Environmental Politics

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/fenp20

Weaponizing economics: Big Oil, economic consultants, and climate policy delay

Benjamin Franta

To cite this article: Benjamin Franta (2021): Weaponizing economics: Big Oil, economic consultants, and climate policy delay, Environmental Politics, DOI: 10.1080/09644016.2021.1947636

To link to this article: https://doi.org/10.1080/09644016.2021.1947636

Published online: 25 Aug 2021.

ENVIRONMENTAL POLITICS
https://doi.org/10.1080/09644016.2021.1947636

Routledge
Taylor & Francis Group

Weaponizing economics: Big Oil, economic consultants, and climate policy delay

Benjamin Franta

Department of History, Stanford University, Stanford, CA, USA

ABSTRACT

The role of particular scientists in opposing policies to slow and halt global warming has been extensively documented. The role of economists, however, has received less attention. Here, I trace the history of an influential group of economic consultants hired by the petroleum industry from the 1990s to the 2010s to estimate the costs of various proposed climate policies. The economists used models that inflated predicted costs while ignoring policy benefits, and their results were often portrayed to the public as independent rather than industry-sponsored. Their work played a key role in undermining numerous major climate policy initiatives in the US over a span of decades, including carbon pricing and participation in international climate agreements. This study illustrates how the fossil fuel industry has funded biased economic analyses to oppose climate policy and highlights the need for greater attention on the role of economists and economic paradigms, doctrines, and models in climate policy delay.

1 Introduction

> What bothers me is that our analysis just talked about the costs; we didn't talk about the whole problem of global warming. There are also consequences to doing nothing about climate change. In fact, it looks more and more like there are serious potential consequences of doing nothing.
>
> I believe we conducted sound economic analyses of the costs of reducing emissions … but I regret not being in a position where I could tell what I feel is the whole story.
>
> - *Economic consultant Paul Bernstein*[1]

Numerous industries under regulatory threat have used the language of science to defend their commercial interests. The tobacco industry, under Operation Whitecoat, cultivated and funded a worldwide network of scientists to act as spokespeople and convince the public that the harms of cigarettes remained unproved (U.S. v. Philip Morris USA, Inc., 2006). The

CONTACT Benjamin Franta bafranta@gmail.com

lead industry supported Harvard professor Joseph Aub to perform research ignoring the effects of lead on children (Markowitz and Rosner 2002). Chemical companies routinely hire scientific consulting firms such as Exponent, ChemRisk, Ramboll, and Gradient to produce studies disputing the hazards of products for lawmaking and litigation (Michaels 2020).

For some industries, science represents both a danger and an opportunity. Scientists make potent spokespeople, and rhetorical positions ostensibly backed by science are powerful, while misalignments between industry pronouncements and the scientific community can spell trouble. An early handbook written for regulated industries even has among its top recommendations, 'Coopt the Experts' (Owen and Braeutigam 1978). The handbook explains (p. 7):

> "Regulatory policy is increasingly made with the participation of experts, especially academics. A regulated firm or industry should be prepared whenever possible to coopt these experts. This is most effectively done by identifying the leading experts in each relevant field and hiring them as consultants or advisors, or giving them research grants and the like. This activity requires a modicum of finesse; it must not be too blatant, for the experts themselves must not recognize that they have lost their objectivity and freedom of action. At a minimum, a program of this kind reduces the threat that the leading experts will be available to testify or write against the interests of the regulated firms. AT&T has made a major investment, for instance, in very high grade economic talent over the past decade. It is not entirely accidental that this group of economists has produced a formidable new theory of multiproduct natural monopoly that may serve as a powerful argument in favor of barriers to entry and the exclusion of competitors in AT&T markets."

Economists, as the above quote indicates, are particularly relevant to industry efforts to influence regulation. In the context of climate change politics, much as been written about the use of scientists, often supported by fossil fuel or other antiregulatory interests, as spokespeople for policy delay (Oreskes and Conway 2011). Yet less attention has been paid to the role of economists.

By the early 1980s, at least some economists were already counteracting calls for policies that would help prevent and minimize global warming. In 1983, the US National Academy of Sciences published *Changing Climate*, a report presenting an overview of contemporary climate science and policy thinking (National Research Council 1983). The portions by scientists, for the most part, warned that continued fossil fuel use would have dire consequences. Oceanographer Roger Revelle discussed the potential disintegration of the West Antarctic Sheet, warning that such a development would 'flood all existing port facilities and other low-lying coastal structures, extensive sections of the heavily farmed and densely populated river deltas of the world … and large areas of many of the world's major cities' (p. 442).

The economists, in contrast, counseled against policy action, suggesting that global warming might not be that bad. Thomas Schelling of Harvard University argued that migration and adaptation would be preferable to reducing fossil fuel emissions. 'It would be wrong to commit ourselves to the principle,' he wrote, 'that if fossil fuels and carbon dioxide are where the problem arises, that must also be where the solution lies' (p. 449). William Nordhaus of Yale University agreed, writing that although a fossil fuel tax would reduce emissions, '[t]he strategies suggested ... by Schelling ... climate modification or simply adaptation to a high CO_2 and high temperature world – are likely to be more economical ways of adjusting' (p. 151). Yet neither economist provided a detailed analysis to support his conclusions.

The report's summary, written by physicist William Nierenberg, adopted the economists' position, stating (p. 61–62):

> [I]t could be that emissions will be low, or that concentrations will rise slowly, or that climatic effects will be small, or that environmental and societal impacts will be mild ... It is probably wiser not to act aggressively to 'solve the CO_2 problem' right now, when we really do not know the future consequences or context of CO_2 increase. In trying to consider the world of 50 or 100 years from now, we cannot be sure that we can tell the difference between solutions and problems.

While the scientists' warnings were supported by decades of research, the economists' reassurances were closer to hopeful guesses. Although it was possible that global warming would be less severe than expected, by the same logic it could also be worse. Coastal flooding worldwide would presumably pose a serious problem in any century, and without an understanding of the damage global warming would cause, it was impossible for the economists to know whether adaptation or prevention would be more economical. Yet the economists' arguments, though speculative, were given credibility by the National Academies report, which was used by the Reagan administration to promote further coal use (Oreskes and Conway 2011, p. 182).

