

1 and it has taken me some time to begin to appreciate the issues and to come to
2 some conclusions about the extent to which markets will deal with the perceived
3 prospect of climate change. I can summarise those conclusions in three assertions,
4 each of which I will then try to justify:
5

- 6 1. We should be sceptical of the widespread view that damaging climate change is
7 in prospect.
- 8 2. Nevertheless, an “atheistic” position – that we do not believe that damaging
9 climate change will occur – is inappropriate. By taking such a position we
10 commit a similar error to the extreme believers, but in the opposite direction.
11 “Agnosticism” is more appropriate, leading as it does to our concentrating on
12 the considerable uncertainty that exists about future climatic trends, which
13 means that we cannot reasonably rule out adverse changes which could have
14 serious consequences.
- 15 3. To cope with any future climate change that may occur, markets represent the
16 most certain and most flexible means of adaptation.
17

18 **The case for scepticism about damaging climate change**

19 *The hypothesis and some broad issues*

20
21
22 The generally accepted hypothesis about climate change is that emissions of carbon
23 dioxide and other “greenhouse gases”, from the use of energy and from other
24 human activities, will lead to a future trend towards warming of the earth
25 (anthropogenic global warming) and consequential damage to economic and social
26 life.

27 There is general (though not universal) agreement that there has been some
28 warming of the earth in the last hundred years or so, but it is relatively modest¹.
29 The Intergovernmental Panel on Climate Change (IPCC) puts the increase in global
30 annual mean temperature at around 0.75 degrees Celsius over that period (IPCC
31 2007: 2). Future warming has become the main focus of concern: there is a wide
32 range of estimates, varying from about 1 to over 6 degrees Celsius (IPCC 2007: 7),
33 comparing the end of the 20th century with the end of the 21st century. Obviously,
34 I cannot provide a critique of the hypothesis from a climate science viewpoint² but
35 economists are in a position to comment on some of the underlying
36 methodological issues, on the economic and social consequences of climate change,
37 and on possible policy responses and their effects. I begin by outlining the links in
38 the chain that lead to the view that climate change will be damaging and make some
39 initial comments on them.

¹ For a review for non-scientists of the problems involved in measuring temperatures and of assessing the scientific evidence, see Lawson (2008).

² For such a critique see Carter et al. (2006).

1 ***A climate change trend?***
2

3 Since the climate is always changing, the damaging change hypothesis is difficult to
4 pin down, but those who support the hypothesis must presumably think there is a
5 clearly established *trend*. If we were merely in the upward phase of a *cycle* caused by
6 natural forces, there might be little cause for concern because, by definition, the
7 direction of the cycle would reverse and global warming would be replaced by
8 global cooling. Determining whether warming is a trend or just part of a cycle is
9 extremely difficult, given the apparent very long timescale of climatic change; yet,
10 from a policy point of view, the distinction between trend and cycle is clearly vital:
11 if warming is to be replaced by cooling in the relatively near future, as part of the
12 same natural cycle, action now to curb warming might well have perverse effects.

13
14 ***The link with greenhouse gases***
15

16 There is scientific evidence that, other things equal, increasing emissions of carbon
17 dioxide and other greenhouse gases will bring rising world temperatures. However,
18 in the absence of complete scientific knowledge, the list of the “other things” and
19 their effects is long but incomplete. There is considerable controversy over the
20 significance of man-made emissions, compared with all the other effects on
21 temperature. Most climate scientists would, like most economists, readily admit that
22 their models are gross simplifications and that large areas of ignorance remain.
23 Working out what happens when other things are constant is therefore not easy.
24 Experience in the 20th century must lead to some doubts about the exact causal
25 link between emissions and warming: despite continuously rising emissions during
26 the century, the warming occurred in two periods (1920–40 and 1975–98), with
27 slight cooling in the intervening years. In the 21st century so far, emissions have
28 continued to increase but no further warming has occurred in the ten years since
29 1998.

30
31 ***Economic and social consequences***
32

33 Even if it could be established that there is a clear warming trend caused by
34 greenhouse gas emissions, there are still difficult questions to be answered about
35 the extent to which natural adaptation will deal with any economic and social
36 consequences or whether, if action to combat the trend should be taken, what form
37 it might take and what the costs might be compared with the benefits. Some
38 economists, such as Nicholas (Lord) Stern, have attempted to answer these
39 questions and to say what actions are required (Stern 2006)³. But, in the process,
40 they have used some truly heroic assumptions and tried to peer into the far distant
41 future.

³ A recent modelling exercise, concentrating on the macroeconomic effects of policies to combat climate change, is in IMF (2008).

1 Climate change is often seen as a distinct and indeed unique issue. But it is
2 useful to place it in a more general context.

4 ***Some questions of context***

6 *The conventional wisdom*

8 The first context takes us back to the ideas of John Kenneth Galbraith who, in
9 Chapter 2 of *The Affluent Society* (1958), coined the term "conventional wisdom"
10 which in a nice phrase he described as "the name for the ideas which are esteemed
11 at any time for their acceptability". Galbraith went on to point out that, since
12 exposition of the conventional wisdom "has the approval of those to whom it is
13 addressed", it is always in great demand and "it follows that a very large part of our
14 social comment – and nearly all that is well regarded – is devoted at any time to
15 articulating the conventional wisdom". The conventional wisdom is regarded as
16 "more or less identical with sound scholarship" and "its position is virtually
17 impregnable".

18 Galbraith's notion of the conventional wisdom is a powerful one. The
19 prevailing view that damaging climate change is in progress and will become worse
20 in the future is clearly a major element in the conventional wisdom of the early 21st
21 century. It is an idea, in Galbraith's words, "esteemed for its acceptability", and it
22 "has the approval of those to whom it is addressed". Its exponents are regarded as
23 "sound scholars". Leaders of the movement (for such it is) assure their followers
24 and anyone who will listen that "the science is settled", a dismissive phrase,
25 intended to indicate that their view is beyond challenge.

