



Markets and Public Goods: Integrity, Trust, and Climate Change

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Accepted: 22 July 2024 / Published online: 5 August 2024
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Abstract

Public goods are an anomaly in neoclassical economics, a form of ‘market failure’. They exist outside the efficient and equitable optimality of market exchange. It can be shown however that competitive markets are only efficient in short product cycles. Long-term objectives require social support. Corruption arises from the consequent private public interaction. Integrity, the absence of corruption, is a public good. Corruption has risen since the 1980s with privatization and outsourcing. How did European governments become honest in the first place? In the century after the 1770s, they moved from regarding public office as a form of private property to a conception of serving the public good. This integrity revolution was facilitated by Weberian bureaucracies, selected by academic merit and committed to impartiality by long-term incentives. The neoliberal revolution of the 1980s regarded bureaucracies as obstructive and slow. It admired the business corporation with its opaque procedures and charismatic leadership. Concurrently economics moved from neoclassical harmony theory to an asymmetric information model of ‘opportunism with guile’, providing doctrinal legitimacy for corruption. Corporate advertising is deliberately deceptive, and undermines the public good of trustworthiness. Digital platforms, powered by advertising, have subverted public discourse. Misinformation and disinformation have become prime risk factors for current societies. The practical operation of markets undermines the public goods of integrity and trustworthiness. The public good of a habitable climate cannot be achieved by market methods. For long-term payoffs, ‘free markets’ are a harmful delusion, inefficient, corrupt, impossible to achieve, and not sustainable.

Keywords Markets · Public goods · Climate change · Trust · Integrity · Friedrich von Hayek · Paul Samuelson · Corruption · Leadership · Joseph Stiglitz · R.A. Musgrave

Public goods are associated with wholesomeness, e.g. clean air and street lighting. Integrity, the opposite of corruption, is another public good. The invisible hand of the market, its seamless provision of goods and services, can also be seen as a public good and the economist Gary Becker has argued, ‘if we abolish the state, we abolish corruption’ (Tanzi 2003: p. 26). There is however an abiding tradition that corruption is a form of market failure, a negative externality of business, a public bad. The purpose here is to explain how markets promote corruption, and why they undermine the public goods of integrity, truth, and climate stability.

In neoclassical economics, social optimality is achieved by means of market exchange. In general equilibrium, an encompassing one-off bazaar in which all goods are bought and sold at once and for all time, market trading is efficient in the sense of leaving no goods on the shelf. It also delivers a thin version of equity: an improvement only counts if nobody loses (‘Pareto efficiency’). In buying and selling, each person can signal their tastes to collectively achieve this ‘attainable-bliss point’ (Samuelson 1954: p. 388). But these conditions apply only when markets are complete, i.e. all goods are up for sale. The existence of public goods challenges this vision since they come into being outside the market. In an economy with public goods, markets are not complete.

The textbook understanding of public goods goes back to the American neoclassical consensus of the 1950s. Paul Samuelson, the main architect of that consensus, defined

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collective consumption goods as those for which one individual's take does not diminish that of any other (Samuelson 1954: p. 387), a condition that has come to be known as 'non-rivalry'. Public goods are also non-excludable: no citizen or resident can be left out, for example from the protections of national defence. All navigators can see the lighthouse, and each navigator's use of it does not interfere with another's (Musgrave and Musgrave 1973: ch. 3; Desmarais-Tremblay 2017: pp. 72–76; my example). Such goods cannot be allocated by means of ability to pay, so nobody has an interest in paying for the benefit, assuming that the others will. That is why markets alone cannot provide for all of society's needs, why markets sometime fail. Public goods constitute a challenge to the market order (Samuelson 1954, 1955, 1958; Musgrave and Peacock: xvii; Musgrave and Musgrave 1973: ch. 3; Pickhardt 2006: pp. 443–444, 446–447). The criteria of non-exclusion and non-rivalry, defined jointly by Richard Musgrave in 1969 and 1973, were widely prefigured, and were already stated in these terms by the Swedish economist Gustav Cassel in 1918 (Desmarais-Tremblay 2014: p. 12; Sturn 2010: p. 293).

