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Abstract: This commentary discusses the opinion piece published on 1 June 2014 by Professor Robert Stavins in *The New York Times*. Professor Robert Stavins argues that "The Only Feasible Way of Cutting Emissions" is to set up a market for tradable permits. We review and criticize his mains arguments. Our purpose here is not to deny the possibility of carbon trading, but to call for a realistic assessment of the deployment of cap-and-trade systems and their limitations.

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JEL classification: H23, Q54,Q58.

1.Introduction

On 1 June 2014 Robert Stavins, the Albert Pratt Professor of Business and Government at Harvard University published an opinion piece in the *New York Times* entitled "The Only Feasible Way of Cutting Emissions" (Stavins, 2014). By that he means the only effective way of reducing carbon-dioxide emissions – which involves setting targets, cutting costs and deploying low-carbon technologies – is to set up a market for tradable permits. He introduces and concludes his piece with these words: "A national carbon-pricing regime is the only feasible way for the United States to reach its goal of reducing emissions to 83 percent below their 2005 level by 2050. [...] it becomes clear that cap and trade has emerged as the preferred approach for meaningful action to address climate change."

Stavins is one of the leading protagonists in the economics of the environment and global warming, having worked on carbon-pricing and permit markets for almost four decades. In 1988 he headed "Project 88: Harnessing Market Forces to Protect the Environment". This emblematic report, which enjoyed bipartisan support from both Democrats and Republicans, focused on market incentives as an alternative to regulatory public policies. About 50 experts, from universities, government, private business and environmental organizations, took part in the project. Its message was that the environment could be protected in other ways than by regulation, through market incentives such as tradable emissions permits. To the best of our knowledge this report launched the cap-and-trade concept – a system for capping and trading emissions

permits – to combat climate change. It included a recommendation for "international trading in greenhouse gases" (Stavins, 1988, p. 10). Which is well and good.

But there is a sizable problem with Professor Stavins' recent article in the *New York Times*, key points in his analysis being open to question. Our purpose here is not to deny the possibility of carbon trading, but rather to raise another issue. We shall restrict ourselves to just a few comments.

The cap-and-trade system, Stavins explains, "has a history of successful adoption and implementation over three decades". Let us take a closer look at the examples and evidence he provides in support of this claim.

2.The phasedown of lead in gasoline

He starts by asserting that the trading programme introduced by the Environmental Protection Agency in 1982 to phase out leaded petrol "produced a more rapid elimination of leaded gasoline from the marketplace than had been anticipated, and at a savings of some $250 million per year". The literature confirms the fact that the trading programme, compared with regulation, lowered the cost of achieving the targets for phasing out leaded fuel (Newell, Rogers, 2003). But we need to look a little closer at what actually happened when this trading scheme was set up, only operating for five years, from late-1982 to the end of 1987. Of all the sales and purchases of permits, respectively 67% and 70% were made between refineries, as part of internal trades or compensations, not as part of trading on a market between firms (Harrison, 1999, p. 30). So this was not so much a market as a source of flexibility for controlling sources of pollution within the same firm.

It is also important to see this market in the context of regulation spanning two decades, in other words the standards for lead content gradually imposed by the EPA starting in the mid-1970s. As a result of this regulatory policy the lead content of fuel in the United States had already been cut by 80% by the start of the 1980s, prior to the introduction of lead credits. The latter system was launched, in particular, to lower the cost of achieving the target standards for small refiners, which were struggling to meet increasingly stringent requirements for lead reduction. In 1988 the EPA went back to imposing the same standard of performance on all refineries. Lead, as an additive in fuel, was virtually eliminated by the beginning of the 1990s. It was finally banned altogether in 1996 (Newell, Rogers, 2003).

Stavins makes no mention of the US attempt – which was rapidly shelved – to set up a scheme for trading permits for ozone-depleting substances. Between 1989 and 1995 there were 561 trades; in 1992, the busiest year on this market, there were 160 trades

within firms, with only 20 international trades in 1992-95. Alternative technologies, covered by the Montreal Protocol, were quickly deployed, killing the market. "Reductions appear to have been the result of cost-saving due to technological change and the development of substitutes, rather than cost-saving due to trading." (Harrison, 1999, p. 33).

Nor does Stavins say anything – obviously space is limited in an opinion piece published in the mainstream press – about the Regional Clean Air Incentives Market (RECLAIM), a trading programme launched in California in the late-1980s primarily targeting nitrogen oxide emissions. In the past he has been positive and enthusiastic in his appreciation of this scheme, unlike other authors (Fowlie et al., 2009, p. 3). Meredith Fowlie et al. conclude their very detailed analysis of NOx trading in California as follows: "Our results indicate that emissions at RECLAIM facilities fell approximately 20 percent, on average, relative to the control facilities. However, during the period of great permit price volatility, several facilities did not comply with the regulation. When these facilities are included in our analysis, we find that RECLAIM did *not* reduce emissions relative to command and control during this volatile time." (Fowlie *et al*., 2009, p. 35; authors' emphasis).