26 As always, the conventional wisdom is spread and its pre-eminence is
27 maintained by "intellectuals" most of whom, as Hayek (1949) pointed out, are
28 essentially "second hand dealers in ideas" rather than original thinkers. Prominent
29 among today's second hand dealers are the numerous members of the media who
30 provide comment on contemporary issues. Almost all embrace the view that
31 immediate and drastic government action is required to offset damaging man-made
32 climate change: it is obvious to them that such change is under way and that it is
33 the duty of people (or, at least, other people) to change their lifestyles, particularly
34 away from activities once thought liberating but now regarded as damaging, such as
35 air and motor vehicle travel. The media constantly reinforce the position of this
36 piece of conventional wisdom rendering it, in Galbraith's phrase, "virtually
37 impregnable".

38 But does the damaging climate change hypothesis have the other characteristic
39 implied by Galbraith's analysis of the conventional wisdom? Is it no more than the
40 repetition of ideas that people want to hear and essentially empty of intellectual
41 content? Or should we take it seriously? I will revert to this issue after discussing
42 other contextual matters.

1 *A religious movement?*
2

3 My second context relates to the nature of the climate change movement. One
4 major problem to which I have already alluded, faced by anyone who expresses any
5 degree of scepticism about the damaging climate change hypothesis, is that the
6 scientific establishment regards anyone who questions the consensus about climate
7 change and its effects in much the same way as heretics are regarded by religious
8 movements. Indeed, in many ways, upholders of the consensus view *are* a religious
9 movement which has its own prophets who readily denounce “unbelievers”
10 (Peacock 2008). Those prophets look far into the future using not oracular powers,
11 as did their forebears, but models which attempt to integrate scientific and
12 economic variables; they see dreadful events which can be averted only if the
13 present generation repents of the sins that are the root cause of these events; and
14 they propose means of atonement. In their view of the world, scepticism is itself a
15 sin. In an echo of earlier times, the climate change prophets have in recent years
16 tried to silence opposing views and to suppress dissent. August members of the
17 Royal Society, a body once noted for its cultivation of debate in science, are now
18 leaders of the “science is settled” camp: the only debate they consider to be
19 legitimate is about choice among the different forms of the centralised action they
20 believe is required to deal with the problems they foresee.

21 Moreover, the scientific establishment has a view of scientific progress which
22 seems quite surprising in a historical context because it rests on the idea that any
23 branch of science discovers a bedrock truth which then remains untouched as
24 scientists move on to find other “truths”. Surely this is not an accurate description
25 of scientific progress over the years, which constantly questions hypotheses and
26 overturns them, often replacing them as they are discovered not to be the “truth”
27 after all (Kelly 1969). The “science is settled” view replaces genuine scientific
28 enquiry and challenge by undue faith in the most recent hypotheses.

29 Finally, on the “science is settled” issue, it is worth a reminder that only 30
30 years ago the consensus then among climate scientists was the opposite of today’s:
31 global cooling was the perceived threat (Gwynne 1975).⁴ Some climate scientists
32 will claim that they now know much more about the climate so we should not
33 assume that the errors of present predictions will be on the scale of those
34 associated with past predictions. That seems to me close to the “bedrock truth”
35 idea of scientific discoveries. I suspect that there is a vast amount more that they
36 do not know and so it should be a matter of concern to those who now claim that
37 “the science is settled” in favour of global warming that the opposite view was
38 generally held only 30 years ago – and there are signs of a revival of global cooling
39 fears.
40

⁴ I am grateful to Julian Morris for drawing this *Newsweek* article to my attention.

1 *Past apocalyptic forecasts*
2

3 My final context is based on the observation that supporters of the doomsday view
4 about climate change are usually so bound up in their own predictions of doom
5 that they fail to recognise something very important – that they are part of the
6 apocalyptic forecast genre, which again has religious roots. Apocalyptic forecasting,
7 of which predictions of the dire consequences of climate change are one example,
8 has a long history, which can be traced back at least to the Old Testament prophets
9 (Robinson 1972). The New Testament, of course, provides the somewhat more
10 recent and more specific source document for the genre, in the Revelation of St
11 John, where the Four Horsemen of the Apocalypse represent the forces of man's
12 destruction and where, following catastrophic events:

13
14 ...the kings of the earth, and the great men, and the rich men, and the chief
15 captains, and the mighty men, and every bondman, and every free man, hid
16 themselves in the dens and in the rocks of the mountains.⁵
17

18 Although the events, foretold in Revelation, which caused everyone to hide are
19 particularly disastrous – the sun turns black, the moon is like blood and the stars
20 fall to earth – subsequent history is littered with forecasts which are recognisable as
21 belonging to same apocalyptic category in that dreadful events are foreseen unless
22 people repent of some sin. As already explained, latter-day prophets of doom can
23 be seen in a quasi-religious context in which they provoke feelings of guilt and then
24 propose means of atonement. A characteristic sin is supposed lack of concern for
25 future generations. So, for example, a recurring theme in the 20th century was the
26 claim that people were exploiting the earth's resources at a destructive rate which
27 would leave insufficient for future generations: atonement was by acknowledging
28 the error of their ways and adopting policies, such as reducing rates of depletion,
29 which would leave more for their successors. The prevailing concern now is
30 essentially that people are using up too much of the earth's environmental
31 resources. Both views belong to an ecocentric tradition which stresses the value of
32 the "natural" environment and regards most human activities as damaging. I will
33 come back to these views.

34 As each apocalyptic forecast emerges, there is a tendency to regard it as unique,
35 with little recognition that it belongs to a general class of predictions. But the
36 prevalence of such forecasts in the past suggests that, regardless of the precise
37 nature of the expected source of doom, there are underlying reasons why,
38 periodically, such forecasts emerge. Rather than being aberrations, they are
39 evidently part of the normal course of events. The explanations are probably quite
40 simple. First, as regards the supply side, the prophet of doom is a member of a
41 profession which, as well as any money income it may earn, enjoys psychic income

⁵ Rev. 6: 15.