Scientists had been warning of global warming increasingly since the 1950s (Franta 2018), and by the early 1980s, even Exxon privately acknowledged that prompt action would be required to avoid severe damage (Knisely 1979). Despite the scientific consensus, the *Changing Climate* report demonstrated how economic rhetoric could be used to delay policy action, reflecting a broader trend since the 1970s of industries deploying economic arguments against regulatory efforts (Waterhouse 2014). The year after the report was published, its chairman, William Nierenberg, co-founded the George C. Marshall Institute, which went on to oppose climate policy for decades through a combination of science denial and anti-regulatory economic talking points (Oreskes and Conway 2011).

Thus, as pressure grew in the late 1980s to prevent severe global warming, it may not be surprising that the fossil fuel industry turned to economists to help influence public policy. Important among these economists were those at Charles River Associates, a US-based consulting firm that played a key role in weakening, delaying, or defeating a wide range of climate policies over the following years, including US carbon pricing proposals and international climate agreements. These economic consultants helped convince the public and policymakers that climate policy would be costly, global warming would be relatively unimportant, and there would be little harm in delaying action. Their work was paid for by the fossil fuel industry, a fact often concealed from the public, and their methodologies were incomplete in favor of the industry. Yet their results were only occasionally challenged and eventually formed a significant part of conventional economic thinking.[2] The history of Charles River Associates illustrates how the fossil fuel industry has used biased economic analyses to weaken and defeat climate policy and highlights the need for greater attention on the role of economists and economic paradigms, doctrines, and models in climate policy delay.

2. Carbon pricing in the 1990s

1988 was a key year in the history of global warming politics. Climate scientist James Hansen testified to Congress that anthropogenic global warming was likely underway, the United Nations established the Intergovernmental Panel on Climate Change (IPCC), and the Canadian government sponsored a conference in Toronto calling for worldwide carbon dioxide emissions to be reduced by 20% by 2005 (Bodansky 2001). As Europe and Japan considered carbon taxes to meet the goals of the Toronto conference, the US petroleum industry and Bush administration insisted that climate science was uncertain and that controlling emissions would destroy the economy (Platt's Oilgram News 1988). Reinforcing the economic argument, in 1991 Bush's Department of Energy released a report stating that the envisioned 20% reduction in emissions would require a large carbon tax of 500 USD per ton (Bradley *et al.* 1991). Rather than emissions cuts, the report promoted the administration's National Energy Strategy, which would allow emissions to grow until at least 2015 and called for the focus to be taken off of the fossil fuel sector.

In 1991, a report was also released by the economic consulting firm Charles River Associates, commissioned by the American Petroleum Institute (API), the US petroleum industry's primary trade association.[3] The report's author, David Montgomery, an economist who had served in the Congressional Budget Office and the Energy Information Administration during the Ford, Carter, and George H.W. Bush administrations, concluded that reducing CO_2 emissions by twenty percent would require a carbon tax of

200 USD per ton and would reduce Gross National Product (GNP) by 1.7% by the year 2020 and 2.4% by the year 2100 (Montgomery 1991). Montgomery also claimed, with scant evidence, that avoiding global warming would provide no economic benefits until the year 2100 and that even then the damage would never amount to more than 0.5% of GNP *(id.)* Montgomery's conclusions were broadcast nationwide through the Associated Press, CNN's *Moneyline*, industry publications, and more. In *USA Today*, he urged policy delay, telling the public, 'The costs [of climate policy] would be high. Economic benefits are uncertain, distant, and potentially small' (Montgomery 1992).

As the 1992 Earth Summit in Rio de Janeiro approached, the API brought Montgomery's conclusions to *The New York Times*. The paper had previously reported that an uncontrolled buildup of carbon dioxide could result in global warming of 3–8 degrees Fahrenheit (1.7–4.4 degrees Celsius) by the end of the 21st century, with potentially catastrophic results (Stevens 1992). The API's executive vice president, William O'Keefe, countered in a letter to the editor, citing the George C. Marshall institute to dispute the role of fossil fuels in global warming and Charles River Associates to insist emissions cuts would be uneconomic (O'Keefe 1992):

> Those judgments [of catastrophic effects on the world's climate] cannot be supported by hard and consistent scientific evidence. Some of the country's leading scientists, working through the George C. Marshall Institute, recently concluded that . . . 'the sun has been the controlling influence on climate in the last 100 years, with the greenhouse effect playing a smaller role . . . [of] a few tenths of a degree.' According to Charles River Associates, an economics research organization also doing studies on this issue, a mandate to stabilize carbon dioxide emissions at or below current levels in the United States could require a new tax of 200 USD a ton of carbon burned . . . This could mean a 2 percent drop in our gross national product in the last half of the 1990's, resulting in a drastic impact on jobs, as well as on our standard of living. We are facing the equivalent of a 100 USD billion tax on Americans without solid scientific evidence.

Besides reporting Montgomery's results inaccurately, O'Keefe omitted the fact that the API had paid for Montgomery's study, instead portraying Charles River Associates as an independent research organization.[4] Although the API's funding was acknowledged in Charles River Associates' report itself, it often was not in public promotions of the report's results. That misleading portrayal, along with the dual strategy of casting doubt on climate science while insisting climate policy would be uneconomic, would become standard practice for the petroleum industry as it successfully fought climate legislation for years to come.

The following year, the new Clinton administration proposed a carbon price, a hybrid energy and carbon tax eventually dubbed the 'BTU tax.' To

oppose this policy, the API again turned to David Montgomery, this time through the consulting firm DRI-McGraw Hill (Montgomery 1993). Montgomery and O'Keefe held a press conference at the National Press Club in Washington, D.C. to share the results of the new analysis. O'Keefe explained that the API believed the tax would damage the economy and turned to Montgomery to confirm its position. Montgomery did so, concluding that the proposed tax would reduce GDP by 73 USD billion and eliminate nearly 400,000 jobs by 1998 (Foster Natural Gas Report 1993). One press conference attendee asked (Federal News Service 1993), 'Mr. Montgomery, was this survey that you did for API . . . an independent and scientific survey that would stand peer review, or was this commissioned to meet your client's expectations?'

