

A-level ECONOMICS

Paper 1 Markets and Market Failure

Monday 18 May 2020

Morning

Time allowed: 2 hours

Materials

For this paper you must have:

- an AQA 12-page answer book
- a calculator.

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Write the information required on the front cover of your answer book.
The **Paper Reference** is 7136/1.
- In **Section A** answer **EITHER** Context 1 **OR** Context 2.
- In **Section B**, answer **ONE** essay.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- There are 40 marks for **Section A** and 40 marks for **Section B**.

Advice

- You are advised to spend 1 hour on **Section A** and 1 hour on **Section B**.

Section A

Answer **EITHER** Context 1 **OR** Context 2.

EITHER

Context 1

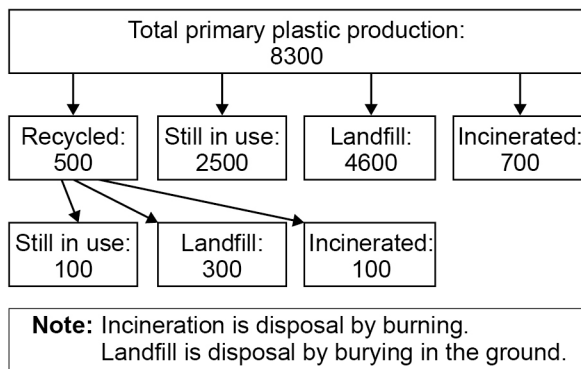
Total for this context: 40 marks

The circular economy

Study **Extracts A, B and C**, and then answer **all** parts of Context 1 which follow.

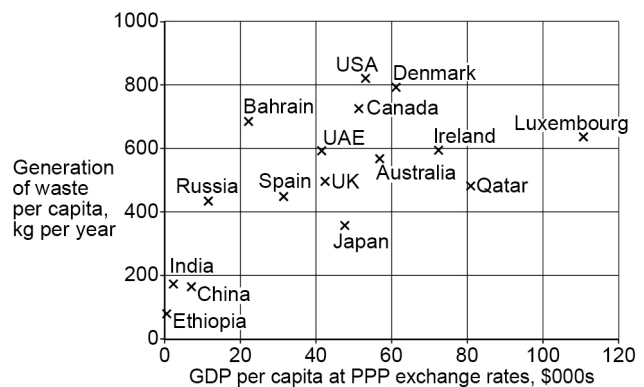
Extract A

Figure 1: Global plastic production and disposal, 1950–2015, million tonnes



Source: Data from ourworldindata.org, 2018

Figure 2: Generation of waste and GDP per capita, 2016, selected countries



Source: World Bank, 2018

Extract B: The global economy needs to become more circular

Of the 84 billion tonnes of materials produced each year by the global economy, barely 9% are reused. The United Nations (UN) suggests that better use of resources could add \$2 trillion to the global economy by 2050.

1

Environmental groups argue for a 'circular' economy, an economic system aimed at minimising waste, making the most of scarce resources and reusing precious raw materials. However, if products last longer, it may seriously damage demand in sectors such as fossil fuels, minerals and agriculture. Manufacturers' sales would fall, as would the need for shipping and other transport. Currently, many companies intentionally make it difficult to repair their products in order to increase sales. This is both economically inefficient and environmentally foolish; it imposes costs on the environment even though it may make sense for individual companies.

5

10

Would a circular economy result in workers losing their jobs? Manufacturing jobs are likely to come under pressure, but new jobs would be created. According to one study, waste disposal generates just 0.1 jobs per 1000 tonnes, compared with two jobs from recycling the same amount. The environment would benefit, with fewer mines, more trees and less need for landfill and incineration. Recycling aluminium saves 95% of energy compared with creating new metal. The comparable savings are 88% for plastic, 60% for steel and paper, and 38% for glass. By 2035, all European Union (EU) states will be required by law to recycle 65% of their waste, compared to an average of 40% today. But populations grow. By 2050, the world will have 2 billion more consumers, increasing the pressure on the environment.

15

Source: News reports, 2018

Extract C: China bans imports of waste

While rich countries are cleaning up at home, they are exporting their 'disposable' lifestyle around the world, by sending their waste to developing countries. Many developing countries are now beginning to resist this. In 2018, a huge shock hit the global recycling industry. China, the world's biggest waste importer, stopped accepting recycled plastic and paper from abroad, and limited imports of cardboard. Previously, over 50% of such waste was transported to China each year. China plans to introduce bans on most other waste imports.

The Chinese ban removed the third part of the 'collect, sort, export' system on which developed economies rely. Alternatives are scarce. Incinerators and landfill will take some of the surplus waste, but the capacity of both is limited. Landfill is gradually being regulated out of existence in many places, including the EU. High labour costs make hiring enough human sorters to deal with waste volumes very expensive.

Automation could, in time, sort some of the surplus waste, but innovation has been slow. Although China has disrupted the whole global waste trade, many experts see some benefits in forcing rich countries to rethink. The ban has given a boost to some entrepreneurs. Online marketplaces for recycled plastics, metal and paper have grown rapidly. Recycled materials now flow to the highest bidder and hence to the highest-value use. However, such operations cannot compensate quickly for the Chinese ban. Many environmental economists suggest that making firms pay for the costs of landfill associated with their products, or taxing raw material inputs, will be necessary to ensure a sustainable future for all.

Source: The Economist, 2018

0 1 Using the data in **Extract A** (Figure 1) calculate the percentage of all plastics produced in the period 1950–2015 which have either been sent to landfill or incinerated. Give your answer to **one** decimal place.

[2 marks]

0 2 Explain how the data in **Extract A** (Figure 2) show that higher living standards lead to greater volumes of waste per capita being produced.

[4 marks]

0 3 **Extract B** (lines 8–10) states: 'many companies intentionally make it difficult to repair their products in order to increase sales. This is both economically inefficient and environmentally foolish; it imposes costs on the environment even though it may make sense for individual companies.'

With the help of a diagram, explain how the production of goods which are designed not to last long may result in market failure.

[9 marks]

0 4 **Extract C** (lines 17–19) states: 'Many environmental economists suggest that making firms pay for the costs of landfill associated with their products, or taxing raw material inputs, will be necessary to ensure a sustainable future for all.'

Using the extracts and your knowledge of economics, evaluate policies, if any, that governments in developed countries should pursue to reduce waste and encourage the recycling of waste products.

[25 marks]

Turn over ►

Do **NOT** answer Context 2 if you have answered Context 1.

OR

Context 2

Total for this context: 40 marks

The adult social care market

Study **Extracts D, E and F** and then answer **all** parts of Context 2 which follow.

Extract D

Figure 3: Pay for care workers, compared with pay for workers in the whole economy, £s per hour, 2017

Percentile	Care worker	Whole economy
10 th	7.20	7.31
25 th	7.20	8.69
50 th	7.50	12.23
75 th	8.02	18.57
90 th	8.73	27.06

Source: National Audit Office, 2018

Figure 4: UK population by age (000s)

Age group	Year 2016	Year 2041 (forecast)
0–18	14 652	15 132
19–64	39 182	39 980
65–84	10 250	14 545
85–94	1 436	2 887
95+	128	360
Total	65 648	72 905

Source: ONS, 2018

Note: The figures may not sum to the total due to rounding

Extract E: Problems in the social care market

Social care in England involves the provision of personal care to adults with needs arising from illness, disability, old age or poverty. Social care is provided to people in their own homes or in care homes. Many people in need of care are on low incomes and cannot afford to pay for it themselves. High quality care provides private benefits and also external benefits, including lower burdens on the NHS and on working relatives. Until the 1990s, almost all workers in the care sector were employed by the government, which acted as a monopsonist by keeping wages low. Over the last 30 years the sector has been largely privatised, with 75% of England's 15 000 care homes now run for profit. Privatisation was intended to create more choice, improve efficiency and ensure high quality, whilst enabling a quicker response to changing demand.