1 from the effect of its prophecies on its audience: individual prophets may or may
2 not be clothed in sackcloth and ashes but they enjoy supplying mental discomfort
3 to their listeners or readers.

4 Second, and probably more important, the apocalyptic forecast is a natural
5 reaction to the pervasive state of uncertainty which creates both anxiety and a
6 demand for predictions. At any point in time, any intelligent person can see
7 numerous problems to which solutions have not yet appeared. That is so for the
8 rather obvious reason that human ingenuity can, by definition, only be directed at
9 solving problems after they have been perceived as such. Consequently, an
10 abundance of unsolved problems is the norm. It is not difficult to find issues about
11 which to be anxious – either that no solution is possible or that, if it is possible, it
12 will not appear in time. But the presence of unsolved problems is not, in itself,
13 particular cause for concern. In the words of Dennis Gabor (1963), “The problems
14 of fifty years hence will not have to be solved by our present-day technology but by
15 that which we shall possess in twenty or thirty years’ time”.

16 Seen in this context, one way of regarding the apocalyptic forecast is as part of
17 the process by which unsolved problems are indeed solved. By raising awareness of
18 an issue, the forecaster sets in motion forces that produce solutions. On this view,
19 the apocalyptic forecaster – whether St John or, at a lower level, Lord Stern – is an
20 unwitting part of the great machine that stimulates human ingenuity into producing
21 the advances in knowledge and its application that deal with the problems that
22 always confront us. I shall return to that argument.

23 To summarise, the doomsday view of climate change can be placed within
24 several contexts. First, it has become part of the conventional wisdom so that it is
25 constantly reinforced by repetition. Second, it appears to be similar to a religious
26 faith, which thinks it has uncovered a truth that should not be questioned and
27 which therefore tries to suppress dissent. Finally, the view belongs to a general class
28 of apocalyptic forecasts which appear periodically primarily because problems
29 naturally precede solutions.

30 Of course, none of these observations about contexts should, on its own, lead
31 us to believe that the doomsday view is incorrect. But they should make reasonable
32 people enquire further about the extent to which it can be supported.

34 *Centralised action and apocalyptic forecasts*

35
36 Another characteristic of the apocalyptic forecast is that, as well as being a forecast,
37 it always contains a call to action. It comes in two parts. Part one is the
38 “conditional” forecast – what would happen on unchanged policy. Part two is the
39 plan – what should be done to avoid the dire consequences which the forecast has
40 revealed. The latter-day apocalyptic forecaster, when turning to the plan, almost
41 invariably recommends centralised solutions carried out by governments and
42 international organisations. It would be unusual, if not unprecedented, for
43 someone, having seen the Apocalypse, to recommend leaving the solutions of the
44 foreseen problems entirely to decentralised market forces. Recommendations are

1 usually for some direct government intervention in the market, though the use of
2 “market instruments” (see below) may also be recommended. In either case the
3 recommendation will be for national government or international action so that
4 someone is seen to be doing something. There are, of course, serious problems
5 with centralised action, which I will come to later. First, I want to discuss the type
6 of modelling that is used to generate forecasts of such severe climate change that
7 this drastic centralised action is required. That will lead to my second topic – what
8 is the root of the climate change “problem”, as perceived, and is there sufficient
9 uncertainty about what might happen that we should be concerned?

Modelling and uncertainty: the example of the Stern Review

10
11
12
13 At the root of most attempts to forecast climate change and its effects are models
14 which combine climatic factors with economic variables. The British 2006 Stern
15 Review of climate change is a notable example, including detailed modelling in a
16 report which looks a very long way ahead. Different time horizons are used in
17 different places but they are all very distant. The review explains:

18
19 The analysis of climate change requires, by its nature, that we look out over
20 50, 100, 200 years and more. (Stern 2006: Executive Summary, p. x)

21
22 It joins the IPCC, some of whose scenarios it uses, in taking a very long-term
23 view. Quite properly, in various places the review expresses due caution about
24 interpreting the results of modelling so far ahead which requires “caution and
25 humility”, though by the time conclusions are drawn such reservations seem to fade.

26 Looking ahead for long periods is often supposed to be virtuous. Both markets
27 and governments are sometimes criticised because they have short time horizons
28 and do not pay sufficient regard to the interests of future generations – as the Stern
29 Review argues, their implicit discount rates are too high. I return to the discount
30 rate issue later. But there are good reasons why individuals and organisations do not
31 habitually peer many years into the future and act on what they think they see. It is
32 because, in practice, it is not possible to see far into the future and make enough
33 sense of it to act usefully on the results. Inability, not unwillingness to look into the
34 far distant future, is the issue. Consequently people and organisations take limited
35 views of the future, taking what action they can to anticipate future events but also
36 adapting as they go along, using rules of thumb and other simple decision rules to
37 muddle through in the presence of uncertainty. With decentralised decision-making
38 in markets, there are many views of the future, and the forecasting problem is
39 “solved” imperfectly through different forecasts, rules of thumb and adaptation.
40 Those who are broadly right are more likely to make profits than those who are
41 wrong.

42 In the climate change case, the danger is that, given our very limited ability to
43 foresee changes in climate, technology, the economy and society, long-term views

1 are more misleading than helpful. Human myopia cannot be overcome simply by
2 well-meaning attempts to build models that purport to peer decades and centuries
3 ahead. Action taken now, in anticipation of supposed long-run trends, may
4 concentrate on the wrong issues and make matters worse rather than better.
5 Centralised action, which constitutes a large part of Stern's recommendations, risks
6 major mistakes. Such action, by governments or international organisations,
7 concentrates on consensus views (which have frequently been wrong in the past),
8 creating information monopolies and suppressing dissenting opinions. It suffers
9 from essentially the same problems as does now discredited central planning.

10 In addition to the time horizon, there are underlying problems related to this
11 kind of modelling. Modelling is a valuable tool in economics because it forces the
12 conceptual structures of models and their parameters to be made clear. Moreover,
13 as professional forecasters know, in principle it permits learning from experience in
14 the sense that a post-mortem on a forecast (which, except by chance, will be
15 incorrect) will reveal whether structure or assumptions were at fault (Robinson
16 1971).