Neoclassical public finance strove nevertheless to square the anomaly of public goods with the ideal of market exchange (Samuelson 1958; Stiglitz and Atkinson 1980: pp. 4–7). As in dealing with markets, public finance also strives to optimize the delivery of public goods. Pure public goods, Samuelson explained, can be delivered Pareto efficiently 'when the sum of marginal rates of substitution (over all equal goods) equals marginal rate of transformation [of private goods for public goods]' (Samuelson 1954; quote from Stiglitz and Rosengard 2000: p. 116). What this means is that when all individual preferences for substitution between public and private goods are added up, the slope of the substitution between private and public goods equals the slope of substitution determined by their relative cost. This is an 'existence proof', namely that optimality is possible in principle (Samuelson 1954: p. 389). This definition is italicized and also boxed in the source quoted, but does not serve any practical purpose: the premises of substitution are impossible in practice, there are no data available to calculate equilibrium, and it is hard to see how such data could ever exist. In these circumstances, Samuelson argued, optimality cannot arise out of private preferences alone; there has to be some external normative authority, typically government, to provide the public goods.

Samuelson and Musgrave both assumed that public goods added up to satisfy the sum of private wants. There is another tradition of public goods, a German one, which assumes that public goods meet more than private needs. People derive satisfaction from membership of a community and the benefits it confers. The community provides for things we ought to aspire to as a group even if some of them are only conferred on individuals. In the welfare state for

example, differential benefits confer collective well-being. In this tradition, public goods are regarded as legitimate and efficient as market provision (Ritschl 1931/1958; Musgrave 1996/1997: pp. 150–158; Sturn 2010: pp. 285–287).

Samuelson (1955) conceded that most public goods were not pure, i.e. that exclusion and rivalry were usually possible, and indeed that is implicit in his own example of national defence, which strives to exclude the unwanted. Much of the subsequent discussion has shifted to how public goods are restricted to particular groups, communities, locations, and nations (Desmarais-Tremblay 2014: pp. 17–26).

II

For Friedrich von Hayek, government provision of public goods constituted 'the road to serfdom', the title of his book of 1944. He nevertheless acknowledged that government was necessary and even conceded a measure of social welfare. In response, John Maynard Keynes wrote to Hayek, 'You agree that the line has to be drawn somewhere... But you give us no guidance whatever as to where to draw it' (28 June 1944, Keynes 1980: p. 386, quoted in Sturn 2010: p. 301). Hayek did not rise to the challenge, but it is possible to draw such a line, a precise empirical and practical boundary between market competition and public provision. This divide is also a prime source of the public bad of corruption, and hence also of its opposites, integrity, and trust (Offer 2022: chs. 1–3). It provides an alternative rationale for why government needs to promote public goods, and also suggests alternative ways of how they might be provided.

Market goods need to be financed before they are provided. An investment needs to pay off within a period of time, the duration of which is defined by the interest rate. How long does it take an investor or lender to break even? This waiting time is the 'payback period'. It is the time required for the interest payments to add up to the original advance. This duration is determined by the interest rate. The higher the rate, the shorter the wait. For example: For a loan of £100 with interest at 10%, £10 is paid as interest every year and the payments add up to the value of the advance in 10 years. When the interest rate is 2%, the payback period is 50 years. If it takes any longer, the investment cannot repay the cost of capital. But that is only the nominal cost of credit. Business needs to make a profit on top of its capital cost, which means that it has to break even in less time than the payback period. If a project takes longer than the payback period to return its cost, it cannot be undertaken by business alone. It has to be carried out by the public or undertaken with its support. This provides a different justification for the existence of public goods than the neoclassical criteria of nonexcludable and non-rival (Offer 2022: pp. 13–18).

The ‘payback period’, which only measures the nominal return, is widely used as an investment threshold. But a dollar tomorrow is worth less than a dollar today. To take this into account, future revenue has to be discounted by the interest rate. At 10% interest, £10 of revenue in a year’s time is only worth £9 today. In conventional project appraisal, a project is only acceptable if the discounted future revenue flow adds up to more than the initial advance. This ‘net present value’ (NPV) needs to be positive for the project to go ahead. If NPV is set to 0 in 10 years with a given interest rate (i.e. the project is borderline viable), what interest rate would be required to achieve it? This is called the ‘internal rate of return’. When NPV (on a loan of £100) is 0 in 10 years (at a discount rate of 10%), the internal rate of return needs to be about 16% and the actual payback period is a little over 6 years. To make a profit, a project needs to break even in a shorter period of time, and the business ‘hurdle rates’ for investment are much higher than the IRR. So the simple payback period (in which the interest adds up to the sum of the advance) is merely an outer bound for business to break even under the prevailing interest rate. If the project takes any longer to mature, business cannot repay the initial loan. That is why business is perennially ‘short-termist’ — under prevailing interest rates it cannot deal with the longer term unaided, on its own.