Since privatisation, the sector has seen further downward pressure on wages. Social care providers, bidding competitively for contracts from local authorities starved of cash, have minimised labour costs. Privatisation does not seem to have improved the quality of care either. Some elderly clients are cared for, in their own homes, by unqualified staff in 15-minute slots, with budgets too small to provide nutritious meals or basic care. Despite the actions of the industry regulator, the Care Quality Commission, there have been many scandals involving care homes in recent years. As a result, some have argued that there are moral and economic arguments for social care to be brought back into public ownership.

Source: News reports, 2019

Extract F: Social care work is undervalued

There are aspects of market failure in the social care sector, though some argue that inappropriate government intervention and a lack of funding are the main reasons why the system is failing to deliver high quality care. This is a vitally important sector, yet care jobs have some of the economy's worst salaries and around a quarter of these workers are employed on zero-hour contracts. Consequently, the sector has high levels of staff turnover (28% per year) and vacancies (6.6% of all roles). At present, many care workers are recruited from overseas and so government immigration policy affects the sector. Some suggest that the skill level of care workers is relatively low and does not justify a higher wage while others have argued for high quality training programmes. Less than half of care workers hold a relevant qualification, and some parts of the workforce feel undervalued, are demotivated and have few opportunities for promotion.

Research from the Royal College of Nurses found that 38% of care homes were understaffed. Private social care companies have argued that the introduction of the National Living Wage, while raising average pay, has left them at risk of bankruptcy because of higher wage bills. More than 100 care firms went bust in 2018, worsening the under-provision of care. One day, the government will have to accept the need for more generous funding. However, public finances remain under pressure. Measures such as subsidies to private providers are likely to worsen the government's budget deficit but public support for an increase in taxation to fund social care is high.

Source: News reports, 2018

0 5 Using the data in **Extract D** (Figure 3), calculate how much the median care worker earns for every pound earned by the median worker in the whole economy. Give your answer to the nearest penny.

[2 marks]

0 6 Explain how the data in **Extract D** (Figure 4) show that there is likely to be substantial upward pressure on the wages of care workers by 2041.

[4 marks]

0 7 **Extract E** (lines 5–7) states: 'Until the 1990s, almost all workers in the care sector were employed by the government, which acted as a monopsonist by keeping wages low.'

With the help of a diagram, explain how a monopsonistic public sector can lead to low pay for social care work.

[9 marks]

0 8 **Extract F** (lines 1–3) states: 'There are aspects of market failure in the social care sector, though some argue that inappropriate government intervention and a lack of funding are the main reasons why the system is failing to deliver high quality care.'

Using the extracts and your knowledge of economics, assess policies that might be used to improve the provision of social care in the UK.

[25 marks]

Turn over ►

Section B

Answer **one** essay from this section.

Each essay carries 40 marks.

EITHER**Essay 1**

Critics of the world's five most valuable multinational technology firms (Google, Amazon, Apple, Facebook and Microsoft) argue that there ought to be greater government intervention to protect consumers' interests. Several European governments are considering imposing new taxes on the revenues of such firms, rather than their profits.

- | | | | |
|---|---|---|------------|
| 0 | 9 | Explain how the imposition of a tax on a good or service affects both consumer surplus and producer surplus. | [15 marks] |
| 1 | 0 | Discuss whether governments should consider increasing the regulation and taxation of technology firms which have acquired significant global monopoly power. | [25 marks] |

OR**Essay 2**

The economist Greg Mankiw has written that 'society faces a trade-off between efficiency and equity. Efficiency means that society is getting the maximum benefits from its scarce resources. Equity means that those benefits are distributed fairly among society's members. Often, when government policies are designed, these two goals conflict.'

- | | | | |
|---|---|---|------------|
| 1 | 1 | Explain how a production possibility diagram can be used to illustrate some features of the fundamental economic problem. | [15 marks] |
| 1 | 2 | Evaluate the view that government intervention to reduce inequality will lead to an improvement in economic welfare. | [25 marks] |

OR

Essay 3

In December 2018, the Competition and Markets Authority (CMA) announced a range of policies to prevent firms charging existing customers more than new customers. Firms supplying financial services, mobile phones and broadband are no longer allowed to discriminate against loyal customers renewing their contracts.

1	3
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 Explain why imperfect information can lead to market failure.
[15 marks]

1	4
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 Assess the view that price discrimination is always damaging.
[25 marks]

END OF QUESTIONS

There are no questions printed on this page

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0 **1**

Total sent to landfill or incinerated = 4600 + 700 + 300 + 100 = 5700 million tonnes

Percentage = $(5700 \div 8300) \times 100 = 68.674\ldots\%$

Answer = 68.7%

0 **2**

GDP per capita at PPP is a good indicator of living standards because it measures average real income per person, so it shows the quantity of goods and services each person can afford. Figure 2 shows a clear positive correlation between GDP per capita and waste generated per capita: a line of best fit through the points would slope upwards.

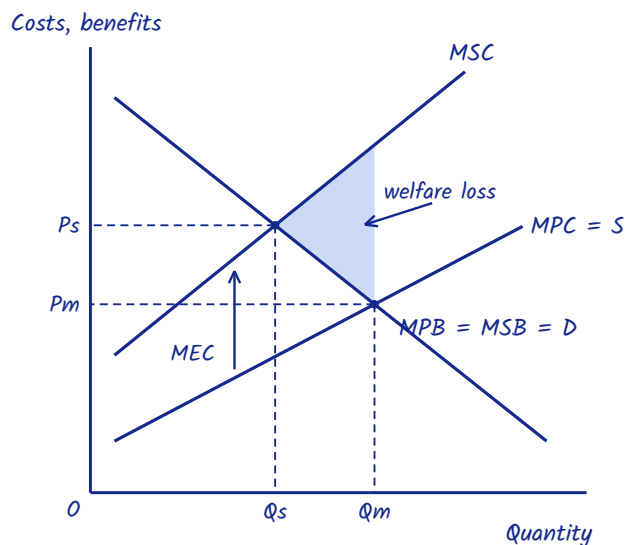
For example, Ethiopia has the lowest GDP per capita, about \$1000, and the lowest waste, about 80 kg per person per year, while Luxembourg has the highest GDP per capita, about \$111 000, and generates about 620 kg. Similarly, the USA (\$52 000) generates 810 kg per person compared with only 500 kg in the UK (\$43 000).

This is because households with higher incomes buy more goods, more packaged and convenience products and replace items more often, so more material is thrown away. The relationship is not perfect (Japan and Qatar produce less waste than their incomes suggest), but in general higher living standards mean more waste per capita.