3.The SO_2 emissions trading scheme

Stavins then pulls out a joker, citing the US sulphur dioxide allowance trading system, which served as a model for the Kyoto Protocol in 1997 and the European Union Emissions Trading Scheme. He sweeps the board with a single sentence, containing one striking, round number. "Congress enacted a law proposed by President George H. W. Bush to use cap and trade to cut sulphur dioxide emissions (and consequently acid rain) by half, at a savings of $1 billion per year." But to understand and debate this substantial saving rather more detail is required.

The US SO_2 allowance trading system, which was started in 1980, was the first scheme for tradable permits to be deployed on such a large scale. Many authors maintain that it was an economic, environmental and technological success, but this is open to question (Damian, 2014, 2012). On the economic front the market purportedly reduced emissions by more than initially projected and at half the cost entailed by a regulatory policy (Ellerman *et al*., 2000). But in fact the trading system itself had little impact. Between 1985 and 1993 about 80% of the cuts in SO_2 emissions were achieved by supplying coal-fired power plants with coal with a lower sulphur content (which had become more competitive thanks to lower transport costs obtained by deregulating the rail system, from the mid-1970s onwards) (Ellerman, Montero, 1996, pp. 13 and 15). As a result the price of a tonne of SO_2 stayed very low for a long time, simply because use of low-sulphur coal made it pointless to resort to the trading system. So the claim that this was an 'economic' success should perhaps be taken with a pinch of salt. Although the cost

of reducing emissions was lower than expected – perhaps as much as 30 times lower (Burtraw, 2012, p.8) – credit for this achievement was not exclusively due to the trading system.

As to the claim that it was an environmental success, the EU used a regulatory method, not market mechanisms, as the basis for reducing SO_2 emissions. Between 1980 and 2010 overall SO_2 emissions dropped by 86% in EU-15 countries and by 67% in the US. Over the same period per capita emissions were cut by a factor of more than 12 in EU-15 countries, but by less than 5 in the US (in 2010 SO_2 emissions amounted to 6kg per person in EU-15 countries, compared with 24kg in the US). Emissions in relation to gross domestic product were roughly equivalent on both sides of the Atlantic in 1980; in 2010 they amounted to 259kg per million dollars of GDP in EU-15 countries, as against 656kg in the US.

Finally at a technological level, several technologies (desulfurization filters) were available and long established, well before the cap-and-trade programme. All that was needed was to improve them and promote their widespread use. Yet two decades after the launch of the SO_2 trading system, one-third of US coal-fired power plants are still not fitted with a desulfurization system. In contrast Germany rejected the idea of a trading system and achieved large-scale take-up of desulfurization solutions. There can be no doubt about the conclusion. "Traditional economists' view is that command-and-control instruments are less efficient than economic instruments (e.g., taxes and tradable permits) […] However, our analysis suggests that the German command-and-control approach was most likely the best choice in terms of efficiency. […] The implementation of an SO_2 emissions trading scheme in the United States has not led to the development of technologies that could have been used to achieve the ambitious German reduction aims at lower costs." (Wätzold, 2004, pp. 37 and 38).

So there is nothing very compelling about the success of the US SO_2 allowance trading system, neither economically, nor environmentally and less still technologically. The alleged success is more an illusion. Furthermore the US is not the only place where an SO_2 trading system has run into problems. In China too, despite the full support of the US administration and international organizations, the attempt to set up a market for permits along these lines proved a failure (Shin, 2013).

In the two examples cited above Stavins pulled out of his sleeve savings worth millions and billions of dollars, thanks to cap-and-trade systems. It all seems very appealing. But he is very sparing in his attention to the difficulties assessing the ex ante and ex post costs and benefits of policies based on regulation *versus* market incentives (Harrington, Morgenstern, Nelson, 2000; Schelling, 1983).

But there is a more important concern with the SO_2 trading system. It is now moribund, an empty shell with permit prices devoid of any economic significance. This is what happened. Coal-fired power plants do not only emit SO_2 but also NOx, various carcinogens and mercury which is highly toxic. Under George W. Bush the administration proposed stricter limitations on emissions, by lowering the number of SO_2 permits available and setting up a cap-and-trade system for mercury. Many American states had already introduced strict standards limiting mercury emissions. Environmental organizations argued that a toxin such as mercury could not be treated as a marketable commodity and that it should be strictly regulated (Rabe, 2007; Bellas, Lange, 2005). In 2008 US courts ruled in favour of the opponents of the cap-and-trade scheme: emission-reduction policies should be based on norms and standards (using the best available technologies, which generate the least pollution). As a direct consequence of establishing norms for mercury, SO_2 emissions also dropped, the two forms of pollution being associated. The new regulations should cut the latter emissions by a factor of three by 2015, compared with 2010. As a result the market value of SO_2 is currently close to zero (Burtraw, 2012, p. 8).