'It was certainly the first,' Montgomery responded, explaining:

> There are two fundamental economic principles that lie behind these results that are true no matter who looks at energy taxes . . . Energy taxes have the fundamental problem that whenever you try to reduce the deficit, you reduce purchasing power . . . and that needs to be offset somehow through active monetary policy . . . The second principle is that energy taxes are a very narrow tax; a value-added tax is a broad-based tax. A narrow tax has much higher costs than a broad-based tax.

Montgomery may have referenced standard economic doctrines, but he applied them selectively. Though he acknowledged that climate policy costs could be offset through other monetary policies, he and the API omitted these when citing high cost predictions to the public. Moreover, his analysis ignored the benefits of climate policy entirely. As designed, Montgomery's reports could provide only one answer: climate policy would be costly with few, if any, benefits.

Using Montgomery's new report, the API and other industry organizations established a group called the American Energy Alliance, which spent millions of dollars fighting passage of the BTU tax by threatening the election prospects of Democratic senators in swing states (Duffy 1993). The strategy worked, and the bill died in the Senate.

3. The Kyoto Protocol

US domestic climate policy had been quashed, but international negotiations moved forward. In 1996, as the UN's second Conference of Parties approached, the fossil fuel industry's Global Climate Coalition, an alliance of fossil fuel and other anti-climate-policy interests formed in 1989 with the API's O'Keefe now serving as its chairman, attacked the credibility of the IPCC to undermine its recent finding that anthropogenic warming had been detected (Rheem 1996).[5] Concurrently, the API again hired David

Montgomery, who was joined at Charles River Associates by two new colleagues, Paul Bernstein and Thomas Rutherford, to predict the global economic costs of an international climate treaty (Montgomery *et al.* 1996).

If emissions were reduced to 20% below 1990 levels by 2005, Montgomery and his colleagues concluded, developed nations could lose 3.5% of GDP and developing countries would lose half that as demand for exports shrank (Inter Press Service 1996). Accompanied by API personnel, the three economists presented their results at the UN's climate conference. 'A lot of people from different delegations are coming up and saying they had no idea what the economic impact would be,' said the API's manager for planning and special projects David Banks (Evans 1996). 'We're hoping to contribute to that debate.'

As the conference came to a close, the United States' lead negotiator, Timothy Wirth, announced that since voluntary actions to reduce emissions had thus far failed, the US would support a binding international treaty at the following year's conference in Kyoto, Japan (Morgan 1996). In response, the API reactivated the American Energy Alliance and developed an influence campaign directed at columnists, TV hosts, and '89 key officers, economists and analysts with leading think tanks' (*id.*) API president Charles DiBona told the public that the IPCC was 'government by stealth' (Lorenzetti *et al.* 1996). At the API's annual meeting in Washington, D.C., the trade association's chairman Lee Raymond (also the chairman and CEO of Exxon) described global warming treaties and policies as 'the greatest long-term threat to our industry' (Oil & Gas Journal 1996).

To undermine the meeting in Kyoto, the petroleum industry continued to employ a dual strategy of casting doubt on climate science while alleging that climate policy would be economically disastrous. Despite decades-old internal research at Exxon to the contrary (Exxon Research and Engineering Company 1982), Raymond told the public that efforts to reduce the use of fossil fuels were 'based on the unproved theory that they affect the earth's climate' and that 'scientific evidence remains inconclusive as to whether human activities affect global climate' (Oil & Gas Journal 1996). The Global Climate Coalition claimed there was 'no convincing evidence that future increases in greenhouse gas concentrations will produce significant climate effects' and asserted, '[t]he scientific community has not yet met the "burden of proof" that greenhouse gas emissions are likely to cause serious climate impacts' (Karey 1997). O'Keefe, directly contradicting the actual findings of the IPCC, wrote in the *Washington Post*, '[the IPCC] clearly states in its latest report that scientists have not yet been able to distinguish any human-induced changes in climate from the natural variations that have been observable for centuries . . . Climate scientists don't say that burning oil, gas and coal is steadily warming the earth' (O'Keefe 1997).

For favorable economics, the API again turned to Montgomery, Bernstein, and Rutherford, who used their international cost model to conclude that a treaty would cost double what the Clinton administration had calculated (Bernstein *et al*. 1997). 'The entire world is connected through international trade,' the economists argued, 'and all countries will be affected if economic growth slows in the industrial countries' (Platt's Oilgram News 1997). O'Keefe praised the industry-sponsored study, calling it 'highly effective in revealing the economic consequences' of the proposed climate treaty (*id*.)

The new report was disseminated around the world and to members of Congress. Montgomery promoted the group's results at 1997's OPEC meeting in Vienna, Austria, speaking alongside Brian Flannery of Exxon, Klaus Kohlhase of British Petroleum, and Fred Singer from the science-denying Science & Environmental Policy Project (Inter Press Service 1997). Montgomery also testified before the Senate Committee on Foreign Relations, chaired by Senator Timothy 'Chuck' Hagel (R-NE), urging climate policies to be delayed (Federal News Service 1997a). The president of the National Association of Manufacturers testified too, citing Charles River Associates' report and claiming that a climate treaty would cost the country 250,000 jobs (Federal News Service 1997b).

Senator Hagel adopted the message, introducing a resolution to block any climate treaty that might result from the upcoming meeting in Kyoto, explaining, 'Even using very conservative assumptions, Charles River Associates, a leading economic modeling firm, for example, has estimated that holding emissions at 1990 levels would reduce economic growth by one percent a year, rising to three percent in the later years' (Congressional Record 1997). Senator Hagel didn't mention the study had been paid for by the petroleum industry or that it ignored the benefits of a climate treaty entirely. To support his resolution, Hagel entered into the Congressional Record two articles from that day's *Wall Street Journal*: one entitled 'A Treaty Built on Hot Air . . . Not Scientific Consensus' by Fred Singer of the Science & Environmental Policy Project, which denied the existence of a scientific consensus about climate change, and another similarly entitled 'A Treaty Built on Hot Air' by former US Representative Jack Kemp (R-NY), which cited Charles River Associates' cost estimates and alleged that a climate treaty would be economically disastrous (Kemp 1997, Singer 1997).