0 **3**

Market failure occurs when the price mechanism allocates scarce resources inefficiently, so the free market outcome does not maximise economic welfare. Making products that are designed to fail (planned obsolescence) makes sense for individual firms: they can use cheaper raw materials and less quality control, cutting costs, and because consumers must replace items more often, future sales and profits rise. However, firms base output decisions only on their marginal private costs (MPC). They are not required to consider how products are disposed of at the end of their short lives, so the costs of landfill and incineration, such as air and water pollution, methane emissions and loss of land, fall on third parties. These are negative externalities in production. The faster use of scarce

resources such as minerals, oil and water also degrades the environment and leaves less for future generations. Marginal external cost (MEC) means that marginal social cost ($MSC = MPC + MEC$) lies above MPC.

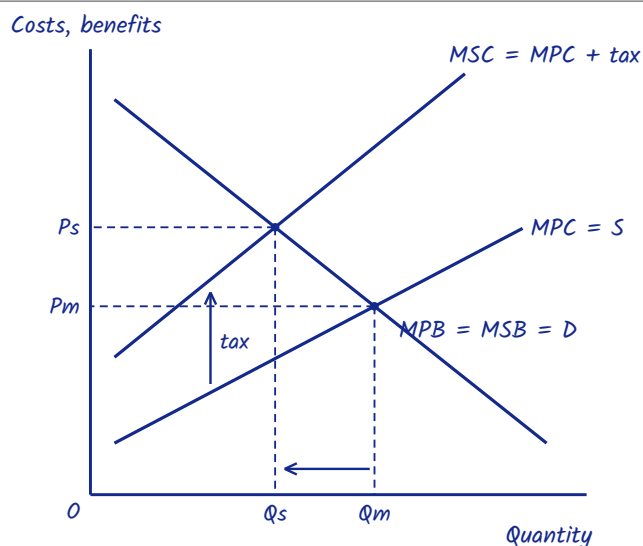


As shown in the diagram, in the free market output is where $MPC = MPB$, at Q_m and price P_m . The socially optimal output is where $MSC = MSB$, at Q_s and the higher price P_s . Because the external costs are ignored, the price of short-lived goods does not reflect their full social cost, so they are overproduced and overconsumed by Q_s to Q_m . For each unit in this range the cost to society (MSC) is greater than the benefit to society (MSB), so there is a deadweight welfare loss shown by the shaded triangle. The market is allocatively inefficient: too many resources are used making goods that are thrown away and too few in repair and recycling.

The extract shows the scale of the problem: barely 9% of the 84 billion tonnes of materials produced each year is reused. The overproduction also benefits other industries such as shipping and transport, so the external costs spread along the supply chain. Consumers may also lack information about how long products will last, so they cannot punish firms by switching to durable brands. This is why the extract describes it as "economically inefficient and environmentally foolish".

Waste is a by-product of production and consumption. In a free market, firms and households base decisions only on private costs and benefits, so the external costs of landfill and incineration are ignored, waste is overproduced and recycling, which yields external benefits, is under-provided. Extract B shows that only 9% of materials are reused and Figure 2 shows that rich countries generate the most waste per capita, so developed economies have a particular responsibility. The case for intervention has grown since China's 2018 ban removed the "export" stage of the "collect, sort, export" model on which rich countries relied (Extract C), leaving surplus waste and limited landfill and incinerator capacity.

One policy is to make firms pay for the landfill costs of their products, through a landfill tax or "extended producer responsibility" charges. As shown in the diagram, a tax equal to the marginal external cost shifts the private cost curve from MPC up to $MPC + \text{tax}$, which equals MSC. The externality is internalised: output falls from Q_m to the socially optimal Q_s , price rises from P_m to P_s and the welfare loss is removed. Firms now have an incentive to design products that last longer, use less packaging and are easier to repair, moving towards the circular economy in Extract B. The tax revenue could fund recycling infrastructure.



However, the effectiveness of such a tax depends on several factors. It is very difficult to value the external cost of waste in money terms; if the tax is too low, overproduction continues, and if too high, output falls below Q_s , a form of government failure. If demand is price inelastic, most of the tax is passed on to consumers as higher prices with only a small fall in quantity, so waste falls by

less than hoped, and the tax is regressive. It may also encourage illegal fly-tipping, which imposes even greater external costs. Nevertheless, the UK landfill tax has led to a large fall in the amount sent to landfill, suggesting that firms and councils do respond to price signals in the long run.

Taxing raw material inputs, such as virgin plastic, attacks the problem at source. It raises the price of new materials relative to recycled ones, increasing the derived demand for recycled materials and making recycling more profitable.

Extract B shows the benefits: recycling aluminium saves 95% of the energy needed to make new metal and plastic 88%, so switching to recycled inputs cuts resource depletion and carbon emissions. The new online marketplaces in Extract C, where recycled materials "flow to the highest bidder", would grow. However, if one country taxes raw materials alone, its manufacturers become less internationally competitive and production may move to countries without the tax, so the problem is simply exported, just as rich countries have already outsourced much manufacturing and its pollution to developing countries. International agreement is therefore needed, but such agreements are slow to achieve and often weak.

Regulation is a third option, such as the EU's requirement that member states recycle 65% of waste by 2035 compared with an average of 40% today, bans on single-use plastics and "right to repair" laws forcing manufacturers to supply spare parts. Regulation is easy to understand and guarantees an outcome, which is useful where damage is severe. However, it gives no incentive to go beyond the minimum standard, it is costly to monitor and enforce, and it ignores differences in the cost of compliance between firms, so it may be less efficient than a tax. There is also a risk of regulatory capture by powerful manufacturers.

Governments could also subsidise recycling, for example sorting plants and research into automation. Recycling generates positive externalities and, according to Extract B, two jobs per 1000 tonnes compared with only 0.1 jobs for waste disposal, so a subsidy could raise employment as well as cut waste. Extract C notes that high labour costs make human sorting very expensive and that innovation in automation has been slow, which suggests under-investment that a

subsidy could correct. However, subsidies have an opportunity cost, as the money could be spent on health or education, and they must be financed by higher taxes or borrowing. Firms may also become dependent on them. Deposit return schemes, which combine a charge and a refund, may be more cost-effective because they change consumer behaviour directly.

Some argue that intervention is unnecessary because the price mechanism is already responding. China's ban has created a surplus of waste in rich countries, lowering the price of recyclable materials. This signals to entrepreneurs to find new uses, ration scarce landfill space and creates incentives to invest in automated sorting. However, Extract C states that such operations "cannot compensate quickly for the Chinese ban", and the market still ignores the external costs of landfill, so on its own it is likely to remain inefficient, especially in the short run.

Policy makers must also consider the costs of moving to a circular economy. Extract B warns that longer-lasting products would damage demand in fossil fuels, minerals, agriculture, manufacturing and shipping, causing structural unemployment in those sectors, so the impact would be uneven. In the long run, though, jobs in repair and recycling should replace them, and the UN suggests better use of resources could add \$2 trillion to the global economy by 2050, so the long-run gains are likely to outweigh the short-run adjustment costs.

In conclusion, developed countries should intervene, because waste involves significant negative externalities and the loss of the export route means the problem can no longer be pushed abroad. The best approach is a combination of policies: making firms pay for disposal and taxing virgin raw materials to internalise external costs at source, backed by targeted regulation such as recycling targets and right-to-repair laws where outcomes must be guaranteed, and some subsidy for recycling technology. Market-based taxes are probably the most important because they change incentives along the whole supply chain at low administrative cost, but their success depends on setting the right rate, protecting low-income households and coordinating with other countries so that waste and production are not simply exported. With 2 billion more consumers by

Question
number

2050, the cost of doing nothing is likely to be far greater than the risk of government failure.