Short-term projects typically benefit from market competition. The payback period is the outer bound for ‘free markets’, for profit-making enterprise. It truly constitutes the private–public divide. Beyond it, enterprise has long or indeterminate financial breakevens, and hence, the continued existence of a large not-for-profit sector: healthcare, education, science, art, universities, roads, railways, energy, nuclear power, parks, museums, opera, defence and war, global warming, space exploration: A large array of desirable and vital enterprises cannot be undertaken for profit because they take too long to complete, or are never actually completed. The family, in which the future labour force is brought into being, is also formed not-for-profit. In terms of cost, home production comes up to 20 to 40% of GDP in developed countries.

This suggests a division of labour: Business for short product cycles, e.g. food, hospitality, retail, and consumer durables like smartphones and motor cars. Government, non-profit, philanthropy, and altruism for long product cycles, e.g. infrastructure, education and scholarship, public goods, and family. Conservative politicians, even after years in office, complain that the state is too large, and that more of its activities should be undertaken by private enterprise in market settings. In practice, ‘free market’ solutions for long-term objectives are costly, ineffective, or impossible. There are however exceptions: Where the investment creates an asset whose units can be sold off one by one, they can be used as collateral and long-term investment can proceed.

That is why it is possible to borrow long-term to finance airliners, ships, and housing. When assets are indivisible, when private or public enterprises ignore the boundary (in either direction) expect inefficiency, corruption, or failure.

In addition to asset divisibility, two other mechanisms allow business to operate beyond the payback period boundary. One is a ‘franchise’, which transfers the risk from business to society. This is done by protecting the private revenue flow. It can be a straightforward government guarantee but more typically involves indirect support by means of limited liability, rights-of-way, tax concessions, monopolies, patents, subsidies, bailouts, resource concessions, intellectual property rights, and legal personality. The benefits of the financial, legal, and social order also underpin private enterprise beyond the payback period, e.g. something as basic as upholding the security of contract. The financial system, regulated and guaranteed by government, is another pillar of long-term security, and a franchise in its own right. The security of a franchise provides business with access to long-term private finance in the form of bonds. For a business, bonds offer a long maturity; for the lender, they allow for immediate exit, with the security of a franchise.

Another mechanism which can facilitate long-term private enterprise is ‘mania’, an investment boom driven by the prospect of windfall returns in excess of the ordinary. This is usually set in motion by technological innovation, which may or may not prove successful. In response, investors become speculators and suspend rational calculation. Nineteenth-century dashes to invest in British and American railways, and in urban tramways in the last third of the century, were substantially financed by manias of this kind. In the 1990s, the dot.com boom paid for a network of high-speed optical cable communication. Few manias achieved their expected returns and they were often followed by over-investment and shakeouts, but whether financially successful or not they sometimes left behind a legacy of physical assets which continued to serve long after excitement subsided.

Franchise and mania both give rise to corruption. In manias, entrepreneurs can mislead naïve and greedy investors. The franchise model gives government officials the discretion to hand over public resources to private individuals. Neoliberalism relies on government underpinning for the market order (Mirowski 2009); in other words, the neoliberal market order is itself a form of business franchise. The scale of corruption has been rising since the onset of the neoliberal revolution in the 1980s (Offer 2022: chs. 2–3).

In Britain, the Private Finance Initiative (PFI) was started by a conservative government in 1992 but was taken up with gusto by New Labour between 1997 and 2010. Under PFI, hospitals, schools, etc., were financed, built, and run privately for public bodies such as the National Health Service and local authorities. If you wanted a hospital, PFI was the only game in town. Lenders were typically guaranteed