There is much to be learnt from recent regulations, and their effectiveness, with regard to the economics of the environment (and global warming). Dallas Burtraw, a fine analyst, particularly of US cap-and-trade systems, has made a substantial contribution to this process in "The Institutional Blind Spot in Environmental Economics", a work of great intellectual honesty in which he acknowledges past errors and blind spots, including his own: "With adoption of the sulfur dioxide program, many economists (including me) clamored initially that other regulations under the [Clean Air] Act were unnecessary, inefficient, and raised costs; but ultimately they delivered substantial public health and economic benefits" (Burtraw, 2012, p. 9).

4.California's cap-and-trade system

In his article in the press Stavins goes on to cite the two cap-and-trade regimes operational in the US: the first and oldest operating in the north-east; the other in California. In 2008 10 east-coast states, now only nine (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont; New Jersey, yielding to Republican pressure, pulled out in May 2011), set up the *Regional Greenhouse Gas Initiative*. Its modest objective was to reduce CO_2 emissions in power generation by 10% by 2018. The permits almost all found buyers on the auctions organized by the various states. The funds collected, amounting to more than $1 billion, were mainly directed towards measures promoting energy efficiency and renewables. This is indeed a success, from which lessons may be learned: the price of permits is low, about $4 to $5 per tonne of CO_2, even after the recent reduction in the volume of authorized emissions. Electricity prices have only slightly increased, by only 1%. So the cost is acceptable for consumers, who have made greater savings on their

electricity bill thanks to the energy-efficiency schemes funded by the electricity utilities (Pool, 2010; Navarro, 2012).

Stavins sums up the Californian initiative in one, powerful sentence. "California's ambitious cap-and-trade system will soon cover 85% of the state's economy *and reduce carbon dioxide emissions to their 1990 levels by 2020*" (our emphasis). Readers of the New York Times, unless they are very well informed, will be impressed. All on its own – or so Stavins would have us believe – California's cap-and-trade system will bring CO_2 emissions back down to their 1990 level by 2020. This would indeed be quite an achievement, but unfortunately it is not the case and what Stavins has written is downright misleading. As we shall explain.

In 2006 California passed the Global Warming Solutions Act (also known as Assembly Bill 32), which aims to reduce the state's greenhouse gas emissions to their 1990 level by 2020. Measures include a tradable permit system which was launched, after a great deal of legal wrangling, in 2013. It is the largest cap-and-trade system in the US. It could represent about 20% – it all depends on the terms of its operational deployment – of efforts to cut emissions by 2020. "The vast majority of reductions – about 80% – to achieve California's emission reduction mandate are expected to come from policy instruments other than carbon pricing. The California cap-and-trade program is tasked with inducing about 20% of the reductions, 34.4 MMTCO2E [million metric tonnes of CO_2 equivalent] out of 174 total" (Hanemann, Bush, 2009, p. 6). So the vast majority of the expected gains will be achieved through public policies, consisting of a bundle of forty regulatory actions, according to Michael Hanemann: reduction in emissions from motor vehicles; greater share of renewables in electricity generation; energy savings; reforestation; and even smaller-scale measures, "such as regulating the handling of wet manure at animal facilities. […] Implicit in this approach was an emphasis on 'cap' rather than 'cap and trade'. […] it was a natural extension of the regulatory approach traditionally used with air pollution and energy efficiency in California." (Hanemann, 2008, p. 119). With very ambitious public policies it might even be possible to achieve the targets "without engaging in cap and trade." (Bushnell, Peterman, Wolfram, 2008, p. 190).

What is the point in exaggerating the true situation, as Stavins has done in the *New York Times*? Particularly as the future of cap-and-trade is likely to be settled in California, home to the world's 12th largest economy. Not only has this system been hotly disputed in the courts but it has proved difficult to harmonize with a complex bundle of regulatory measures. The EU may well learn from what is happening in California. "Cap and trade may add little to the many energy efficiency regulations California has long had in place. […] For Europe, California has lessons about what can be achieved by regulators. […] The Californian stress on, and success with, energy regulation

deserves Europe's attention at a time of European nervousness concerning the inefficacy of the ETS." (Buchan, 2010, pp. 30 and 33).

Stavins devotes two paragraphs to the EU carbon trading system. We shall not comment on this, it not being to our purpose, except to note that he concludes that the system "is now being expanded". Really? Let us hope that his words will allay the worries of Eurocrats nursing the ETS. They might even remind them of those happy times when Christian de Perthuis (then a member of the climate change economics research unit at France's Caisse des Dépôts) could write, hailing the launch of the European system: "This new creature can look forward to a fine future" (de Perthuis, 2006).

5.Conclusion

In his article in the *New York Times* Stavins has overstated his case in favour of a solution based exclusively on cap-and-trade, for he is perfectly familiar with the economic literature on we have drawn. His apology, which includes several glaring omissions, does nothing to boost his credibility. What is needed now is an honourable, realistic defence of the deployment of cap-and-trade systems and their limitations.

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