17 But when the system that is being modelled is poorly understood and the
18 intention is to make predictions over a very long period ahead (so that huge
19 unforeseeable changes which affect model structures are likely), there is a clear
20 danger that formal modelling will mislead. In the climate change case, the Stern
21 Review, for example, uses some models that purport to "integrate" climate models
22 with models of economic and social linkages to climate change. Integrating two
23 poorly understood systems and making projections for long periods ahead, far
24 outside the range of previous experience, moves the "forecasts" into unknown
25 territory, surrounded by massive uncertainty. Moreover, the danger is that, because
26 the models appear to be able to quantify the future, the results will be given far
27 more weight than is their due. Where these modelling exercises are discussed⁶, the
28 Stern Review acknowledges the uncertainties around its results. But caution seems
29 to evaporate as the review goes on. Towards the end we can observe examples of a
30 common phenomenon against which forecasters have to try to guard – that,
31 because of the amount of effort they have put into their predictions, they begin to
32 believe in their own results, no matter how shaky the foundations. Hence, on page
33 450 we read:

34
35 This Review has made a compelling case for action – on both mitigation
36 and adaptation – demonstrating that the global economic costs of business
37 as usual paths are likely to far outweigh the costs of taking action to reduce
38 the risks.
39

40 And, by page 572, there are "clear and strong conclusions" about the dangers
41 of government inaction which could lead to:

⁶ For example, in Chapter 6.

1 ...risks of major disruption to economic and social activity, on a scale
2 similar to those associated with the great wars and the economic depression
3 of the first half of the 20th century.
4

5 It is simply implausible to believe that the models that Stern uses can reveal
6 sufficient about the future for any reasonable person to draw such firm
7 conclusions. Because the models relate to systems about which there is
8 considerable ignorance and because they go so far ahead, it seems most unwise to
9 suggest that they can indicate so certain a long-term future. On a Hayekian view,
10 the apocalyptic forecaster/planner who believes he or she can see a long way into
11 the future and has the answer to the world's problems, substituting for and
12 surpassing the problem-solving capabilities of markets, has been misled into the
13 "pretence of knowledge" (Hayek 1974), if not into a "fatal conceit" (Hayek 1988).
14

15 **Uncertainties about future climate change**

16
17 Heroic attempts to quantify changes in climate and their effects centuries ahead
18 give a false impression that such quantification can be helpful and suggest that the
19 outlook is more certain than it is. Nevertheless, one should beware of jumping
20 from the deficiencies of the Stern Review and its ilk to the conclusion that future
21 climate change is not and cannot be a problem. It is conceivable that man-made
22 climate change is occurring and that in the future it will cause difficulties unless
23 preparations are made to offset or adapt to its effects. This is a separate issue that
24 ought to be examined.
25

26 ***Differences in principle between resource depletion and global*** 27 ***environmental issues***

28
29 In principle, there are reasons why global environmental problems might be more
30 difficult to solve via markets than the apparently similar resource depletion
31 problems that have in the past caused alarm but which markets have dealt with so
32 adequately. A significant difference in the case of resource depletion is that there
33 are price signals that encourage changes in the depletion rate in the "right"
34 direction, as they did at the time of the "energy crisis" in the 1970s and early 1980s.
35 For reasons discussed by Harold Hotelling in a seminal paper in the 1930s
36 (Hotelling 1931), changes in price expectations and discount rates tend to
37 determine depletion rates (on the assumption that technology and resource deposits
38 to be given). For example, if there is a perception of increasing scarcity of a
39 resource, future prices are expected to be higher relative to costs than previously
40 anticipated, and there are two effects that increase the life of remaining resources.
41 First, resource owners cut current production, holding back resources to reap the
42 higher profits they expect from selling at increased future prices: as they reduce
43 supply, current prices increase. Second, this increase in current prices induces

1 consumers to reduce their demand. It was such effects that turned the oil
2 “scarcity” of the 1970s to the oil “surplus” of the 1980s despite the almost
3 complete absence of the centralised action that had been deemed so important by
4 most economists and political leaders in the 1970s. But these benign market effects
5 depend on the presence of appropriate market institutions, and in particular on
6 there being reasonably clearly defined and enforced property rights.

Property rights and market “failure”

10 In general, provided property rights are clear and are enforced, as they are or can be
11 for many environmental assets, owners will defend their rights against potential
12 polluters as they would against other intruders, and markets will work reasonably
13 well. But where property rights do not exist or are difficult to establish, as with the
14 global environment which is not owned by anyone, is difficult to “enclose” and so
15 has no one to defend it, a case can be made for collective action. The argument is
16 that there is a “global commons” problem which results in the natural environment
17 being overused as a sink for wastes since it is, in effect, a factor of production with
18 a zero price. The natural environment has “public good” characteristics in that
19 people cannot be excluded from using it and so no charge can be made for that use.

20 To take a specific case for collective action, it is argued that individuals and
21 organisations that burn fossil fuels have little incentive to reduce the emissions of
22 carbon dioxide that ensue because they bear merely the private costs of their
23 actions (the price of the fuel and associated costs): these private costs are less than
24 the full social costs of those actions, including the adverse impact on world climate.
25 Hence, the argument goes, the external costs should be incorporated directly or
26 indirectly by government, acting on behalf not only of those of us alive now but
27 future generations.

Concern for future generations

31 The question of concern for future generations is worth further discussion. The
32 resource depletion case will again illustrate the issues. Throughout the 20th century
33 there was periodic concern about natural resource depletion. Since there is
34 apparently a finite stock of oil, coal, natural gas, uranium, metals, and so on, should
35 we be using those stocks or should they be conserved for future generations? It is a
36 difficult question. First, which future generation are we concerned about? Is it
37 those living late in the 21st century or, for example, those living in and around the
38 year 3000? The actions we might want to take would be quite different depending
39 which future generation is our prime concern. Second, what would we actually do?
40 Usually it is assumed that some stocks should be held back for people living in the
41 future. That is not a straightforward strategy, first because the amount that is set
42 aside depends on how distant are the generations about which we are concerned,
43 but second because keeping back resources for future generations is not necessarily
44 doing them a favour.

