for fraction of population who are scientists, engineers. Private and social benefits differ if there are externalities (some skills make it easier for people with other skills). Subsidies to education also imply discrepancy between private and social cost.

3 Pollution and congestion. Can quantify and value some (e.g. how much house prices are lower under airport flightpath). As information technology lets us record data better, will get easier to include in GNP.

4 Poverty traps possible even in Solow model. Endogenous growth can also explain why growth rates permanently differ.

5 Land input has increased much less than labour, without big diminishing returns to labour. We accumulated other factors (human and physical capital) as substitutes for land, and technical progress invented ways to economize on land. Same is already happening for other scarce inputs.

6 (a) In short run, might reduce output by reducing consumption demand. (b) In long run, might just raise level of per capita output (Solow model).

7 (a) Now gross investment per person must be $(n+d)k$. This replaces the line nk in Figure 30.1, otherwise the figure the same. (b) A rise in d makes the $(n+d)k$ line steeper, and shifts the steady state to the left, reducing output per person and environmental capital per person. (c) Yes.

8 From its position of technological pre-eminence 700 years ago, China then went into a period not merely of relative decline but absolute decline. People can forget how to do things, especially if activities are prohibited for long enough. Open access to information, and the ability to use it, are usually sufficient to ensure that knowledge improves over time.

AB 30   (a) In Figure 30.1, if k and y are low, even a small amount of saving is sufficient for capital deepening, improving the future position. (b) If aid to countries in a poverty trap allows them to break out completely, the present value of the extra output and welfare is huge compared with aid that merely speeds up slightly what would have happened anyway. (c) In Figure 30.1 suppose the line nk has a larger n whenever k is below a critical amount. There are then two possible equilibria – a high n low k equilibrium and a low n, high k equilibrium. Aid would be very valuable if it allowed the economy to increase k enough to move into the more benign regime. It might be plausible if children were seen as insurance against old age, and poor countries feared more for life in old age.

Chapter 31

1 It would kill the multiplier–accelerator model. Technology, costs and real interest rates might still induce investment fluctuations. Might also be fluctuations from C, G, X.

2 For example, higher oil prices are also a demand shock for Norway, since export revenues rise, while a supply shock for many other European countries.

3　Bygones now bygone. What matters is what can be done from now on.

4　It might accentuate a global political business cycle. With elections at different dates, pre-election booms are more diffuse.

5　Cause lies not in fluctuations in nominal money, or monetary policy, but rather in real shocks such as views about future technology and productivity growth. More generally, tries to explain cycles without nominal rigidities and constraints on adjustment speeds. Persistent is optimal because of intertemporal substitution.

6　(a) Closer integration accentuates international transmission mechanism of booms and slumps, e.g. US high-tech bust of 2001 quickly spread to Europe. (b) Multiplier–accelerator model relies on failure to forecast future output correctly. (c) Costs of adjusting labour mean output cycles induce cycles in output per worker.

7　(a) Less evidence of an output cycle since the central bank should be offsetting any cyclical aspects of fiscal policy, at least to the extent that they have inflationary implications. (b) If there are cycles in the fiscal stimulus to aggregate demand, one would expect to see the central bank raising interest rates when fiscal policy is unduly expansionary and reducing interest rates when fiscal policy is tighter.

8　The success of the multiplier–accelerator model would mean that (i) changes in income are closely related to changes in saving (that is the simple consumption function, the multiplier bit) and (ii) changes in income are closely connected with the rate of investment (the accelerator). Even if households realize that expected future income should ideally influence current consumption decisions, if they have problems borrowing because of lack of collateral, they may be driven back towards the simple consumption function not because they are stupid but because they are poor and cannot implement it. Firms may realize that changes in their ideal capital stock should depend on real interest rates, profit margins and many things besides the rate of income growth, but income growth may still be quantitatively important, especially in a period of relatively stable real interest rates.

AB 31　(a) Decisions by the European Central Bank would then suit every member of the eurozone. (b) There is a lot of evidence that geography matters for the degree of trade and integration – you would be correct to guess that Ireland, the UK and Portugal are less integrated with the EU as a whole than are France, Germany and the Benelux countries. (c) Financial markets are most integrated, then probably goods, then services or skilled labour; and unskilled labour is probably least integrated.