payment for 30 to 40 years at commercial interest rates which were twice the borrowing cost for government. After the collapse of the large PFI contractor Carillion in 2018, Sir Howard Davies, chairman of the nationalised Royal Bank Of Scotland (among several private–public posts in his career), said that PFI was ‘fraud on the public because the government is always the cheapest borrower’ (BBC ‘Question Time’ 18 January 2018). On the face of it (although never admitted), PFI was undertaken in order to keep the borrowing off government books. Neither the motivation nor its denial is consistent with honest government. PFI itself was deeply corrupt: Notional value for money tests carried out by the Treasury were rigged in its favour; conflicts of interest abounded, for example where staff of beneficiaries seconded as temporary civil servants wrote contracts with their own industries and companies. Government and business interpenetrated, with ‘revolving doors’ for executives and officials in both directions, as well as several publicised cases of explicit cronyism. No reviews, accountability, or transparency existed, except for occasional audits by toothless Parliamentary committees. Dissimulation, deception, self-congratulation, and violation of fiduciary duty were the order of the day. In a culture of impunity, nobody was ever punished. Much of the profit drained away into overseas tax havens. By the late 2010s, the system was in disrepute and was terminated in 2018 after one scandal too many. PFI was abandoned but bloated payments will continue until the mid-century (Offer 2022: pp. 28–41; Hare 2013).

III

How did British governance come to be honest in the first place? Britain underwent an integrity revolution over a century between c. 1770 and 1870. In the century that followed, it enjoyed the benefits of integrity. In the eighteenth century, British governance was deeply corrupt (Harling 1996; Knights 2021). Public office was an opportunity for enrichment often treated as a species of private property. Ministers were venal, the Church was grasping, University Professors were idle, military officers invested funds to buy their own commissions, and seats in Parliament (‘rotten boroughs’ with few voters) could be purchased. Under Robert Clive and Warren Hastings, the East India Company corruptly extracted untold wealth from an impoverished society (Dirks 2006). William Cobbett, a Radical writer of the time, called it ‘Old Corruption’.

In the course of about a century, the countries of North-Western Europe underwent a transition from self-interested bias in every sphere of governance to a norm of impartiality and integrity. The change was achieved mainly by means of a professional, meritocratic, and impartial civil service. These institutions and their incentives were

explained retrospectively by Max Weber (Weber and Elbers 1921/2015). In this perspective, loyalty to the monarch was reassigned to the public interest. Government service became an exalted ‘Calling’ (*Beruf*), and not a transactional contract of employment. Professional norms pre-empted self-interest. Recruitment was by impersonal examinations, designed to identify talent. Officials were chosen from among the brightest and the best. The disciplines examined were academic, not easy to master, and difficult to fake. The procedure embodied respect for validated knowledge, for honesty, for impartial truth. Loyal service was rewarded by permanent employment, generous pay, and respected status. Officials stayed in post for decades, and acquired specialist expertise and the confidence of experience. There was more to look forward to: a medal to crown a career, and a pension when it ended. Cutting corners or bending the rules risked the loss of all that. A career in public administration was a long-term investment with a long-term break even, in line with our time-horizon incentive model.

German kingdoms and principalities, especially Austria and Prussia, set the process in motion. In France, public service recognized the value of credible expertise, imparted in *Grandes écoles* which graduated certified administrators and engineers for responsible positions. Britain began late and acted slowly. The Northcote-Trevelyan report on the civil service (1854) contained most Weberian elements and was applied piecemeal in the following decades. Corruption and self-service abated gradually in the church, the judiciary, the military, and the universities.

Bureaucracies had their limitations, but Weberian public-service norms gave North-Western Europe more than a hundred years of effective and honest governance. In the 1980s, the integrity revolution was reversed. On coming into power, the neoliberal Right denounced bureaucracy as inefficient and plodding, an enemy, not a friend. Instead, they promoted the business corporation as a model for public service and an end in itself. Around the end of the 1970s and the beginning of the 1980s, this neoliberal model was embraced by the social democratic parties in Europe, English-speaking countries, and beyond (Mudge 2018). The neoliberal programme, first tried out in Pinochet’s Chile in the 1970s, and subsequently led by the Conservative Thatcher government in UK, was to privatise or outsource as much as possible of government activities. For the rest, under the ‘New Public Management’, officials were motivated by short-term rewards in the form of immediate performance targets and incentive pay. Water supply, energy, and the railways were privatised in the UK in violation of the payback period boundary norms. Problems have emerged in all of these industries, requiring renationalisation in the railways and serious failures in water and energy supply. With their unwarranted claim that private enterprise was best, market efficiency doctrines justified conversion of government revenue streams into tradable

assets underpinned by government guarantees, i.e. into franchise operations. ‘I cannot think of another instance where a modern democracy has systematically undone the system by which uncorrupted public services were brought into being.’ (Neild 2002: p. 198).