1 Think what would have happened if, 250 years ago, at the beginnings of the
2 Industrial Revolution in Britain, some central planners had decided that they ought
3 to conserve Britain coal reserves for the benefit of people living in the early 21st
4 century. We would have very large amounts of coal now but, since we would have
5 forgone all the investment and technological advance associated with the extraction
6 of millions of tonnes of coal, in material terms we would be much worse off than
7 we actually are.

8 Looking at the matter from the perspective of the present day, when
9 considering what we should forgo for the benefit of future generations, we should
10 think about relative levels of prosperity as between ourselves and future
11 generations. The history of recent centuries is of a strong economic growth trend
12 which, if continued, will mean that, if we look ahead no farther than the last quarter
13 of the 21st century, our successors will be very much more prosperous than we are.
14 Economic growth at a rate as low as 2 per cent per annum would quadruple income
15 levels compared with now.

16 The prescription of the proponents of the doomsday view of climate change
17 that we should invest heavily now to reduce the prospects of damaging climate
18 change in the future parallels the view that, 250 years ago, people then alive should
19 have invested in coal reserves in the ground for our benefit. In effect, the proposal
20 is that relatively poor people now should reduce their incomes to benefit people in
21 the future who are likely to be very much richer. In those terms, the doomsayers'
22 "remedies" look much less appealing than when they say we must act for the
23 benefit of future generations.

24 To pose the question in terms of discount rates, at what rate should the future
25 be discounted? Some, like Stern, think that the social time preference rate should be
26 close to zero to reflect concern for future generations. That way lie enormous
27 problems. For the reason just given, there seems little reason to weight
28 intergenerational transfers in favour of the wealthy. And, if it is argued that climate
29 change projects in particular should benefit from an especially low discount rate, all
30 kinds of distortions are likely to appear. A hidden effect, which may or may not be
31 an unintended consequence, is that trying to incorporate in the economy a discount
32 rate that is much lower than firms actually use can be done only by a considerable
33 expansion of the government sector, which would either have to carry out the
34 necessary projects itself or raise funds in taxation to subsidise the private sector to
35 do so⁷.

36 To avoid any misunderstanding, I am not suggesting that we should spend time
37 on working out what the social discount rate is. That is a matter for central planners
38 and not an issue which should trouble market economists. But Stern-type models
39 must necessarily make heroic assumptions about social discount rates.

Possible policy responses

⁷ For a discussion of the discount rate issue in climate modelling, see Byatt (2008).

1 What policy response would be appropriate, given all the uncertainties about future
2 climate change and its effects?
3

4 *Picking winners*
5

6 One response would be direct action by governments to promote energy sources or
7 technologies that promise to reduce carbon emissions. The two main candidates are
8 nuclear fission power and “renewable” forms of energy (those that do not diminish
9 a capital stock), such as wind, solar, wave and hydro power, and biofuels, though
10 there are also hopes for “clean coal” technologies and for technologies that would
11 capture and store carbon.

12 In recent years, many governments in developed countries have been wary of
13 permitting nuclear investment, partly because of the long history of over-optimistic
14 cost forecasts for nuclear power (Robinson and Marshall 2006), but principally
15 because of the potential adverse effects associated with the operation of nuclear
16 power plants and with nuclear fuel use and storage that have made nuclear power
17 unpopular with electorates. In the face of climate change fears, however, there are
18 signs of a revival of interest in nuclear generation, in Britain as elsewhere.

19 Renewable sources are already being promoted heavily. The British
20 government, for example, is providing large subsidies for wind power in the hope
21 of reaching a target of 10 per cent of electricity generated from renewables by 2010,
22 with an “aspiration” of 20 per cent by 2020⁸. The European Commission is setting
23 even more ambitious targets that would involve EU member states increasing the
24 share of renewables in their energy (not electricity) supplies to 20 per cent by 2020.
25 Another form of direct government action, but on the demand rather than the
26 supply side, is to try to persuade consumers to use less energy by subsidising home
27 insulation and other means of “conservation”. All manner of restrictions on
28 people’s freedom to choose fuels and technologies are now being imposed, with, in
29 Britain, five-year “carbon budgets” in the background (under a new Climate
30 Change Act), in an attempt to influence consumers to change their ways in
31 directions the government thinks desirable. Every effort is being made, for
32 example, to make owners of “gas guzzling” cars feel guilty and to tax them heavily.

33 The problem with direct promotional action for particular fuels, with subsidised
34 energy conservation and with regulation to enforce behaviour, is that such
35 measures do not address the basic property rights issue that is at the root of the
36 apparent climate change problem. Instead, it involves government in the difficult
37 process of “picking winners”, whether that “winner” is nuclear power or renewable
38 energy or energy conservation or some apparently promising technology. Past
39 attempts at picking winners have been notoriously unsuccessful (see, for example,
40 Myddleton 2007), not just because of specific failings of particular ministers but for

⁸These various targets and measures to try to achieve them are set out in DTI (2003; 2006; 2007). See also Simpson (2006).

1 much deeper reasons of principle involving inherent information failures, poor
2 incentives and the influence of pressure groups. Some of the climate change
3 “winners” that have been picked are already being seen as “losers” – for example,
4 biofuels, where there are serious doubts whether certain biofuels will actually result
5 in net carbon saving compared with the alternatives. Unintended consequences are
6 also appearing, as again in the case of biofuels, where government support seems to
7 have resulted in rising food prices because of the increased demand for land to
8 grow these crops. Nuclear power is another “winner” that may not be all that it
9 seems: an accident anywhere could cause such an adverse reaction that there might
10 be widespread shutdowns or derating of operating reactors.