Charles River Associates' study was also amplified in *The New York Times*. Mobil oil company, in an advertorial entitled 'Stop, look and listen before we leap,' wrote (Mobil Corporation 1997b):

> International efforts to deal with climate change are lurching from speculation toward actions that could wreak havoc on nations even as the underlying

> science and economics continue to signal caution … Studies have examined some of the emission-control plans tabled to date and concluded that they will impose painful burdens on developed economies … For Americans, such solutions mean jobs will disappear and lifestyles will be pinched as our industrial infrastructure shrinks.
>
> A study just issued by Charles River Associates (CRA) provides additional weight to the impact of emission controls in an age of global markets … The cost of limiting emissions could range from 200 USD to 580 USD per ton of carbon, depending on the timing and severity of the plan selected. To put this in perspective, this equates to an additional cost to consumers of 50 cents to 1.50 USD per gallon of gasoline in today's dollars. The expected blow to U.S. prosperity would be considerable, according to CRA: an annual drop in gross domestic product ranging from 105 USD billion in the year 2010 to 460 USD billion in 2030 …
>
> One key finding of CRA's study is that the economic burden of emissions controls is borne not only by the industrialized countries, but also by developing societies … The developed world feels the pain as it is forced to switch fuels and revamp its industrial infrastructure. The developing world, which now exports 60 to 75 percent of its products to industrialized countries, will see those markets shrivel as economic growth stalls and demand for protectionist measures grows … The CRA study injects a healthy dose of realism into the climate-change debate.

Again, Mobil didn't mention that the study had been funded by the API (of which Mobil was a member), nor that the study entirely ignored the benefits of preventing global warming. Florentin Krause, director of the International Project for Sustainable Energy Paths, noticed Charles River Associates' methodological gaps. 'The feedback between imposing an emissions cap in some sort of international agreement and what firms and people will do to innovate in the way they produce goods and services is missing,' he said, concluding, 'the studies cited by the GCC [Global Climate Coalition] were structured to come up with the results that they did' (Platt's Oilgram News 1997).

Yet as the meeting in Kyoto approached, Charles River Associates' report continued to be promoted widely. O'Keefe again cited the study to Congress, claiming that a treaty would cost 200,000–500,000 jobs (Federal News Service 1997c). Montgomery testified again too, saying, 'Near-term emission limits will be costly. There is some uncertainty about how large the costs will be, but no uncertainty that there will be costs' (Federal News Service 1997d). Montgomery insisted Charles River Associates' cost estimates were, if anything, low: 'This is a lower-bound estimate. Depending on how such limits were implemented, the costs could be substantially higher … Uncertainties about these costs are all on the upside. Not using carbon taxes or emissions trading will make the costs higher, not lower … The most important uncertainties are that economic models underestimate costs by assuming

efficient, market-based policies' (*id.*) Mobil again publicized the report in *The New York Times*, pairing industry-funded economic analysis with denial of climate science (Mobil Corporation 1997a):

> Credible economic studies, including those by Charles River Associates and Wharton Economic Forecasting Associates [which was also funded by the API (O'Keefe 1998)], point out the enormous, cumulative costs that these [climate] proposals could have . . .
>
> Even after two decades of progress, climatologists are still uncertain how – or even *if* – the buildup of man-made greenhouse gases is linked to global warming . . . There is a better way – one that doesn't commit nations to targets that may be scientifically overblown and financially crippling.

Charles River Associates then released yet another report, funded by the American Automobile Manufacturers Association, describing the proposed climate treaty as the 'single most expensive environmental measure ever adopted by the U.S. government' and claiming a treaty would reduce household income by 4,250 USD by 2030 (Coal Week 1997). The economists argued there would be no harm in delaying climate policy, writing, 'There is no need to depart from baseline emissions until well after 2010' and that 'even a decision to hold [carbon dioxide] concentrations at today's level of 350 ppm still allows flexibility for emissions to continue to increase significantly until 2020' (*id.*) Of course, their assertions made little sense, since continued emissions would necessarily increase the atmosphere's carbon dioxide concentration, which today has reached around 410 ppm (Lindsay 2020). Using Charles River Associates' work, the API and other industry organizations launched a 13 USD-million influence and media campaign called the Global Climate Information Project, which told the public that a climate treaty would 'raise the cost of just about everything' while offering no or few benefits (Behrens 1997).

Despite the industry's extensive campaign, an agreement was ultimately made in Kyoto to reduce emissions in the US and other industrialized countries (albeit by modest amounts). To prevent US ratification of the agreement, the API again hired Charles River Associates' David Montgomery and Paul Bernstein, who wrote a report predicting the treaty would cost the US economy 100 USD billion per year, ten times more than calculated by the Clinton administration (Bernstein and Montgomery 1998, Crow 1998). Congress again picked up the message. Senator Kit Bond (R-MO) cited the new study while claiming electricity prices in his state would rise by over 50%, and Senator Mike Enzi (R-WY) invoked Charles River Associates to claim the treaty would destroy 3.1 million jobs by 2010 (Congressional Record 1998a, 1998b). Margo Thorning, chief economist for the anti-regulatory American Council for Capital Formation, cited Montgomery and other industry-hired consultants in telling Congress the

treaty 'would impose a heavy burden on United States households and industry' (Federal News Service 1998).

The Senate refused to ratify the treaty, and as George W. Bush assumed the presidency, the API suggested replacing the global agreement with a program of voluntary actions, even though the inadequacy of that approach had motivated the treaty in the first place (Lorenzetti 1998). To enhance its credibility, the API hosted a conference that highlighted industry efforts to address climate change, consisting largely of efficiency retrofits in office buildings and limited research on carbon capture and sequestration (Oil & Gas Journal 2000). The Bush administration quickly adopted the industry's position and in 2001, citing high predicted costs to the US economy, withdrew from the Kyoto Protocol, privately informing the Global Climate Coalition that its requests had been heeded (Brill 2001). In place of participating in the treaty, the Bush administration announced a voluntary program as the industry had called for, the goal of which was not to reduce emissions, but instead merely to slow their rate of increase – much like the program adopted by Bush's father when he was president a decade earlier (Karey 2002). The API approved, stating the program would complement the industry's 'already aggressive efforts' on climate (*id.*)

4. Cap & trade and the Paris Agreement

In 2003, Senators John McCain (R-AZ) and Joseph Lieberman (D-CT) introduced the bipartisan Climate Stewardship Act, which included a national carbon cap-and-trade program. Senator James Inhofe (R-OK) took aim using a new study from Charles River Associates (Congressional Record 2004):

> "[T]he renowned economic forecasting firm of Charles River Associates has concluded that under the McCain-Lieberman bill … economic growth would slow. The Nation would lose up to a quarter million jobs by 2010, increasing to up to 610,000 jobs by 2020 … Natural gas prices would increase by up to 82 percent, driving thousands of companies overseas … Average households in the United States would incur a financial cost up to 1,300 USD in the year 2010, with the annual cost rising up to 2,300 USD by 2020 … Within six years, residential electricity prices would rise by up to thirty percent … By 2020, those prices would rise by up to forty three percent[.]"