Chapter 32

1　New Classical: at earliest opportunity, nominal wages and prices fall by same amount, restoring all real variables to original level, so very small and temporary output fall. If anticipated, no output fall, since wages and prices already adjusted. Gradualist Monetarist: bit longer for wage and price adjustment to happen, bit larger fall in output. Moderate Keynesian: bit longer still, so larger output fall and slower recovery. Extreme Keynesian: very long time indeed.

2　NC: Entirely as fall in U^* because of better supply-side policies plus maybe some intertemporal labour substitution (fewer in labour force). GM: mainly fall in U^* as above, but also recovery from very high interest rates in 1991–92 caused by German unification (see Part 5); MK: sustained fall in U over many years must eventually be from lower U^*, but initial recession larger than GM think; EK: big Keynesian recession at start of 1990s, so mainly end of Keynesian U.

3　(a) NC. (b) MK. (c) GM. (d) EK.

4　GM, MK.

5 (a) Rational expectations possible in model with other reasons for slow wage adjustment, just happened that rational expectations was first pioneered in New Classical models. (b) Not true in short run. (c) They stress that money the main determinant of prices.

6 What is true is that central banks set the interest rate and passively supply whatever money is necessary to make this an equilibrium in the money market. If the consequence is that the nominal money supply grows faster than the demand for nominal money, this will still be inflationary – the original insight of monetarists. The part that is new is that a central bank with an inflation target will then quickly respond by raising interest rates, for which a lower money supply is then necessary, preventing the sustained monetary expansion that was possible under some previous monetary policies.

7 We know productivity fluctuates over the business cycle, but sustained productivity growth requires supply- side improvements. Except for reasons of hysteresis, demand policies should not be expected to have much supply-side effect in the longer run. We need good supply-side policies as well as good demand management. The latter is easier than the former.

AB 32 (a) A new classical economist might try to argue that markets not bankers restored the economy to potential output. If all output fluctuations are to be interpreted as fluctuations in potential output, it is then difficult to explain why cycles diminished at precisely the time that central banks were given independence. If we give central banks the credit, then interest rate changes must be able to affect output reasonably quickly. Evidence consistent with Moderate Keynesian position, but not entirely at odds with Gradualist Monetarist. It is not consistent with those Extreme Keynesians who believe that monetary policy is pretty powerless and that fiscal policy a more reliable demand management tool. (b) See box 25.2.

Chapter 33

1 (a) US, with higher human and physical capital, exports more manufactures. (b) Brazil, with less than Asia, exports fewer manufactures.

2 No. Equilibrium exchange rate can be low enough to offset any absolute disadvantage. To enjoy efficiency gains from comparative advantage, should allow trade.

3 Wine and cars have high two-way trade based on choice and differentiation, steel based more on comparative advantage and one way.

4 Only if planning to become subsequent export in TVs, but production subsidy more efficient than tariff.

5 (a) No. Government may as well have the tax revenue too. (b) Domestic art buyers gain since prices fall. Domestic artists lose out, so too foreign art buyers. (c) Probably not.

6 (a) There always exists an equilibrium exchange rate that makes it profitable to export the goods in which they have comparative advantage. (b) International trade is generally better than no trade because countries specialize in products in which they have a comparative advantage.

7 True that gain less as percentage of their initial income: small countries cannot enjoy scale economies without international trade. Trade by large countries also bids the world price in adverse direction from their viewpoint.

8 (a) Better off, since demand for their skills rises. (b) Worse off, since demand for their skills falls. (c) If the export industry faces inelastic demand in the world economy, an increase in supply can bid down the price so much that the country gets less revenue than before (and small individual competitive producers can do nothing about it) – see the examples on primary product prices at the beginning of the chapter.

APPENDIX: Answers to review questions

AB 33   (a) Benefits Europe provided the additional supply is permanent. (b) Rhetoric to protect European workers from competition (see the answer to Question (8b) above – as consumers European are big beneficiaries. (c) Tariff better because you get the tariff revenue; quota adds this to profits of Chinese exporters.