11 Analyses of climate change policy which urge direct action by governments are
12 silent on these issues of principle about the ability of government to take successful
13 direct action to promote particular energy sources. They ignore the economic
14 analysis of government action, exemplified in “public choice” theory⁹, and the
15 Hayekian view of competitive markets.

16 The Hayekian critique of government action emphasises the role of markets as
17 discovery processes which produce information and embody powerful incentives to
18 solve incipient problems which governments cannot match. It is complemented by
19 the public choice critique which suggests that the chances are low that governments
20 will improve welfare by attempts to pick winners. Governments are not
21 disinterested servants of the public good. They are complex organisations, where
22 self-interest is likely to play a major part in decision-making, and they are, for
23 example, susceptible to the influence of pressure groups (unmentioned and
24 apparently unrecognised in the Stern Review) which are likely to be very influential
25 in pushing their own interests when governments are known to be searching for
26 technologies to support. Governments face the most serious problem of central
27 planners – that they cannot gather the information they need, which is essentially
28 decentralised and would have been produced by markets had it not been
29 suppressed by government intervention. Into the vacuum come pressure groups
30 that supply information that supports their causes and “blinds with science”.
31 Consequently government policies, far from being pursued in the “public interest”,
32 are frequently significantly biased in favour of pressure groups.

33 34 *Using “market” instruments*

35
36 If we rule out direct action by governments, for the reasons just suggested, we are
37 left with an approach which is more appealing to mainstream economists because it
38 addresses the property rights problem. That is to apply standard microeconomic
39 theory by introducing some general “economic” or “market” instrument that will
40 take into account the externality and will then allow the market to adjust without

⁹ As developed principally by James Buchanan and Gordon Tullock, though the public choice approach has its roots in the work of David Hume and Adam Smith. See Peacock (1997).

1 being constrained by the views of the government about which energy sources are
2 most acceptable and how much energy should be conserved (Marshall 2005).

3 One such instrument would be a “carbon tax” – a tax on fuel that varies
4 according to the carbon emissions produced when the fuel is burned – which
5 would attempt to move the price of carbon-emitting activities closer to what they
6 “should” be. Another instrument would be a carbon trading scheme under which
7 permits to emit specified amounts of carbon are allocated (preferably by auction¹⁰),
8 and trading of those permits encourages efficiency in reducing emissions: such a
9 scheme would allow a price of carbon to emerge. Carbon trading is favoured in
10 the Stern Review and there were experiments with such schemes before one was
11 introduced by the European Union in January 2005 (Nicholson 2005).

12 Using market instruments, such as carbon taxes or carbon trading, should
13 reduce the potential for government failure as compared with direct government
14 action. The use of carbon trading, as in the EU, for example, should in theory mean
15 that producers and consumers make their own decisions about what fuels to use,
16 obviating the need for government action, such as deciding on whether a country
17 should have a nuclear power programme and, if it should, what size it should be. I
18 return to that issue.

19
20 *A case for collective action?*

21
22 To summarise, there is a theoretical case for collective action (which could include
23 action by governments and international organisations or voluntary action) where
24 there appear to be particularly damaging environmental effects that cannot be
25 reduced by the allocation of property rights. Anthropogenic global climate change
26 may be an example. We do not know whether it will occur and, if it does, whether it
27 will be damaging. But, to guard against possible damaging climate change, we could
28 take counteraction by pricing carbon, either by taxing it or by establishing carbon
29 trading schemes.

30 Mainstream economic theory has little more to say. But we should have qualms
31 about stopping the analysis at this point. I understand the view of economists who
32 make the case for “market instruments”, particularly if their case is that, once such
33 instruments are established, direct action by governments is both unnecessary and
34 undesirable. Nevertheless, we should recognise that there is an element of
35 misrepresentation in the term “market” instrument. Carbon taxes and carbon
36 trading could just as well be labelled “interventionist” instruments. In one case, the
37 government sets a price and lets the quantity of carbon adjust: in the other case, it
38 sets a quantity and lets the price of carbon adjust. I am reminded of Ely Devons’s
39 definition (1965) of government as “the art of taking decisions in a state of relative
40 ignorance”. Whether it is setting prices or quantities, a government is acting in
41 ignorance of what the price or the quantity “should” be. Real-world governments

¹⁰ Allocation other than by auction invites lobbying, as in the case of the allocation of North Sea exploration and production licenses, of which few have been auctioned.

1 invariably fail both in their diagnoses and their prescriptions, and their actions have
2 unintended consequences.

3 The problem of ignorance is compounded in the climate change case. If there is
4 to be centralised action to combat climate change it should be international –
5 otherwise, activities will migrate to areas where control of emissions is relatively lax
6 (thus possibly increasing world emissions if, for example, there are inherent reasons
7 why energy is used less efficiently in those areas). But, at the international level, the
8 ignorance problem is maximised because the “centre” where decisions are being
9 made is even farther away from where the information resides than is “Whitehall”.
10 Moreover, international cooperative action is frequently undermined because of the
11 incentives participants have to “cheat”, letting others bear the burden of adjustment
12 while they themselves participate as free riders. It is perhaps significant that the one
13 example we have of a major carbon trading scheme – the European Emissions
14 Trading Scheme – has been subject to such severe government failure that it may
15 now be difficult to rescue it from the discredit in which it stands.

16 As far as government action is concerned, even if it relates only to the
17 introduction of “market” instruments, there is a multitude of possible problems.
18 Given that it is setting taxes or allowable amounts of pollution in a state of
19 ignorance, how confident can we be that the net effect of action will be welfare-
20 improving? Then there is the question of whether governments will be willing to
21 rely entirely on carbon taxes and carbon trading schemes. Experience so far
22 suggests not. They have instead insisted on trying to pick winners as well. For
23 example, both the British government and the EU authorities are, as explained
24 above, setting targets for “winners” (such as renewables) as well as using carbon
25 trading. Then there is the question of whether, if governments act, there will be a
26 significant encroachment on people’s freedom (in effect, an external cost of
27 government action).