The proposed legislation was defeated, 55 votes to 43. Two years later, McCain and Lieberman introduced another version of the bill, and opponents again invoked Charles River Associates. Senator George Voinovich (R-OH) said the bill, 'according to Charles River Associates … would cause the loss of 24,000 to 47,000 Ohio jobs in 2010, and energy-intensive industries to shrink by 2.3 to 5.6% in 2020' (Congressional Record 2005a). The

following day, James Inhofe told the Senate, 'Enacting the McCain-Lieberman bill would cost, according to Charles River Associates, the U.S. economy 507 USD billion in 2020, 545 USD billion in 2025 . . . [and] would mean a loss of 800,040 jobs in 2010 and 1.306 million jobs in 2020 . . . McCain-Lieberman would increase energy prices in 2020 by 28% for gasoline, 20% for electricity, 47% for natural gas, and much more for coal' (Congressional Record 2005b). That bill was also defeated, 60 votes to 38.

With cap & trade twice defeated, in 2007 the API hired Charles River Associates to analyze a variety of current and proposed climate policies, including corporate average fuel economy (CAFE) standards, renewable portfolio standards, and renewable fuel standards. The economists' conclusion was simple: those policies were even worse than carbon taxes or cap & trade systems. Representative Mike Conaway (R-TX-11), arguing to end various ongoing policies, cited Charles River Associates while telling the House, '5 million jobs will be lost by the year 2030 . . . The average American household's purchasing power could drop by 1,700 USD by 2030 . . . Our national GDP could decline by more than 1 USD trillion by 2030, relative to the baseline . . . the energy bills that have passed this House and have been introduced on this floor have a consequence, and these consequences appear very dire' (Congressional Record 2007a). Representative Stevan Pearce (R-NM-2) echoed, 'The Charles River report is nationally respected and says: Please, please reconsider what you're doing in Congress' (Congressional Record 2007b).

At the close of 2007, Senators Lieberman and John Warner (R-VA) introduced yet another bipartisan climate bill. Senator Inhofe was ready, telling Congress, 'A study by Charles River Associates puts the cost . . . at 800 USD to 1,300 USD per household by 2015, rising to 1500 USD to 2,500 USD by 2050. Electricity prices could jump by 36% to 65% by 2015 and 80% to 125% by 2050' (Congressional Record 2008a). Ihhofe reiterated days later, 'The analysis by Charles Rivers Associates says that each family of four in my State of Oklahoma will have their taxes increased by 3,300 USD a year' (Congressional Record 2008b). The bill was defeated in 2008 by Senate Republicans insisting it would damage the economy (Pooley 2008).

In 2009, President Obama was inaugurated and another cap & trade bill was proposed by Representatives Henry Waxman (D-CA-30) and Edward Markey (D-MA-7). Charles River Associates again provided the economic ammunition to fight passage of the legislation. 'According to the independent Charles River Associates International,' Representative Virginia Foxx (R-NC-5) said, the bill 'would result in a net reduction in U.S. employment of 2.3 million to 2.7 million jobs each year . . . through 2030' (Congressional Record 2009a). The following day, while testifying to the House, Indiana state Representative Woody Burton (R-58) quoted the same line

(Congressional Record 2009b). The bill narrowly passed the House but died in the Senate.

With climate legislation repeatedly defeated in Congress, the Obama administration moved its attention to regulating carbon dioxide through the Environmental Protection Agency (EPA) under the Clean Air Act. Again, Charles River Associates provided the talking points needed to oppose fossil fuel reductions. 'In a study that Charles River Associates International did,' James Inhofe told the Senate, 'they estimate that EPA's cap-and-trade regulations could increase wholesale electricity costs by 35 to 45% … the EPA is doing what the legislature refused to do; that is, regulate the emissions of fossil fuels, [and] it will increase electricity prices about 40%' (Congressional Record 2011a). Senator John Thune (R-SD) repeated the same statistics a week later (Congressional Record 2011b).

Eventually, the economists' results assumed the status of conventional wisdom. 'Charles River Associates is a credible group that to my knowledge no one has challenged,' Senator Inhofe told Congress in 2013 (Congressional Record 2013a). 'Their study of the Waxman-Markey bill reported that the policies would cost the economy 350 USD billion a year in 2030 and 730 USD billion a year in 2050' (*id*.) A week later, he continued, 'The cost [of climate policy] has never been debated much, because Charles River Associates … came out and said it would be between 300 USD billion and 400 USD billion a year and MIT [Joint Program on the Science and Policy of Global Change, also funded by the petroleum industry][6] said about the same. So we know that cost is there' (Congressional Record 2013b). In 2014, Inhofe again insisted, '[Waxman-Markey] would have cost, according to Charles River Associates – and I think people recognize them as authentic – between 300 USD billion and 400 USD billion a year … The cost estimate has been the same since we first started debating this issue. I don't think anyone is challenging that' (Congressional Record 2014). And in 2015, Inhofe again told Congress (Congressional Record 2015):

> For [the Obama administration's] core domestic plan policy, the Clean Power Plan, let's look at what this is. Starting back in 2002 … Members of this Senate started introducing bills that would be cap-and-trade bills that would address this issue. It is very similar to the plan the president is putting out now … Charles River Associates and MIT [Joint Program on the Science and Policy of Global Change, see above] said if we comply with the cap and trade, the cost to the American people would be in the range of 300 USD billion to 400 USD billion every year. That, again, would be the largest tax increase in history.