Weberian bureaucracy came into conflict with two other forces of modernity, with business and democracy. For business, the flow of taxation was a lost opportunity to profit from the riskless provision of necessities. Democracy for its part provided a vent for the anti-intellectualism of the common person. Weberian officials were selected and promoted by merit from among the old elites, for distinction in education, knowledge, and capacity. They had power without a mandate, in conflict with democracy’s conviction that one person was as good as another. The corporate model was more in tune with people’s experience and expectations: corporate leaders delivered results. They had what it took, as tested by reality. They had charisma. In Max Weber’s overarching interpretation, modernity constitutes progress from the magic and charisma of legacy leaders, to the reason and routines of rational bureaucracy. The neoliberal revolution went the other way: back from bureaucratic reason to corporate magic. ‘What works’, not ‘how it works’. Corporate leadership was opaque: it could not be taught and it earned exorbitant rewards. It had a mystery akin to magic: what counted was not procedure but results, personality, private knowledge, and confidential dealmaking. A corporate leader did not require substantive knowledge; they could handle anything. No longer deferential and deliberate, public management became assertive, adversarial, and abrasive.

Under the ‘New Public Management’, administration was modelled on business (Ferlie et al. 2005; Hood and Dixon 2015). Officials were moved around frequently, their skills being managerial rather than substantive, and when these did not suffice, advice was outsourced to consultants. The UK civil service has been hollowed out and lost some of its capacity to govern, lost even the ability to outsource effectively. This is exemplified by the recent scandal in which electronic tills for the government-owned Post Office were purchased from the Japanese company Fujitsu, whose unreliable software system Horizon wrongly attributed deficits to thousands of postmasters, with the government unable and unwilling to exercise effective oversight.

IV

In an affecting American magazine advertisement from the 1950s, an attractive mother hugs an adorable daughter, about 6 years old (copy in the author’s possession). The text proclaims, ‘it’s about a commitment that lasts beyond the day you sign on the dotted line’. What is this commitment, as strong as motherly love? ‘Personal attention

is the simple idea behind Chevrolet’s genuine customer care. And it comes with every new Chevrolet’. The viewer is enticed primarily by the ‘warm glow’ of approbation, not by the merits of the product. Approbation is a prime human motivator, the most important one according to Adam Smith. I call it ‘regard’ (Smith 1790/1976: p. 50; Offer 1997). Is a Chevrolet dealer as trustworthy as your mother? And why not? Because real regard is not for sale. If money changes hands in return for approbation, it exposes regard as inauthentic.

There is unease about deception in market exchange, which is expressed in the term ‘caveat emptor’ (let the buyer beware). Neoclassical economics is a ‘good faith’ creed. Traders all have perfect information, and deception is impossible. It is an optimal harmony theory, a ‘just world theory’ in which everyone gets what they deserve, and everything is for the best. In the 1970s, a new strand of economics emerged which assumed (more realistically) that information was incomplete and not available equally to all. With asymmetric information at its core, this was a revolution of sorts, in which deception and defection became the norm. It may be termed ‘bad faith’ economics, in which every party is assumed to be ‘self-interest seeking with guile’ (Williamson 1975: p. 255).

But good-faith and bad-faith economics are both deceptive: neoclassical good-faith economics because the world does not remotely resemble the model. In bad-faith economics (with asymmetric information), deception is built-in, and a good deal of its analysis is a futile quest to outsmart self-serving and cheating. Agency theory for example is largely about how to thwart an agent from deceiving the principal. Game theory more generally is focused on the choice between cooperation and deception. The more social cooperation there is, the greater the incentive to deceive (Frank 1988: pp. 57–59; Nowak 2011: pp. 207–208). But trustworthiness and truth are public goods, necessary for social efficiency. Co-operation and collusion are as much the norm and maybe more so than competition and deception (Benkler 2011; Nowak 2011).