28 To sharpen discussion, take the neglected question of whether, even if there is
29 genuine evidence of damaging climate change, governments can be trusted to act
30 effectively. Or will they give priority to *appearing* to be doing something, as they did
31 in the energy “crises” of the 1970s? There is a great deal of political posturing going
32 on at present about climate change policy. In the EU, for example, summits and
33 other gatherings result in grand declarations about targets for big cuts in carbon
34 emissions in the distant future. Nevertheless, at the same time, member country
35 leaders are undermining the targets they set collectively by lobbying to make sure
36 that their countries or industries within their countries are treated as “special cases”
37 that do not have to meet the targets. The case for collective action hinges on the
38 idea that, in the absence of clear property rights, the market will not work well
39 because there will be numerous free riders. But most EU governments are at
40 present “cheating” and trying to obtain a free ride by letting their fellow member
41 states bear the costs of any carbon reductions. The same is true of the numerous
42 international gatherings where politicians consider successors to the Kyoto
43 agreement.

1 It is rational for political leaders to try to gather the electoral benefits of being
2 seen to be “green” without actually imposing on their electorates the costs of doing
3 so. It is tempting to set very long-term targets – such as reducing greenhouse gas
4 emissions by 80 per cent by 2050, supported by five-year carbon reduction targets,
5 as the British government has done. But these targets go far beyond any horizon in
6 which present-day politicians are interested and should, I think, be treated with
7 great suspicion. In general, if there is to be an improvement in the market outcome
8 resulting from government action, the government in question needs to be far-
9 sighted, wise, able to identify the “public interest” and willing to pursue it. It is not,
10 I think, unduly cynical to question whether either governments in representative
11 political systems or international bureaucracies have such characteristics.

13 **Can markets deal with the climate change “problem”?**

14
15 By contrast, well-functioning markets with appropriate institutions tend to produce
16 benign reactions to emerging problems. Even though the vast majority of
17 intellectuals think only of centralised action, there are great benefits in market
18 responses, which permit gradual and flexible adjustment to perceived problems,
19 which tend to act in the right direction (if not always as quickly as idealists might
20 wish) and which avoid the restrictions on freedom which are one of the principal
21 external costs of government action. They are genuine “automatic stabilisers”
22 which work whether central authorities will them to or not. In the present context,
23 a particular advantage of relying on markets is that it obviates the need to take a
24 view on the difficult issue of whether or not damaging climate change is in
25 prospect.

26 Even apparently massive problems – such as those foreseen in energy markets
27 in the 1970s and early 1980s – tend to yield to market forces. Most mainstream
28 economists assume that appropriate market institutions do not exist in the climate
29 change case because of the property rights problem I mentioned earlier, but that
30 view can be challenged. Even in cases where goods appear to be “public”, it may be
31 that the degree of “publicness” is exaggerated. An example is the case of energy
32 security, which is often characterised as a public good but which, in practice, is
33 largely incorporated in markets because consumers and producers are very
34 conscious of security and therefore regard it as a characteristic of an energy good or
35 service for which they are willing to pay. Energy markets will therefore, through the
36 interactions of consumers and producers, provide security (Robinson 2007).

37 One can argue along similar lines about the natural environment. It appears to
38 have public good features, for the reasons I have mentioned, but what if there is
39 general concern that it is becoming overused? It is not necessarily irrational for
40 people to contribute to the provision of “public goods”, even though they know
41 they are supporting free riders, if the provision is regarded as sufficiently important.
42 In Anthony de Jasay’s words (1994), “...if the public good is valuable enough, it
43 is potentially rational for non-altruists to contribute to it”. They are concerned that
44 otherwise the public good will not be provided.

1 If there is sufficient concern about overuse of the environment, the effect will
2 be *as if* it were owned. Actions by individuals are characterised not so much by
3 narrow self-interest (in the self-centred sense) but by broader interests which
4 include concern for family, friends and descendants. Let us assume that a large part
5 of the population is very concerned about the world in which their children and
6 grandchildren will grow up. This seems to me a reasonable assumption, though
7 different from what is implicitly assumed by many people who work in the climate
8 change field who often display a rather elitist and patronising attitude to their fellow
9 citizens, as though concern for future generations were purely their own preserve
10 and must be forced on to *hoi polloi*.

11 In circumstances where there is widespread concern by individuals for future
12 generations, one would expect that both consumers and producers (the latter both
13 spontaneously and as a reaction to the views of consumers) would act in ways they
14 perceive would protect their successors. If, rightly or wrongly, a significant part of
15 the population is concerned that there will be damaging climate change in the
16 future unless something is done, it will demand and will be supplied goods and
17 services that are deemed “green” (in the sense of reducing greenhouse gas
18 emissions). Market forces will thus tend to correct any emerging climate change
19 problem. The “perpetual referendum” which constitutes the market – which means
20 that people are voting every day by expressing their preferences – will produce
21 votes for “green” outcomes which producers, in their own self-interest, “not from
22 benevolence” (Smith [1776] 1976: 26–7), will satisfy.

23 Already, we can see such reactions all around us, though they have recently
24 been tempered by the effects of recession. A surprising amount of marketing now
25 revolves around “green” claims from suppliers of goods and services that they are
26 reducing their “carbon footprints”. No doubt some claims are false and others are
27 exaggerated, but the important thing is that actions to mitigate climate change and
28 its effects are now regarded as potentially profitable. Consequently, a market
29 reaction in favour of “green” goods and services is under way. It may be
30 “imperfect” and halting but, if you regard the pursuit of profit as a more certain
31 mechanism for getting things done than action through the political process, this
32 market reaction is to be welcomed. As I indicated earlier, forecasts of adverse
33 effects from climate change may, provided they are not too exaggerated, have the
34 beneficial effect of stimulating decentralised action through markets.