Where climate policies were proposed, the economists followed. In 2017, President Trump announced the US would leave the Paris climate

agreement, claiming it would cost the US 6.5 million jobs and 7000 USD in average annual household income by 2040 (Trump 2017). To support his claims, the president cited a report paid for by the American Council for Capital Formation and authored by Montgomery, Bernstein, and others, who were now working at another consulting firm, NERA Economic Consulting (Bernstein *et al.* 2017).

5. Discussion

Charles River Associates played a key role in weakening, defeating, and delaying US climate policy for decades. The group's industry-funded reports provided economic talking points used by fossil fuel companies and the broader climate change counter-movement, often in combination with science denial, to oppose restrictions on carbon emissions (Brulle 2014, Jones *et al.* 2018). Separate from impact, however, were Charles River Associates' reports accurate?

Following the tenets of neoclassical economics, Montgomery, Bernstein, and their coauthors assumed that the economy without climate policy was performing optimally, so that any limit on greenhouse gas emissions would hurt economic growth. Reflecting on the group's work, Bernstein explains that this assumption was attractive to the API. 'Given the model's view of the world, it's clear that if you put on a constraint, then you're going to require people to do something they're not doing now, so it's going to come at a cost,' he says.[7] 'So, in this case, if you put on a greenhouse gas limit, there's going to be a cost to it.' Bernstein reflects, 'I think the API knew that if they had Charles River Associates run these models, it would produce the results the API wanted, namely that it would show a cost to this policy.'

Crucially, the group's models ignored policy benefits, such as avoided global warming or improvements in air quality. Bernstein explains, 'The models we had did not look at the benefit side. The only benefit we looked at was the reduction in emissions, but we didn't quantify that in terms of dollars.' With this limitation, Bernstein today offers an important caveat: 'We could talk about cost *effectiveness*, but we couldn't actually weigh the costs and the benefits. I think it served the API's purpose.'

Although details of the economists' models remain proprietary, the reports that are publicly available illustrate their general methodology. When estimating the costs of the Kyoto Protocol in 1997, for example, Montgomery, Bernstein, and Rutherford estimated that without climate policy, emissions would grow by about 60% in OECD countries by 2030 (Bernstein *et al.* 1997). They then considered two climate policy emission paths: one in which carbon emissions would decline to 1990 levels by the year 2010 and remain there until 2030; and another in which emissions would be reduced even further to 10% below 1990 levels by 2010 and remain there

until 2030. The difference in annual emissions between the no-policy, high carbon path and either of the two lower-emissions paths represented the emissions to be reduced each year.

Rather than replacing fossil fuels with other energy sources, Charles River Associates assumed that emissions would be reduced primarily by reducing overall *energy* use. Then, the economists estimated the energy price increase that would be required to suppress energy use by the required amount each year. To accomplish this, the economists used a neoclassical general equilibrium model describing the global economy with three inputs – labor, capital, and energy – which could substitute for each other at costs given by elasticities of substitution, which quantitatively connected price changes to consumption changes. Arequired reduction in energy use, along with elasticities of substitution, yielded an overall cost, which could be divided by the carbon emissions avoided to estimate an implied carbon price. The model estimated an implied carbon price of 200 USD–$350 per ton in 2010, which would rise to 430 USD–$580 per ton in 2030 as the difference between the no-policy and lower-carbon paths grew. The economists translated these costs to GDP and job losses and negative impacts on international trade.

In reality, of course, fossil fuels are not the only source of energy, so emissions reductions do not necessarily imply reductions in energy use. The economists modeled this, albeit crudely, using a maximum implied carbon price. Once the price reached this limit, the economists assumed that a zero-emission energy source would be used for additional energy needs, leaving the carbon price stationary. To set this maximum carbon price, the economists assumed it would correspond to an energy source that would be six times more expensive than fossil fuel, forever. If clean energy became cheaper than expected, then the economists assumed it would still be four times more expensive than fossil fuel, forever.

The overall approach inevitably yielded high cost estimates. First was the assumption on faith that unregulated markets produce optimal growth, so that any policy intervention would come at a cost. Second was the illogical assumption that carbon emissions would be reduced not by replacing fossil fuels with cleaner sources of energy but instead by suppressing overall energy use. Third was the use of elasticities of substitution empirically based on contemporary technologies, products, behaviors, and policies, which were subject to change over time and potentially of little relevance over the modeling period (through the 21st century). Finally, the economists ignored technological change, assuming that cleaner sources of energy would forever be prohibitively expensive.

Even with correct cost estimates, the economists would have needed also to estimate the economic benefits of reduced fossil fuel use in order to assess whether climate policies were economically beneficial overall. Bernstein today acknowledges that their models should not have been used to make

absolute cost assessments or oppose climate policy altogether. Instead, he notes, the models should have been used to compare the *relative* costs of policies designed to produce the same climate outcome. This has left Bernstein, who has become increasingly concerned about global warming and the use of his work to delay policy action, less than satisfied:

> I would rather have a chance to tell the whole story. I think that there are costs to climate policies, but I also think there are efficient ways to implement them. Let's not say that we shouldn't do anything. That's where I have a big problem: when our reports were used to say that we found some job losses, so we should do nothing. It's a message often spread by the industries that stand to lose.

Bernstein, who deserves credit for shedding light on this issue, notes that Charles River Associates' work was not entirely outside the mainstream. Wharton Econometric Forecasting Associates, another consulting firm hired by the petroleum industry, also predicted high costs for climate policies (WEFA 1997, 1998). Perhaps most significantly, Bernstein observes that Charles River Associates' work was similar to work done by other modeling groups such as the Massachusetts Institute of Technology's Joint Program on the Science and Policy of Global Change, which is also funded by fossil fuel companies, and that both Charles River Associates and the Joint Program participated in Stanford University's Energy Modeling Forum, which again is funded by fossil fuel companies.[8]

6. Conclusion

For decades, the fossil fuel industry has hired economic consultants to help weaken and delay US and international climate policy. Among them, the economic consultants of Charles River Associates played a key role, helping to undermine carbon pricing, international climate agreements, and other climate policies from the early 1990s onward. The work of these economists was often portrayed to the public as independent, when in fact it was funded by the fossil fuel industry, and their models were incomplete and biased in favor of continued fossil fuel use. Yet their conclusions often passed without challenge and eventually came to represent a significant part of conventional economic wisdom.