Before the Internet, advertising was a mixture of the good and the bad. If in economic theory, everybody knows the price of everything for all time, in real-life traders still have difficulty in getting themselves noticed. Before the Internet, advertising typically accounted for between 1 and 2% of GDP every year (Offer 2006: pp. 122–123). It used a scatter-gun approach, and it was difficult to know with what effect. Corporations with large market power (e.g. Coca-Cola) saturated the cities with their images, which made it hard for new entrants and underpinned the advertiser’s dominance. This kind of advertising might be thought of as lubricating the wheels of commerce and jazzing up the urban environment. If it was sometimes an unsightly nuisance, perhaps it was not much worse than that.

Advertising is moderately deceptive almost by necessity. Dissimulation enters all discourse and few of us have not done so at one time or another, but we do not like to be deceived ourselves. Deception may sometimes be useful, or even necessary, but not as a norm. When truthfulness declines, it inhibits cooperation and trust, interpersonal, social, and political. Deception is a burden on society. It makes coordination and leadership difficult. It is a public bad. Truthfulness, its opposite, is a public good (Offer 2006: p. 136): ‘disinformation impinges on a person’s right to be informed about the risks they are facing’ (Ecker et al. 2024: p. 31).

The emergence of digital platforms since has leveraged advertising into an overpowering social force. Digital advertising revenue is now more than twice as large as all the legacy outlets together, which are in slow decline (Fig. 1). The development of digital markets (eBay, Amazon, etc.) has amplified the business potential for exposure, and the need for visibility pays for the main social platforms Google, Facebook, X (formerly Twitter), Microsoft, Amazon, and a multitude of others. It has also come to occupy and dominate the popular mind, especially among the young.

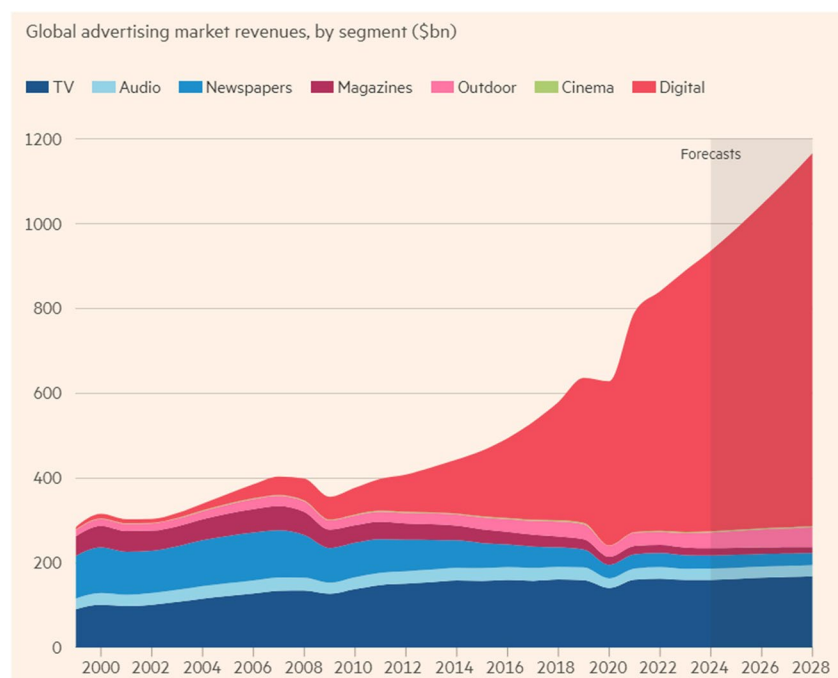
Social platforms harvest and monetise user data to manipulate desires: ‘We now pay for our own domination’ (Zuboff 2019: p. 11). State and private agents hitch a malevolent ride on the social network platforms that are powered by advertising (The Economist 2024a, 2024b). What began as advertising has metamorphosed into a monster. The concentration of economic, media, data, and political power is dangerous for democracy (Stigler Commission 2019).

The platforms are doubly deceptive — providing free information on demand, they secretly measure up each user for a personal profile. Private wants and foibles are exposed and sold for advertisers to tailor and target precisely. Viewers are captured and hooked by misinformation fabricated for their individual proclivities, which (in the aggregate) tend towards the sensational and inflammatory. Interfaces are designed to take advantage of vulnerable users. A disproportionate amount of advertising expenditure flows towards deliberate misinformation. It is estimated that for every \$2.16 in digital advertising sent to legitimate newspapers, US advertisers send a dollar to misinformation sites (Ahmad et al. 2024). When applied to news and current affairs, this lowers standards and crowds out impartiality and truth. Platforms influence political discourse by swaying content, and defend their opaque practices by means of effective lobbying (Stigler Commission 2019).