Do not write outside the box

0 5

Median care worker pay $\div$ median whole economy pay = $\pounds 7.50 \div \pounds 12.23 = 0.6132...$

The median care worker earns 61p for every $\pounds 1$ earned by the median worker in the whole economy.

0 6

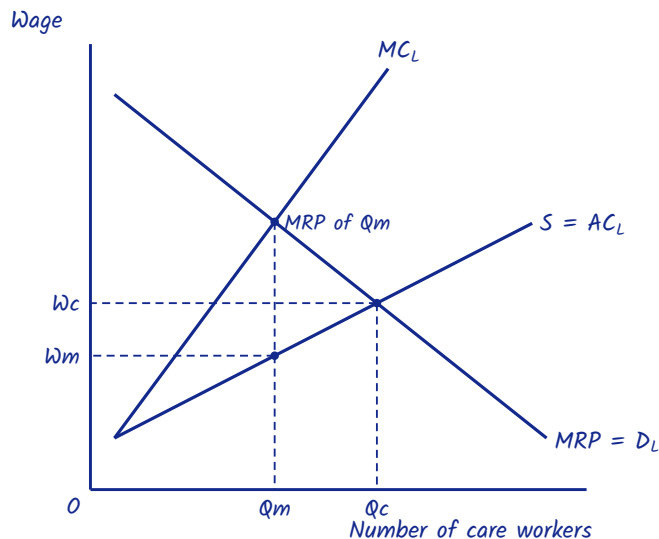
Care workers are needed mostly by the elderly, especially the very old, who have more complex and numerous care needs. Figure 4 shows that between 2016 and 2041 the number aged 65 to 84 is forecast to rise by 41.9% (10 250 000 to 14 545 000), those aged 85 to 94 by 101% (1 436 000 to 2 887 000) and those aged 95+ by 181% (128 000 to 360 000). Demand for care will therefore rise sharply and, because labour is a derived demand, the demand for care workers will shift to the right.

However, the working-age population (19 to 64) is forecast to grow by only 2.0%, from 39 182 000 to 39 980 000, compared with 11.1% for the population as a whole. So the supply of potential care workers will grow far more slowly than demand. At current wage rates there will be excess demand for care workers (shortages), so employers will have to bid wages upwards to attract staff.

0 7

A monopsony is a market with a single buyer; in a labour market it is the sole or dominant employer of a type of labour. Before the 1990s the government employed almost all care workers, so they had few alternative employers for their skills.

Because the monopsonist is the only employer, it faces the whole upward-sloping market supply curve of labour, which is its average cost of labour ($S = AC_L$). To attract an extra worker it must raise the wage, and it must pay this higher wage to all its existing workers too. So the marginal cost of labour (MC_L) lies above AC_L and rises more steeply. The marginal revenue product (MRP) of care workers, the value of their output to the employer, is the demand curve for labour.



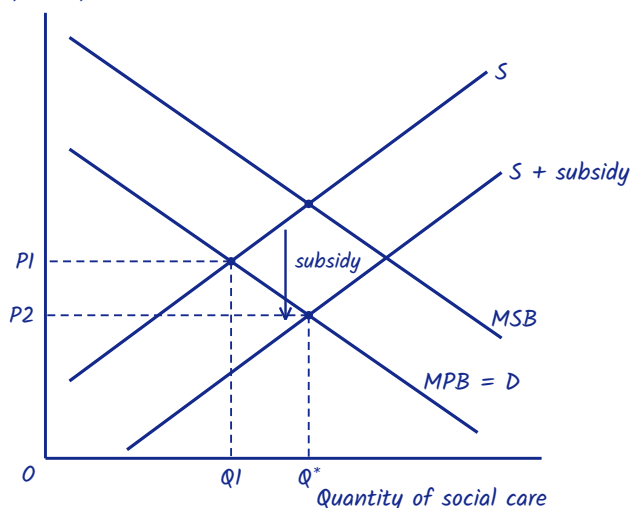
As shown in the diagram, the employer hires workers up to the point where $MC_L = MRP$, employing Q_m workers. It then pays only the wage needed to attract Q_m workers, read off the supply curve, which is W_m . In a competitive labour market the wage and employment would be where supply equals demand, at W_c and Q_c . So monopsony leads to a lower wage ($W_m < W_c$) and lower employment ($Q_m < Q_c$), and workers are paid less than their MRP, which is a form of exploitation. The public sector had a strong reason to use this power: local authorities have tight budgets and want to provide as much care as possible for a given cost, so keeping wages low stretches funding. Care workers had weak bargaining power because many are part-time, seen as low-skilled and have low union membership, so they could not counter the monopsony with a higher negotiated wage. Extract E suggests the problem has continued since privatisation: local authorities "starved of cash" still buy most care, acting as monopsonist buyers of care services. Providers bid competitively for contracts, so those offering the lowest price win and are left with small budgets, so they minimise labour costs, with around a quarter of workers on zero-hour contracts (Extract F). Monopsony power, now combined with the profit motive, keeps pay low: the median care worker earns only £7.50 an hour compared with £12.23 in the whole economy.

Social care is a merit good: it gives private benefits to the person cared for and external benefits, such as lower burdens on the NHS (fewer delayed hospital discharges) and on working relatives, who can stay in employment (Extract E).

Many people who need care are on low incomes and cannot afford it, and individuals may underestimate the benefits of care because of imperfect information. As a result, in a free market social care is under-consumed and under-provided. Figure 4 shows that the 85+ population is forecast to roughly double by 2041, so these pressures will grow.

The most direct policy is more generous government funding, through grants to cash-starved local authorities or subsidies to private providers. As shown in the diagram, a subsidy shifts supply from S to $S + \text{subsidy}$, lowering the price paid by users from P_1 to P_2 and raising the quantity of care from Q_1 , where supply equals MPB , to the social optimum Q^* , where supply equals MSB , removing the welfare loss from under-consumption. Extra funding would also let providers pay higher wages, tackling the 28% annual staff turnover and 6.6% vacancy rate in Extract F, which damage the continuity and quality of care.

Price, costs, benefits



However, subsidies have an opportunity cost, and Extract F notes that public finances remain under pressure, so subsidies would worsen the budget deficit. Funding could come from a hypothecated (earmarked) tax for social care, which Extract F suggests has strong public support. There is also a risk of government failure: external benefits are hard to value, so the subsidy may be set at the wrong level, and with 75% of care homes run for profit, providers may use extra

money to raise profits rather than pay or quality, unless funding is tied to conditions such as minimum staffing levels.

A second policy is to raise the National Living Wage further or set a higher minimum wage for care. In a monopsony labour market a minimum wage set between the monopsony wage and the competitive wage can raise both pay and employment, because the employer no longer has to raise pay for all workers to hire one more. Higher pay would help recruitment and motivation and so improve quality. But Extract F shows the NLW has already left providers "at risk of bankruptcy", with more than 100 care firms going bust in 2018. Unless local authorities pay higher fees, a higher wage floor may reduce the supply of care, worsening under-provision, so wage policy only works if combined with extra funding.