Chapter 34

1   Because price level had risen relative to competitors, joining at old nominal exchange rate meant a much less competitive real exchange rate. UK then had a slump.
2   Automatic adjustment better under GS, since money supply forced to adjust. More scope for discretion in DS: could be good or bad. Financial discipline better under GS: could be good, or bad (if too tough).
3   Commitment to avoid domestic monetary expansion may help reduce inflation expectations. However, if fiscal authorities continue to have big deficits, may still bid up prices, making country increasingly uncompetitive, forcing big eventual crisis, as in Argentina 2001.
4   Because as small open economies they were interdependent and had less sovereignty anyway as separate nation states.
5   Stock market soared, anticipating low interest rates and a low exchange rate that boosted exports and profits. Bond market fell, fearing higher inflation and higher eventual nominal interest rates.
6   (a) Even in long run, only current account need balance. (b) Induced changes in domestic price level change the real exchange rate.
7   (a) In the long run, Cuba will prosper as a result of integration into international trade and the end of embargoes that inhibit its acquisition of the latest technology. However, the experience of Eastern Europe and the former Soviet Union countries is that transition is not painless and that output may fall initially before it is launched on an upward trend. (b) Richer in the future than today, they should smooth consumption across time, borrowing today in order to spend more today even if this means consuming a little less at some future date in order to repay loans. (c) The initial surge in both consumption and imported capital goods will mean a trade deficit.
8   (a) Good opportunities for investment (and hence the likelihood of inflows on the financial account of the balance of payments. (b) With a fixed exchange rate, Cuba is likely to have a balance of payments surplus because the financial inflows will probably be large, and policy makers tend to get nervous of substantial trade deficits and take other actions to limit them. (c) Exchange rate floats up because of the pressure of financial inflows. (d) Latter probably better; former leads to large increases in money supply in Cuba which may cause unnecessary inflation, as happened throughout Eastern Europe (though interestingly not in China).

AB 34   (a) Acting in isolation, each country may be tempted to depreciate its exchange rate in pursuit of short-term gain – collectively this destabilizes the system, making life worse for everyone. (b) Speculators should take their money out of the currency now before they suffer a capital loss when the exchange rate depreciates. (c) You seem to have an alibi – it was the speculators not you – but they probably only acted as they did because they knew, or thought they knew, what you were about to do. (d) Financial outflow on the balance of payments.

Chapter 35

1   Yes, wages lower.
2   Germany, France, Holland have high human capital; Greece, Spain, Portugal less so.

3   No. Equilibrium risk premium on riskier bonds to prevent capital flows by compensating properly for extra risk. Yes, a monetary union: two firms' bonds pay slightly different interest rates even within the UK.

4   If every member state has one vote on central bank board, want to prevent countries getting into fiscal trouble then voting for high inflation to help their budget position. Even with tough monetary policy, monetary–fiscal mix matters. With loose fiscal, need tight money, but then high real interest rates and real exchange rate appreciates to uncompetitive levels.

5   Yes. In practice, hard for borrowers to commit to repay and spend the money wisely. This moral hazard severely limits how much lenders will lend.

6   (a) Non-tariff barriers also important. (b) By matching German interest rates in the ERM, countries had already given up most of their monetary sovereignty. (c) Independence from political control is the best commitment to price stability if politicians are the main cause of inflationary policies.

7   (a) Hardly any – Spain has only a small effect on the aggregate eurozone data to which the ECB reacts. (b) Looser fiscal policy might offset the demand shock but fiscal policy takes longer to change than monetary policy and Spain might be close to the limits set by the Stability Pact and could find itself in a situation in which it is not allowed to loosen fiscal policy. (c) The adverse demand shock leads to a fall in output and employment, wages and prices in Spain gradually fall, competitiveness and net exports increase, demand picks up, potential output is restored, but not external balance since Spain has a trade surplus. This gradually leads to an accumulation of net foreign assets, Spaniards feel richer, consumption rises, bids up prices, erodes the competitiveness gain, and eventually external balance restored. The wealth effect and higher consumption is what ultimately has restored domestic aggregate demand.

8   UK interest rates fall to eurozone levels, causing an increase in aggregate demand. Thereafter you can use the analysis of Question 7 (but for a rise not a fall in aggregate demand). Either fiscal policy is tightened or the boom bids up prices, erodes competitiveness, reduces net exports, gradual fall in net foreign assets, until wealth effect on consumption reduces aggregate demand again.