The World Economic Forum which sponsors the annual Davos gatherings publishes an annual Global Risk Report. In 2024 its number 1 short-term (2-year) risk was ‘Misinformation and Disinformation’, driven on digital networks and enhanced by artificial intelligence (World Economic Forum 2024), ahead of the ever-present threats of war, extreme weather events, and social polarisation. It is a cogent and striking statement of the critical value of truthfulness as a public good.

This may possibly be overstated. A detailed literature survey indicates that false and extreme content is not in fact widely sought, but is concentrated in a narrow fringe which seeks such information, and where the risk of harm is greatest it leaves most of the public but little affected (Budak et al.

Fig. 1 Global advertising market revenues, by segment (\$bn) 1998–2028. Source: D. Thomas 2024. How AI is transforming the business of advertising. *Financial Times* /FT.com. 22 February. Used under license from the Financial Times. All rights reserved



2024). In other words, the harm is still containable, and the public good of truth is worth pursuing promoting.

V

A climate fit for life is a public good. The policy reflex is to engage with global warming the neoliberal way, by means of market incentives. Government sets a price on carbon, and markets adjust accordingly. This objective, now long pursued, has failed to work, thus squandering a one-shot opportunity and leaving society much worse off. As awareness of global warming increased in the 1990s, five Nobel Prize-level economists wrote in 1997 that ‘Government needs to fix a price (tax) for carbon, and leave the rest to market forces’ (DeCanio 2003: p. 165). As late as 2019, an open letter by 3600 economists in the *Wall Street Journal*, including 27 Nobel prize winners, stated that ‘**A carbon tax** offers the most cost-effective lever to reduce carbon emissions.... it will send a powerful price signal that harnesses the invisible hand of the marketplace to steer economic actors towards a low-carbon future’ (*Wall Street Journal*, 17 Jan. 2019; bold in the original). Economists intuitively looked for a market solution to the provision of public goods. They failed to consider that the category had been devised precisely for those forms of welfare that could not be provided in markets.

From a market point of view, it was necessary first to establish the scale of the challenge. Among economists, the American William Nordhaus became the most prominent authority. He developed an analytical model which combined climate science with neoclassical growth theory, commonly known as IAM (Integrated Assessment Model). This class of models attempted to estimate the scale of GDP losses at different levels of global warming above the pre-industrial baseline. Using this method, prospective losses were found to be small, for example 2 to 3% of GDP at 4 °C warming over preindustrial times. In climate science discourse however, a temperature rise of this magnitude would render the planet nearly uninhabitable (Keen 2020; Steffen et al. 2018; Lynas 2020). The methods used employed a raft of questionable assumptions and techniques all biased towards minimizing the future impact of climate change (Keen 2020; Offer 2022: pp. 151–156).

Three alternative economic approaches to the provision of the climate mitigation are more in keeping with our model, which argues that long-term payoffs require government participation bring it off. The first stems from a report by Prof. Nicholas Stern commissioned by the British government (Stern 2007). Whether markets can respond to climate change depends on the discount rate, the annual rate by which future benefits are discounted today. Conventional market time horizons are far too short to engage with so remote a threat as climate change. With a market discount

rate of say 6% (as suggested by Nordhaus), a dollar of benefit in 17 years is worth nothing now. Since climate change is going to happen later than that, Nordhaus advocated procrastination. Climate mitigation should compete in the market with other priorities.

In his report of 2006, Nicholas Stern took a more paternalist approach, that government should set a low ‘social discount rate’ (1.4%) to take account of the interests of future generations. It should also set a high carbon tax. An investment of 1% of GDP annually would avert a permanent annual loss of 5 to 20% of GDP.

Figure 2 shows the present value of £100 50 years hence, at three different discount rates. At William Nordhaus’s market rate of interest (6%), the present value of £100 in 50 years is about £0.3. At Nicholas Stern’s social discount rate of 1.4%, its present value is about £50. In project appraisal, any sum below the present value is worth investing in order to mitigate climate change. The third discount rate, proposed by Martin Weitzman, is an average of the two (Weitzman 2007). For Stern, a large investment is definitely worthwhile; for Nordhaus, no investment is worth undertaking today. When the mean is taken of two discount rates, the resulting rate is not constant but variable: this case has implications which will come up later.