Third, the government could fund high quality training and a professional career structure. Fewer than half of care workers hold a relevant qualification, and many feel undervalued with few chances of promotion. Training would raise productivity and MRP, which justifies higher wages in the long run, and improve the quality of care. However, the benefits take years to appear and better-qualified workers may move to the NHS, so training must go alongside better pay.

Fourth, relaxing immigration rules for care workers would increase labour supply quickly and ease shortages, since many care workers are already recruited from overseas. This is a cheap short-run solution, but it may hold wages down and does not address the low status and pay of the sector.

Some argue for bringing social care back into public ownership (Extract E).

Privatisation was meant to improve efficiency and quality, but quality has not improved, with scandals and clients cared for in 15-minute slots. Public ownership would remove the profit motive and allow better integration with the NHS.

However, before the 1990s the government acted as a monopsonist keeping wages low, public providers may lack incentives to be efficient (X-inefficiency), and nationalisation would be very costly when the budget is under pressure. The real problem may be a lack of funding rather than ownership, as Extract F suggests.

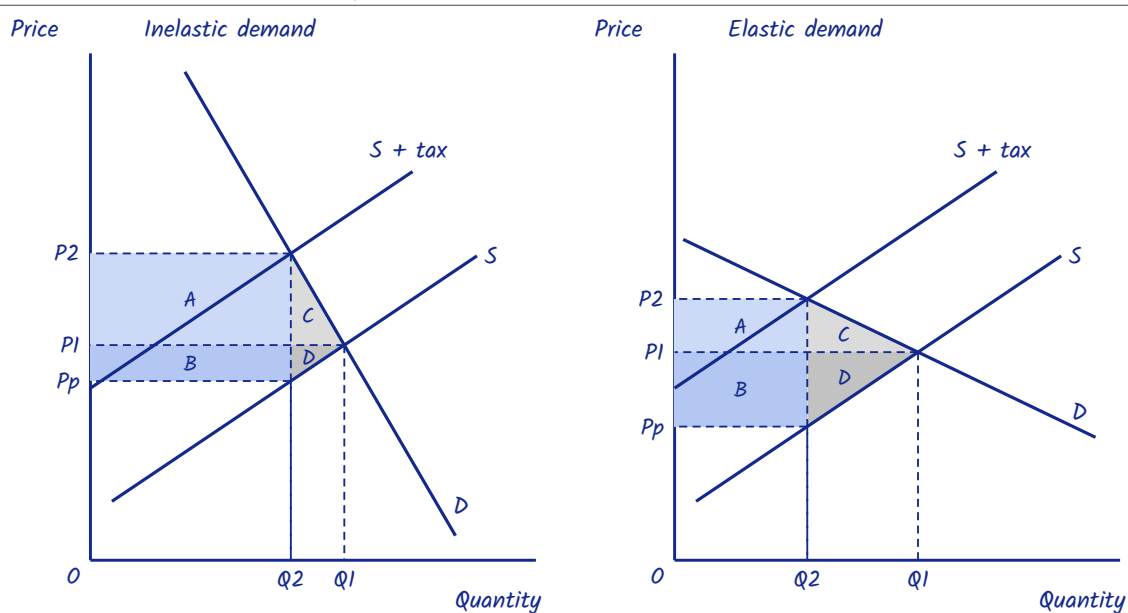
Stronger regulation by the Care Quality Commission, such as minimum

staff-to-client ratios, could raise standards, although many scandals occurred despite the regulator and there is a risk of regulatory capture. Alternatively, a compulsory social insurance scheme or higher cash benefits would let people buy their own care, increasing effective demand, though low-income households would still need state support.

In conclusion, the evidence suggests that the main problem is chronic underfunding combined with monopsony buying by local authorities, which pushes down fees, wages and quality. The most effective policy is therefore a significant rise in funding, ideally through a hypothecated tax, linked to conditions on pay, training and staffing. Raising the wage floor or relaxing immigration rules alone would fail, because providers cannot afford higher costs or because these treat symptoms rather than causes. Whether nationalisation is needed depends on whether better funding and regulation can make private providers deliver quality; given the cost and the history of public sector monopsony, funding reform should come first. With demand for care set to rise rapidly by 2041, delay will make the market failure, and the eventual cost, much greater.

An indirect tax is a tax on spending, paid to the government by producers, either as a specific tax (a fixed amount per unit) or an ad valorem tax (a percentage of the price). Consumer surplus is the difference between what consumers are willing to pay and the price they actually pay, shown by the area below demand and above price. Producer surplus is the difference between the price producers receive and the lowest price they would accept, shown by the area above supply and below price.

A tax is a cost of production for firms, so it reduces their willingness to supply at every price, shifting supply vertically upwards by the amount of the tax, from S to $S + \text{tax}$, as shown in the diagrams. Equilibrium moves from P_1, Q_1 to a higher price paid by consumers, P_2 , and a lower quantity, Q_2 . Producers keep P_2 minus the tax, which is P_p , less than before.



Consumer surplus falls by area $A + C$: consumers pay more for the Q_2 units they still buy (A) and lose the surplus on the units between Q_2 and Q_1 that are no longer bought (C). Producer surplus falls by area $B + D$: producers receive less for each unit they still sell (B) and lose the surplus on the units no longer sold (D). Part of the lost surplus is transferred to the government as tax revenue, area $A + B$ (tax per unit $\times Q_2$), which can be spent on public services. Areas C and D are gained by nobody: they are the deadweight loss, the welfare lost because fewer mutually beneficial trades take place.

How the burden is shared, the incidence of the tax, depends on price elasticity.

When demand is price inelastic (left diagram), as for cigarettes, petrol or services with few substitutes, firms can pass most of the tax on in higher prices, so consumer surplus falls by more than producer surplus (A is larger than B) and the deadweight loss is small because quantity falls little. When demand is price elastic (right diagram), consumers switch to substitutes if the price rises, so firms must absorb most of the tax: producer surplus falls by more (B is larger than A) and the deadweight loss is larger because output falls more. Similarly, the more price elastic supply is, the greater the share paid by consumers.

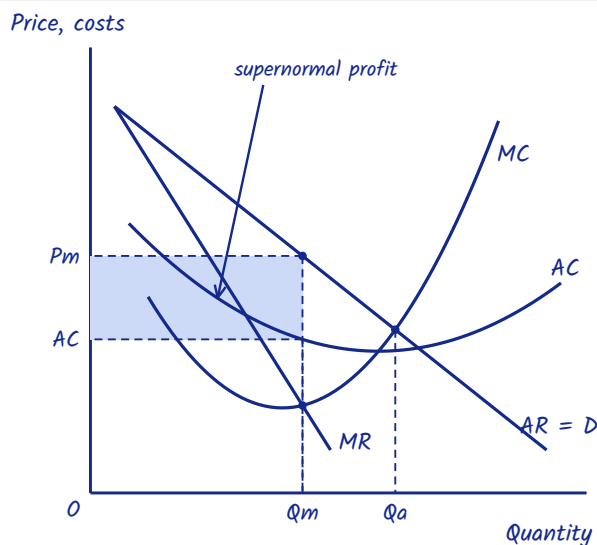
In practice firms may not pass on the tax fully. A firm earning supernormal profit may pay the tax out of profit to protect market share, while firms earning only normal profit may be forced out of the industry, reducing supply further. A tax on revenues, as proposed for the large technology firms, works like an ad valorem tax, so its effect on surplus depends on how far the firms can pass it on to users and advertisers. Finally, if the good creates negative externalities, the loss of consumer and producer surplus may be outweighed by lower external costs, so overall welfare could rise.