Research on the climate change counter-movement has traditionally focused on documenting the promotion of disinformation regarding climate science (Brulle 2014, Franta 2021). While such disinformation has played a crucial role in delaying effective climate policy, the fossil fuel industry and broader climate change counter-movement have also made frequent use of economic arguments to justify inaction. At the same time, the fossil fuel industry has made substantial investments in influential climate economics programs across the US. Further attention is needed on the role of

economists and particular economic paradigms, doctrines, and models within climate politics and the perpetuation of fossil fuels.

Notes

1. Interview with Paul Bernstein, 18 September 2017, Stanford University, Stanford, CA, USA. Quotations confirmed with interviewee 6 December 2018.
2. For a critique of Charles River Associates' work, *see* Barrett *et al.* (2005).
3. The API had been aware of the threat posed by global warming since at least the 1960s, began publicizing disinformation to oppose fossil fuel restrictions by 1980, and helped create the Global Climate Coalition, a prominent organization opposing climate policy, in 1989 (Franta 2021).
4. O'Keefe would later become the Chief Executive Officer of the George C. Marshall Institute, which became the CO2 Coalition in 2015 (Jones *et al.* 2018).
5. The Global Climate Coalition, active from 1989 – 2002, was prominent within the climate change counter-movement (the movement to oppose restrictions on carbon emissions) (Brulle 2014). After the Global Climate Coalition dissolved, some of its leaders formed another counter-movement organization, the Alliance for Climate Strategies (Jones *et al.* 2018).
6. *See* Our Sponsors, MIT Joint Program on the Science and Policy of Global Change: https://perma.cc/4AZ6-AUVL?type=image.
7. Interview with Paul Bernstein, 18 September 2017, Stanford University, Stanford, CA, USA. Quotations confirmed with interviewee 6 December 2018.
8. *See* Our Sponsors, MIT Joint Program on the Science and Policy of Global Change *supra*; Industry Affiliates, Energy Modeling Forum, Stanford University: https://perma.cc/YG97-2FWS.

Acknowledgments

Support was provided by the Stanford University Department of History, the Stanford Interdisciplinary Graduate Fellowship, and the Climate Social Science Network. Paul Bernstein is thanked for generously sharing his experiences; any errors in the article are mine and not his.

Disclosure statement

The author has served as a consulting expert for climate change litigation, and the results reported in this study may be relevant to such litigation.

Funding

This work was supported by the Stanford Interdisciplinary Graduate Fellowship; Climate Social Science Network; Stanford University Department of History.

ORCID

Benjamin Franta http://orcid.org/0000-0001-6110-4725

References

Barrett, J., *et al*., 2005. *Jobs and the Climate Stewardship Act: how curbing global warming can increase employment (prepared for Natural Resources Defense Council)*. Natural Resources Defense

Behrens, L., 1997. Coalition begins advertising campaign against climate change treaty. *Inside Energy*, 5.

Bernstein, P., *et al*., 2017. *Impacts of greenhouse gas regulations on the industrial sector (prepared for the American Council for Capital Formation Center for Policy Research)*. Washington, D.C.: NERA Economic Consulting

Bernstein, P.M. and Montgomery, D.W., 1998. *How much could Kyoto really cost? A reconstruction and reconciliation of administration estimates (prepared for the American Petroleum Institute)*. Washington, D.C.: Charles River Associates.

Bernstein, P.M., Montgomery, W.D., and Rutherford, T.F., 1997. *World economic impacts of U.S. commitments to medium term carbon emissions limits (prepared for the American Petroleum Institute)*.

Bodansky, D., 2001. The history of the global climate change regime. *International Relations and Global Climate Change*, 23.

Bradley, R.A., Watts, E.C., and Williams, E.R., 1991. Limiting net greenhouse gas emissions in the United States (report number DOE/PE-0101).

Brill, K., 2001. *To under-secretary Dobriansky: your meeting with members of the global climate coalition*. Washington, D.C.: Department of State memorandum.

Brulle, R.J., 2014. Institutionalizing delay: foundation funding and the creation of U.S. climate change counter-movement organizations. *Climatic Change*, 122, 681–694. doi:10.1007/s10584-013-1018-7

Coal Week, 1997. *Clinton climate plan would hit economy hard; long term program advocated*. The McGraw-Hill Companies, Inc.

Congressional Record, 1997. Vol. 154, no. 107.

Congressional Record, 1998a. S9525.

Congressional Record, 1998b. Vol. 144, no. 96.

Congressional Record, 2004. S11295-6.

Congressional Record, 2005a. S6885.

Congressional Record, 2005b. S7015.

Congressional Record, 2007a. H13831.

Congressional Record, 2007b. H14239.

Congressional Record, 2008a. S4883.

Congressional Record, 2008b. S5178.

Congressional Record, 2009a. H7396.

Congressional Record, 2009b. H7666.

Congressional Record, 2011a. S1925.

Congressional Record, 2011b. S2166.

Congressional Record, 2013a. S5610.

Congressional Record, 2013b. S5727.

Congressional Record, 2014. S2752.

Congressional Record, 2015. S2680.

Crow, P., 1998. Kyoto's costs. *Oil & Gas Journal*, 31.