In 2018, Nordhaus received the Nobel Memorial prize in economics for his work on climate change. It was justified officially as a significant application of neoclassical growth theory, i.e. for affirming market orthodoxy. This might be stated colloquially as ‘better worlds should burn than markets spurned’. In contrast, for Martin Weitzman, the point of departure was uncertainty. No single discount rate was likely to be correct and in the face of an existential threat there was no point in seeking optimality. Better lose money than lose everything. What matters is not the expected mean. A world-destroying event of even low probability cannot be set aside as unlikely. Probability has to be multiplied by impact. With a ‘a roughly 10% chance of near certain disaster’ (Wagner and Weitzman 2015: p. 54, quote, p. 78), the precautionary principle places the highest priority on averting catastrophe.

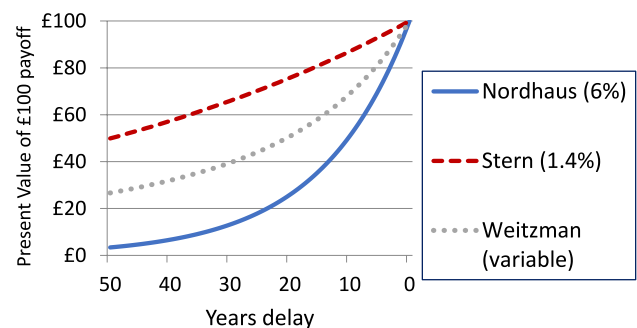


Fig. 2 Present value of a payoff of £100, 50 years hence

The implication is that there is no market solution for the climate crisis. It is a long-term public good that has to be managed by societies collectively.

Unlike a fixed discount rate, a variable one does not lay down a unique course of action. In any case the problem is not the discount rate, but that we procrastinate, and cannot bring ourselves to act in our own benefit (Marshall 2015). Procrastination, however, can also be harnessed to mitigate climate change. A variable rate of discount is typically steep at the outset and shallower further away ('hyperbolic discounting'). Immediate sacrifice is difficult; a delayed one is easier. Hence, a sacrifice that is difficult now can be accepted as a commitment to act a few years hence. What is impossible now can be locked into the future, e.g. by means of legislation. We can bind ourselves in advance. This is the method actually chosen by the global community. Countries enact 'legally binding' legislation now, to impose costs on the future. What drives it is not market rationality but the cognitive bias of impatience, combined with the coercive power of the state. In the Paris accords of 2015, 110 countries accepted a net zero emissions goal mostly to be achieved in the distant future, typically in 2050 (Darby and Gerretsen 2020). How binding this is really going to be is not clear, but it is better than inaction.

Conclusion

Neoclassical theory shows that if there are public goods, perfect competition is not efficient. That is why the category of public goods was created in the first place, as an exception which undermines the norm of market efficiency. The neoclassical concept of pure public goods (e.g. Stiglitz and Rosengard 2000: ch. 5) only gives vague or impractical policy guidance. Public goods are a vital complement to market enterprise, but the practical operation of markets often undermines them, for example the values of integrity in politics and government, truth and trustworthiness in public discourse, and climate stability for everyone. These are more like pure public goods than the government-provided services which were the focus of the neoclassical texts, which often have to be provided in a 'mixed' form which is excludable and rivalrous. This was made worse under neoliberalism (not to be confused with neoclassical economics), under which governments privileged private corporations for social delivery, and restructured their own services on the corporate model. The goals of private corporations, and their private–public interaction, breed corruption, disinformation, and policy impotence. Our own payback model takes competitive markets as the norm for short product cycles, e.g. in food, retail hospitality, mobile phones, and cars. Long product cycles require government, not-for-profit, a business franchise, or private altruism. This is not a trivial matter. In

developed societies, public sector, not-for-profit, and family production account together for more than half of all economic welfare. Much of the rest is produced by business under franchise i.e. with government and social protection. For long-term payoffs, 'free markets' are a harmful policy delusion, inefficient, corrupt, unsustainable, or impossible, and hence, the large persistence of the public and voluntary sectors in so-called market societies.

Data Availability Data for fig. 2 is available on request from the author.

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