1 0

Monopoly power is the ability of a firm to influence the price of its product, usually by restricting output. Google has around 90% of the search market, and Amazon, Apple, Facebook and Microsoft dominate online retail, app stores, social media and operating systems. Their dominance has come from network effects (a platform is more valuable the more people use it), huge economies of scale, control of user data and the takeover of potential rivals, such as Facebook's purchase of Instagram and WhatsApp. These create high barriers to entry.

The diagram shows the traditional case against monopoly. A profit-maximising monopolist produces where $MC = MR$, at Q_m , and charges P_m from the AR curve. Because P_m is above AC , it earns supernormal profit (shaded), protected in the long run by barriers to entry. Price is above MC , so output is below the allocatively efficient level Q_a , and output is not at the minimum point of AC , so the firm is productively inefficient. Consumer surplus is transferred to the firm and there is a deadweight loss. Lack of competition may also cause X-inefficiency

and less choice. These are the arguments for more regulation and taxation.



Regulation could take several forms. Competition authorities can block mergers that remove potential competitors, fine firms that abuse dominance, as the EU did when it fined Google €2.4 billion in 2017 for favouring its own shopping service, or break firms up, for example separating Amazon's marketplace from its own-brand retailing. More competition would push prices towards MC, widen choice and encourage innovation. Data regulation, such as letting users move their data to rivals or requiring firms to pay users for their data, would weaken network effects and lower barriers to entry.

However, regulation faces difficulties. Many of these services are free to users and paid for by advertising, so the usual test of excessive prices does not apply; the harm comes through loss of privacy, lower quality and higher prices for advertisers, which are hard to measure, and many concerns are about data protection rather than economics. Regulators may lack the information and expertise to keep up with fast-changing markets, and competition law was designed for traditional industries. Breaking firms up may destroy economies of scale and network benefits: a search engine or social network may be more useful because everyone uses it, making these firms close to natural monopolies, and lower average costs may mean lower prices than in a competitive market. There is also a risk of regulatory capture, given the firms' huge lobbying budgets.

Supernormal profit can also be beneficial. These firms spend tens of billions of dollars a year on research and development, creating products such as

smartphones, cloud computing and artificial intelligence, so they may be dynamically efficient. Schumpeter's idea of "creative destruction" suggests monopoly power in technology is often temporary: once dominant firms such as Myspace, Ask Jeeves and IBM lost their positions without government intervention as new technologies emerged. If these markets are contestable in the long run, the need for regulation is smaller.

Taxation is the second option. A tax on revenues rather than profits, such as the UK's 2% Digital Services Tax, is designed to stop firms shifting profits to low-tax countries such as Ireland, which lets them pay little corporation tax where their users are. This is seen as fair and raises revenue for public services. By contrast, a windfall tax on supernormal profits would not change the profit-maximising output, because it does not affect MC or MR, so it redistributes monopoly profit without reducing output further.

However, a revenue tax acts like an indirect tax: it raises costs at every level of output, so it may be passed on to advertisers and online sellers and then to consumers through higher prices, reducing output and adding to the deadweight loss. Because these firms are footloose and global, a tax imposed by one country may lead them to shift activity elsewhere, and the USA has threatened trade retaliation against countries with digital taxes. International coordination, such as OECD agreement on a global minimum tax, is more effective but slow to achieve. A tax also does nothing directly to increase competition.

Overall, governments should consider increasing regulation, but it should target specific abuses of dominance, such as blocking takeovers of potential rivals, preventing firms favouring their own services and giving users control of their data, rather than breaking firms up, which risks losing the economies of scale and network benefits that consumers value. Taxation is justified mainly on grounds of fairness and to stop tax avoidance, and works best when coordinated internationally, since a unilateral revenue tax risks being passed on to consumers and provoking retaliation. The strength of the case depends on how contestable these markets really are: if network effects and data create permanent barriers to entry, dynamic efficiency arguments are weak and stronger intervention is

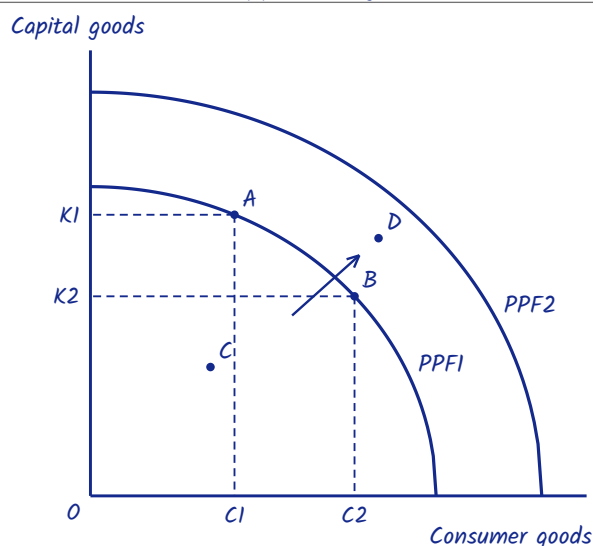
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*justified; if innovation continues to erode dominance, a lighter approach would
avoid government failure.*

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The fundamental economic problem is scarcity: wants are unlimited but the resources (land, labour, capital and enterprise) available to satisfy them are finite. Choices must therefore be made about what to produce, how to produce it and for whom. A production possibility diagram shows the maximum combinations of two goods, or types of goods, that an economy can produce when all its resources are fully and efficiently employed, with a given state of technology.

Scarcity is shown because combinations outside the frontier, such as point D on PPF1, are unattainable with current resources, so the economy cannot produce everything people want. Choice and opportunity cost are shown by moving along the frontier: moving from A to B, the economy produces more consumer goods (C1 to C2) but must give up capital goods (K1 to K2). The capital goods sacrificed are the opportunity cost, the next best alternative forgone.



The PPF is usually drawn concave to the origin (bowed outwards) because resources are not equally suited to producing both goods. As more consumer goods are produced, resources better suited to making capital goods must be switched across, so ever larger amounts of capital goods must be given up for each extra unit of consumer goods: opportunity cost rises. A straight-line PPF would show constant opportunity cost.

All points on the frontier, such as A and B, are productively efficient, because output of one good cannot be increased without reducing the other: resources are fully employed and goods are produced at the lowest cost. A point inside the frontier, such as C, shows unemployed or inefficiently used resources, for example

during a recession. Moving from C towards the frontier involves no opportunity cost and represents short-run growth, using spare capacity. However, not every point on the frontier is allocatively efficient: only one combination best matches society's preferences, and the PPF alone cannot show which point this is.

An outward shift from PPF1 to PPF2 shows an increase in productive capacity, long-run economic growth, caused by more or better quality factors of production, such as investment in capital, education and training, or new technology. Choosing a point with more capital goods (A rather than B) means less consumption today but more investment, which shifts the PPF further outwards in future. This shows the trade-off between present and future living standards and how dynamic efficiency can be achieved. An inward shift could show a loss of resources, for example after a natural disaster or war.