AB 35   (a) Transactions costs of going between pound and euro, and uncertainty of future exchange rate, both act as dampener on the trade that would otherwise have occurred. Recent evidence from many countries is that these effects are potentially larger than we used to think. (b) Main benefits are being able to reconcile scale economies, diversity of choice and competition with less need for regulation. (c) Producers of goods, and workers in these industries, that UK now imports from EU. (d) It is possible but not certain. Political integration depends to a large extent on who identifies with whom, and whether or not voters acquiesce in redistribution. Greater integration tends to enhance familiarity but it is hard to say whether it will do so to a sufficient extent. Global challenges, such as global warming, may provide a different channel for greater political integration eventually. But Europe's history is about competition between small nation states.

Chapter 36

1   Man-made substitutes for raw materials (e.g. rubber) reduced demand. Productivity increases raised supply. Protection in rich countries limited markets.

2   Rise in demand, higher copper price until new copper sources found, substitutes for copper developed, or boom subsides.

3   All require intensive but low-skilled labour, which they have in relative abundance.

APPENDIX: Answers to review questions

4 (a) Buy commodity when price low, stockpile, sell when price high. (b) Incentive for each country to 'cheat' and put all its produce on market and gain higher price at expense of others. No incentive ever to cut production: if average price wrong, as in CAP, stockpile grows without limit plus stocks accumulating.

5 Not indefinitely. Small country has to specialize to get adequate scale in some industries, and hence must export these products and import all the others.

6 Under pure float, capital account inflow = current account deficit. Latter cannot grow without bound, hence capital inflow limited. This helps prevent foreign money subsequently leaving in a rush. Bad domestic policies can still cause a crisis in which domestic citizens want to take their money out – remember the TV pictures of locked banks in the Argentina crisis of 2001.

7 (a) LDCs often argue that aid encourages dependence. They want foreign investment, less protection by rich countries, technology transfer, and debt relief to wipe out mistakes of the past. (b) Europe would make a net gain from greater exploitation of comparative advantage, even though vociferous particular losers have so far blocked the process. (c) Individually, perhaps, but collectively they bid down world prices against themselves, especially when denied access to the richest markets.

8 Increasing globalization, particularly the rise of China, with its cheap labour but thirst for raw materials, gave a series of beneficial supply shocks to the price of imported consumer goods, but a series of adverse supply shocks to the prices of commodities such as oil and metal ores. The former were initially larger and reduced Western inflation. However, poor monetary policy might have responded by cutting interest rates too much. And, as the adverse supply shocks became important, the credibility of independent central banks helped prevent higher commodity prices spilling over into inflationary wage claims.

9 Economic sovereignty is the ability of governments (and their electors) to choose tax rates, government spending and regulations. Nation states have lost most sovereignty on those things most mobile across national borders, where the attempt to behave differently in one country leads to an outflow in response to policies that penalize, or an inflow in response to policies that provide benefits. Ranking depends on assessment of degree of international mobility; internet gambling, then banking, then subsidies, then taxes (one could argue about the relative ranking about the last two of these, probably more international migration to take advantage of benefits than to avoid taxes: though, for specific mobile high-skill groups (investment bankers, rock stars, F1 drivers), location is sensitive to tax rates.

AB 36 (a) If the secondary market thinks the country can now meet in full its obligations as newly defined, bonds no longer trade at a discount in the secondary market. (b) Suppose a UK and a German bank are each owed half the money. Initially, bonds trade at 40 per cent of par value. The UK bank alone writes off all the bonds it has bought. Now all the borrower's trade surplus can go to paying off the German bank. The bonds it holds jump in second-hand value from, say, 40 to 80 per cent of par value. Since it is less than 100 per cent, the LDC is still not paying in full, and the bank still insists the LDC pay as much as it can. UK generosity (assisted by well-meaning UK taxpayers who supported the write-off) is entirely to benefit the German bank, not the LDC borrower! There is a free-rider problem. Every creditor wants every other creditors to be first to offer write-offs. Debt relief requires powerful politicians and world agencies (IMF, World Bank, UN) to shepherd creditors into the same fold at the same time to solve the free-rider problem. Making poverty history is proving as difficult as tackling climate change because it is not a problem that can be addressed by the government of a single nation state.