Duffy, M., 1993. I hear you, I hear you. *Time Magazine*.
Evans, R., 1996. Industry fights move to cut coal and oil use. *Calgary Herald*.
Exxon Research and Engineering Company, 1982. *CO2 greenhouse effect: a technical review*. Exxon Research and Engineering Company.
Federal News Service, 1993. *News conference with the American Petroleum Institute re: btu tax*. Washington, D.C.: Federal News Service.
Federal News Service, 1997a. *Hearing of the International Economic Policy, Export and Trade Promotion Subcommittee of the Senate Foreign Relations Committee*. Washington, D.C.: Federal News Service.
Federal News Service, 1997b. *Prepared testimony of Jerry J. Jasinowski, President, National Association of Manufacturers, before the Senate Committee on Foreign Relations Subcommittee on International Economic Policy, Export and Trade Promotion*. Washington, D.C.: Federal News Service.
Federal News Service, 1997c. *Prepared testimony of William F. O'Keefe, Chairman, Global Climate Coalition, before the Senate Environment and Public Works Committee*. Washington, D.C.: Federal News Service.
Federal News Service, 1997d. *Statement of W. David Montgomery, Vice President, Charles River Associates, before the House Committee on Science, Subcommittee on Energy and Environment*. Washington, D.C.: Federal News Service.
Federal News Service, 1998. *Prepared statement of Margo Thorning, Senior Vice President and Chief Economist, American Council for Capital Formation, before the House Commerce Committee, Subcommittee on Energy and Power*. Washington, D.C.: Federal News Service.
Foster Natural Gas Report, 1993. *API-commissioned study batters BTU tax; API warns of economic impacts, urges more spending cuts*. Foster Associates, Inc.
Franta, B., 2018. Early oil industry knowledge of CO2 and global warming. *Nature Climate Change*, 8, 1024–1025. doi:10.1038/s41558-018-0349-9
Franta, B., 2021. Early oil industry disinformation on global warming. *Environmental Politics*, 30 (4), 663–668. doi:10.1080/09644016.2020.1863703
Inter Press Service, 1996. *Environment: U.N. Climate conference opens, some nations backtrack*. Inter Press Service.
Inter Press Service, 1997. *Energy: OPEC hosts environment workshop*. Inter Press Service.
Jones, C., *et al*., 2018. *Countermovement coalitions: climate denialist organizational profiles*. Providence, Rhode Island, USA.: Climate & Development Lab at Brown University.
Karey, G., 1997. BP charts its own course on warming. *Platt's Oilgram News*.
Karey, G., 2002. Bush unveils voluntary alternative to Kyoto protocol. *Platt's Oilgram News*.
Kemp, J., 1997. A treaty built on hot air. *The Wall Street Journal*.
Knisely, S., 1979. *Controlling the CO2 concentration in the atmosphere*. Florham Park, New Jersey, USA.: Exxon Research & Engineering Company.
Lindsay, R., 2020. *Climate change: atmospheric carbon dioxide*. National Oceanic and Atmospheric Administration. Available from: https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide
Lorenzetti, M., 1998. More agile API is leader's mandate. *Platt's Oilgram News*.
Lorenzetti, M., Karey, G., and Johnston, D., 1996. OPEC ceiling will not move: delegate. *Platt's Oilgram News*.

Markowitz, G. and Rosner, D., 2002. *Deceit and denial: the deadly politics of industrial pollution*. Berkeley, California, USA.: University of California Press.
Michaels, D., 2020. *The triumph of doubt: dark money and the science of deception*. Oxford, United Kingdom.: Oxford University Press.
Mobil Corporation, 1997a. Climate change: where we come out. *The New York Times*.
Mobil Corporation, 1997b. Global climate change: stop, look and listen before we leap. *The New York Times*.
Montgomery, D., 1991. *The cost of controlling carbon dioxide emissions: final report (prepared for the American Petroleum Institute)*. Charles River Associates.
Montgomery, D., 1992. Economy vs. ecology: high costs, uncertain results. *USA Today*.
Montgomery, D., 1993. *Comparison of the economic impact of the Clinton administration's proposed BTU tax and alternatives (prepared for the American Petroleum Institute)*. DRI-McGraw Hill: American Petroleum Institute.
Montgomery, W.D., Bernstein, P.M., and Rutherford, T., 1996. *International impact assessment model (IIAM) (prepared in part for the American Petroleum Institute)*. Charles River Associates.
Morgan, D., 1996. Strengthened U.S. commitment lights a fire under global warming debate. *The Washington Post*.
National Research Council, 1983. *Changing climate: report of the carbon dioxide assessment committee*. Washington, DC.: The National Academies Press
O'Keefe, W.F., 1992. Care for environment doesn't hurt economy: where's the evidence? *The New York Times*.
O'Keefe, W.F., 1997. A climate policy. *The Washington Post*.
O'Keefe, W.F., 1998. Kyoto's mounting costs. *Journal of Commerce*, 6A.
Oil & Gas Journal, 1996. *API girds for Clinton greenhouse tax battle*. PennWell Publishing Company.
Oil & Gas Journal, 2000. *US firms press greenhouse gas initiatives*. PennWell Publishing Company.
Oreskes, N. and Conway, E.M., 2011. *Merchants of doubt: how a handful of scientists obscured the truth on issues from tobacco smoke to global warming*. London, United Kingdom.: Bloomsbury Press.
Owen, B.M. and Braeutigam, R., 1978. *The regulation game: strategic use of the administrative process*. Cambridge, Massachusetts, USA.: Ballinger Publishing Company.
Platt's Oilgram News, 1988. *Next major battleground for industry may be over global warming and causes, effects*. McGraw-Hill, Inc.
Platt's Oilgram News, 1997. *Regulation & the environment*. McGraw-Hill, Inc.
Pooley, E., 2008. Why the climate bill failed. *Time*.
Rheem, D., 1996. *The IPCC: institutionalized "scientific cleansing"*. Global Climate Coalition.
Singer, F., 1997. A treaty built on hot air . . . not scientific consensus. *The Wall Street Journal*.
Stevens, W.K., 1992. Accord on limits on gas emissions is said to be near. *The New York Times*.
Trump, D., 2017. *Statement by President Trump on the Paris climate accord*. The White House. Washington, D.C.

U.S. v. Philip Morris USA, Inc., 449 F.Supp.2d 1 (D.D.C. 2006), aff'd in part & vacated in part, 566 F.3d 1095 (D.C. Cir. 2009) (per curiam), cert. denied, 561 U.S. ___, 130 S. Ct. 3501 (2010)

Waterhouse, B.C., 2014. *Lobbying America: the politics of business from Nixon to NAFTA*. Princeton, New Jersey, USA.: Princeton University Press.

WEFA Inc., 1997. *Global warming: the economic cost of early action (prepared for the American Petroleum Institute)*. Philadelphia, Pennsylvania, USA: Wharton Econometric Forecasting Associates.

WEFA Inc., 1998. *Global warming: the high cost of the Kyoto protocol: national and state impacts*. Philadelphia, Pennsylvania, USA: Wharton Econometric Forecasting Associates.