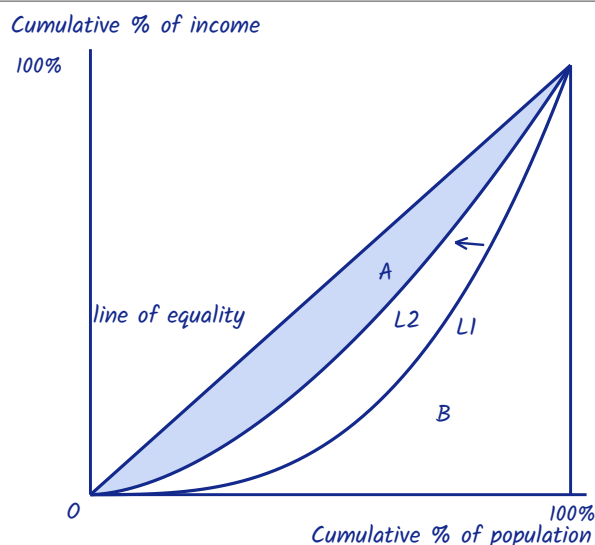
The PPF can also illustrate the "for whom" question and the trade-off between efficiency and equity that Mankiw describes: a PPF of public services against private consumption shows that more spending on public services means less private consumption. However, the diagram is a simplification: it shows only two goods, assumes fixed resources and technology, and says nothing about how output is distributed between people.

1 2

Inequality is the unequal distribution of income (a flow, from wages, rent, interest, profit and benefits) and of wealth (a stock of assets such as property and shares). It is measured using the Lorenz curve and the Gini coefficient: the further the Lorenz curve is from the line of equality, the greater the inequality. The UK's Gini coefficient for disposable income is about 0.35, high by European standards, and wealth is distributed far more unequally than income. Economic welfare is the overall well-being of society, which depends on both total output and how it is distributed.

Governments reduce inequality through progressive taxation, where higher earners pay a larger proportion of income in tax, inheritance and wealth taxes, means-tested benefits such as Universal Credit and tax credits, free state education and healthcare, and policies that reduce inequality in market incomes,

such as the National Living Wage and equal opportunities laws. As shown in the diagram, these policies shift the Lorenz curve from L1 towards the line of equality at L2, reducing area A and so the Gini coefficient, $A \div (A + B)$.



The main argument that welfare improves is the diminishing marginal utility of income: an extra £1 gives more utility to a poor household than to a rich one, so transferring income from rich to poor can raise total utility even if total output is unchanged. Reducing poverty also lets low-income households afford merit goods such as nutritious food, education and healthcare, improving human capital and productivity in the long run.

Inequality also creates negative externalities. Research such as Wilkinson and Pickett's "The Spirit Level" links greater inequality with higher crime, worse mental and physical health and lower educational achievement, which impose costs on third parties and the government. Reducing inequality lowers these costs and improves social cohesion. Low-income households also have a higher marginal propensity to consume, so redistribution raises aggregate demand, and less concentration of wealth may reduce speculative asset bubbles.

Intervention can also correct market failures that cause inequality. Monopsony employers pay workers less than their MRP, and a minimum wage can raise both pay and employment. Equal opportunities laws and free education reduce discrimination and allow talented people from poor backgrounds to contribute fully, improving allocative efficiency and social mobility.

However, there is a trade-off between equity and efficiency, as Mankiw argues.

High marginal tax rates reduce the incentive to work, take risks and invest, and may cause a brain drain or capital flight as footloose high earners and firms move abroad. The Laffer curve suggests that above a certain rate, higher taxes reduce tax revenue, leaving less to spend on the poor. Generous means-tested benefits can create a poverty trap: as benefits are withdrawn when income rises, the effective marginal tax rate can be very high, so people have little incentive to work more. Supporters of "trickle-down" economics argue that lower taxes on the rich lead to more enterprise and investment, raising growth and incomes for all. If total output falls, welfare may fall even if inequality is reduced.

There is also a risk of government failure. Policies may have unintended consequences, such as tax avoidance by the wealthy, high administrative costs and complex benefits that fail to reach those in need. A minimum wage set too high may cause unemployment among the least skilled, worsening inequality. Some inequality is also needed to provide incentives and to signal where labour is most needed, so complete equality would be inefficient.

The outcome depends on the type and scale of intervention. Policies that reduce inequality of opportunity, such as early years education, training and free school meals, are likely to improve both equity and efficiency because they build human capital. Very high income tax rates are more likely to damage incentives. The evidence on incentive effects is mixed: the labour supply of most workers is fairly inelastic with respect to tax, although top earners are more responsive. Countries such as Denmark and Sweden combine low inequality with high living standards, suggesting that reducing inequality need not harm growth, though this may reflect other factors such as high productivity and trust. Value judgements matter too, as what counts as a fair distribution is normative.

In conclusion, government intervention to reduce inequality is likely to improve economic welfare when inequality is high, when it targets poverty and inequality of opportunity, and when it is designed to limit disincentive effects, for example by tapering the withdrawal of benefits and investing in education. Because of diminishing marginal utility and the external costs of inequality, moderate redistribution probably raises total welfare. Beyond a certain point, however, higher

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taxes and benefits are likely to reduce efficiency and growth by more than they improve equity, so the view is valid only up to a point: it is the size and design of the intervention, rather than intervention itself, that determines whether welfare improves.

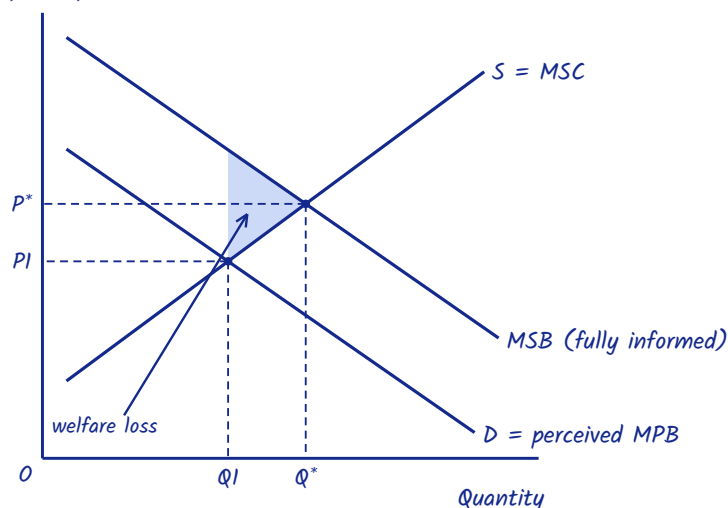
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Market failure occurs when the price mechanism fails to allocate resources efficiently, so economic welfare is not maximised. Markets work best when consumers and producers have perfect information, so their decisions reflect true costs and benefits. Imperfect information exists when economic agents lack the full and accurate information needed to make the best decisions, or when information is presented in a confusing or incomplete way.

First, imperfect information leads to the under-consumption of merit goods.

Consumers often underestimate the long-term private benefits of goods such as education, health checks or pension saving, because the benefits come far in the future. As shown in the diagram, demand is based on perceived MPB, which lies below the MSB that reflects the full benefits if people were fully informed. The market equilibrium is at Q_I rather than the optimum Q^* , so the good is under-consumed and there is a welfare loss shown by the shaded triangle. For example, many people save too little for retirement, which may lead to poverty in old age. Conversely, consumers underestimate the harm from demerit goods such as cigarettes and gambling, which are over-consumed.