35 This decentralised action will promote the discovery, through the exercise of
36 human ingenuity, of means of adjusting to the prospect of adverse climate change.
37 Adjustment to that prospect can, in principle, take two main forms. First, it can
38 stimulate actions that make such change less likely. Second, it can promote
39 adaptation to any change that still occurs. Obviously, we cannot see now the details
40 of the adjustment process since those details are yet to be discovered. We can,
41 however, anticipate that the “greening” of consumer preferences will, so long as it
42 is the prevailing tendency, lead to declining greenhouse gas emissions per unit of
43 output, switching of fuel choices away from high carbon-emitting sources and the

1 related investments in buildings, plant, equipment and vehicles that will provide the
2 greener products and services. These effects of voluntary action are very much the
3 same as those sought by proponents of centralised action. But they seem to me to
4 have a surer prospect of success since they rely on the superior information and
5 more clear-cut incentives that markets generally provide, compared with political
6 and bureaucratic processes.

7 Of course, would-be centralisers, including almost all those who carry out
8 research in the climate change field, do not like the idea that market forces could be
9 left to cope with the climate change “problem”. They distrust their fellow citizens
10 and, like all pressure groups (and they are one now), would like to see their own
11 views implemented through the medium of government. They characterise the
12 market forces route as a “do-nothing” approach. It is certainly not that. It relies on
13 the reactions of millions of people and it seems to me perfectly possible that the
14 decentralised market forces I have described, which result from the expression of
15 people’s preferences, are capable of overcoming the major obstacle to adjustment
16 away from any global environmental issues that may be emerging – the absence of
17 property rights in that global environmental (the global commons problem). The
18 absence of an owner of the global environment will cease to be a serious problem if
19 a large body of people in effect become substitute owners and therefore guardians
20 of the natural environment.

21 **Conclusions: the Apocalypse and practical policy**

22 There seem to me to be three possible policy approaches to the climate change
23 “problem”.

24 First is the overwhelming favourite – centralised action, by some variant of
25 *picking winners*. Adopting this approach necessarily means looking a long way into a
26 very uncertain future and settling now on means of dealing with apparent
27 problems. In my view, governments and international bodies have neither the
28 information nor the incentives to use this approach successfully. It fails essentially
29 because of the well-known problems of central planning. If such action were to be
30 taken, it would run the risk of serious errors, even in the direction of policy, and the
31 major investment programmes that would be involved would be difficult to change,
32 even marginally, let alone reverse if circumstances required.

33 Moreover, there is another serious difficulty in relying on political action to
34 solve any climate change problems that may emerge. It is implicitly assumed by
35 enthusiasts for winner picking that, if a genuine climate change problem occurred,
36 governments would act. However, in such circumstances the political calculus
37 might mean that governments continued to concentrate on the *appearance* of taking
38 action. For that reason, and because of practical experience so far of climate
39 change policy and experience during other “crises”, I think there are legitimate
40 doubts about whether, if effective action were necessary, such action would ensue.

41 A second approach would be to adopt the neoclassical view that “failures” in
42 markets can be corrected by internalising the relevant externality, in this case
43
44

1 introducing a *carbon tax or carbon trading*. Although the approach seems superficially
2 more attractive than picking winners, I would be very doubtful about using it. One
3 major problem with it is that no government seems willing to rely solely on it: those
4 that favour a tax or trading (as in the EU) want to pick winners as well. More
5 fundamentally, the information requirements for the successful use of a carbon tax
6 or carbon trading are huge. Given all the uncertainties about not just the magnitude
7 but the direction of any future climate change, it seems most unlikely that we can
8 rely on a carbon tax or carbon trading to improve welfare.

9 The third approach is to *leave it the market*. Hardly anyone seems to favour it,
10 perhaps because most economists are so impressed with the magnitude of the
11 apparent market “failure”. But it seems to me a constructive approach to recognise
12 the huge uncertainties that exist, and to seek flexible means of dealing with the
13 problems that may arise, without constraining individual freedom as government
14 action does. We can, after all, see a spontaneous market reaction in favour of
15 “green” products and services. That reaction is based on some very “imperfect”
16 information, much of it emanating from governments and international bodies, but
17 consumers are used, in most markets, to filtering distorted information (such as
18 that from producer advertising).

19 Economists who propose reliance on markets to deal with natural resource and
20 environmental problems are sometimes accused of being Panglossian. But
21 remember what the alternative is. I suspect the true descendants of Dr Pangloss are
22 those who have faith in very long-term forecasts of climate change and its effects
23 and who think that, in the face of recent experience and examples they can see all
24 round them, centralised action is the answer. In practice, if damaging man-made
25 climate change is in prospect, the only real hope of avoiding the damage is probably
26 through market responses: the chances of effective action by governments and
27 international bodies seem to me very low.

28 The market system is essentially a massive problem-solving mechanism which
29 offers a continuous referendum on choices. Markets may appear to operate slowly
30 and “imperfectly” but they do so surely. As Hayekian insights about the nature of
31 competition demonstrate (Hayek 1948), competitive markets are powerful adaptive
32 systems which contain strong incentives to solve the problems of the day, whether
33 trivial or apparently serious.

34 A big advantage of relying on markets is their flexibility and adaptability. It is
35 unnecessary to peer many decades ahead into a very murky future and make long-
36 term commitments to massive investments to deal with supposed problems. Nor is
37 it necessary to wait for politicians to act. Markets will start to deal with problems as
38 soon as they are perceived as such. Then they will “make it up as they go along”,
39 which is an advantage in a state of such uncertainty. Views about global warming
40 will change. It may appear a more serious issue than now, in which case markets
41 will enhance the profitability of “greenery”, so reacting in the “right” direction. Or
42 it may seem less serious, so that “greenery” starts to go out of fashion and the
43 market again reacts in the right direction. Can we be so confident that the big

1 programmes now being urged by the climate change alarmists would show a similar
2 degree of adaptability to changing circumstances? They are all too likely to set
3 communities on courses which are very difficult to change as the views of climate
4 scientists change.

5 The late Arthur Seldon once said that, given all the pressures there are for
6 government to expand and all the adverse effects of such expansion, when
7 considering policy we should “take a risk on under-government” (Seldon 1998).
8 Those were wise words and, in my view, directly applicable to the present debate
9 about climate change policy.