Price, costs, benefits



Second, asymmetric information occurs when one party to a transaction knows more than the other. Akerlof's "market for lemons" shows how this can make markets work inefficiently or even collapse. In the second-hand car market, sellers know whether their car is good or a "lemon" but buyers do not, so buyers will only pay a price based on average quality. Owners of good cars find this price too low and withdraw them, which lowers average quality and therefore the price

buyers will pay, until mostly lemons are left. Mutually beneficial trades of good cars do not happen, so resources are misallocated. Adverse selection in insurance works in a similar way: high-risk people are more likely to buy cover, which raises premiums and drives out low-risk people.

Third, moral hazard arises when an agent takes more risks because they do not bear the full consequences and the other party cannot observe their behaviour. Insured drivers may drive less carefully, and banks that expect a government bailout may make riskier loans, as before the 2008 financial crisis. Because the costs of the risk are borne by others, too much risk is taken and resources are misallocated.

Sellers may also exploit buyers' lack of information, for example the "loyalty penalty" charged by banks, broadband and mobile phone providers to existing customers who do not compare deals, which the CMA has acted against. In labour markets, employers cannot observe workers' true productivity, so they may rely on signals such as qualifications or discriminate, leading to inefficient hiring.

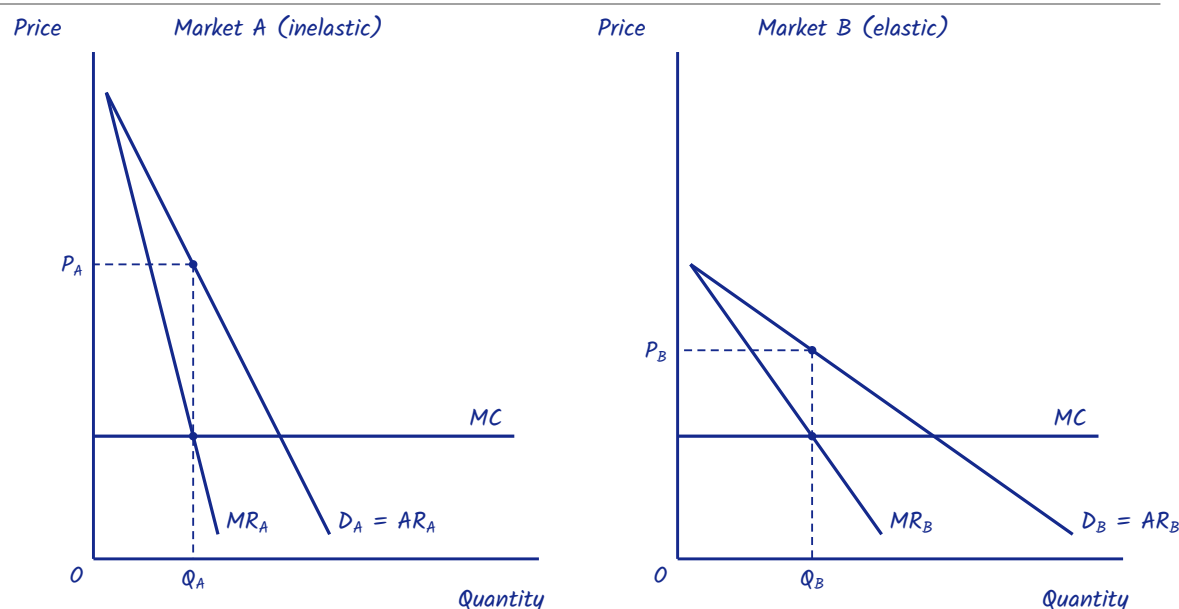
Finally, even when information is available, people have bounded rationality: they cannot process large amounts of complex information, so they use rules of thumb and are affected by biases such as present bias and inertia, so complex pension or energy tariffs lead to poor choices. In all these cases imperfect information means that demand and supply do not reflect the true costs and benefits of goods, so prices send the wrong signals, resources are not allocated to their best use and the market fails. This can justify intervention such as providing information, regulation or subsidies, although the government may itself lack perfect information.

1 4

Price discrimination occurs when a firm charges different prices to different consumers for the same good or service, for reasons not related to differences in cost. Three conditions are needed: the firm must have price-setting (monopoly) power; it must be able to separate consumers into groups with different price elasticities of demand, for example by age, time of purchase or whether they are new or existing customers; and it must be able to prevent resale between the

groups (market seepage). First-degree discrimination charges each consumer the most they are willing to pay; second-degree charges different prices according to the quantity bought, such as bulk discounts; third-degree charges different prices to different groups.

The diagram shows third-degree price discrimination with constant MC. The firm maximises profit by setting $MR = MC$ in each market. In market A demand is price inelastic, for example loyal existing customers who do not switch provider, or business travellers, so a high price P_A is charged. In market B demand is price elastic, for example new customers or students, so a lower price P_B is charged. By charging different prices the firm earns more revenue and profit than it would with a single price.



Price discrimination can be damaging. Consumers in the inelastic market pay a higher price and lose consumer surplus, which is transferred to the producer as profit; under first-degree discrimination all consumer surplus is captured by the firm. This is often seen as unfair, especially when those paying more are captive or vulnerable: the CMA found that loyal customers of broadband, mobile and financial services, often elderly people, were paying more than new customers, which is why it acted in 2018. Price is above marginal cost in market A, so the outcome is allocatively inefficient, and the extra profit may strengthen monopoly power, allowing the firm to deter entry, for example through predatory pricing, or to become X-inefficient.

However, price discrimination is not always damaging. Output is often higher than under a single-price monopoly because the firm sells extra units to the price-elastic group, so allocative efficiency may improve. Consumers in market B, often on lower incomes such as students, pensioners or children, may pay less than under a single price, and some can only afford the good at all because of discrimination, as with off-peak rail fares or last-minute holidays. Firms with high fixed costs and low marginal costs, such as airlines and train operators, can fill seats that would otherwise be empty, making better use of resources.

The extra profit can be used to cross-subsidise loss-making services, such as rural rail routes, or to fund research and development, improving dynamic efficiency, as when drug companies charge higher prices in rich countries and lower prices in developing countries. In some cases a service would not be provided at all without price discrimination, because no single price would cover average cost. Price discrimination can also reduce secondary markets: if a single low price is charged for concert tickets, touts buy them and resell at much higher prices, so the surplus goes to touts rather than to fans or the firm.

Whether price discrimination is damaging depends on several factors. First, the comparison: compared with perfect competition it is worse for consumers, but the realistic alternative is usually a single-price monopolist, compared with which output and total welfare may be higher. Second, who pays the higher price: it is more acceptable if they are high-income groups such as business travellers than if they are vulnerable or poorly informed customers. Third, how the extra profit is used: investment and cross-subsidy benefit society, while higher dividends mainly benefit shareholders. Fourth, the degree of discrimination: perfect first-degree discrimination removes all consumer surplus and is rarely possible, but big data increasingly lets firms personalise prices online.

In conclusion, price discrimination is not always damaging. It harms consumers in the inelastic market and can be exploitative when it targets loyal or vulnerable customers who lack information, which justifies the CMA's action against loyalty penalties. However, it can raise output, make goods affordable for lower-income consumers, keep useful services running and fund innovation. Each case should

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therefore be judged on its effects: regulators should act when discrimination exploits captive customers or strengthens monopoly power, but allow it when it widens access and improves the use of resources.

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