

Cleaning up the Auto Industry



By [Nigel Roberts, London Correspondent](#)

Dirty habits die hard and the only way to encourage auto makers to adopt clean technology is a short sharp shock in the fuel price. It's a radical approach, but research suggests it could work.

If governments took action now and effectively raised carbon tax on fuel by 40 percent percent, INSEAD Assistant Professor of Economics and Political Science **David Hemous** predicts that within 15 years there would be more clean cars than dirty cars sold in the world. The price hike would remove the biggest obstacle to clean innovation – path dependency. In other words, firms that have innovated a lot in “dirty technologies” in the past, will find it more profitable to innovate in clean technologies in the future.

David Hemous and his co researchers - Philippe Aghion of Harvard University and Antoine Dechezleprêtre, Ralf Martin and John Van Reenen of the London School of Economics - analysed data on auto industry technology patents over several decades. They distinguished between “dirty” technologies

(petrol and diesel engines) and “clean” technology (electric and hybrid) and wanted to identify what could influence auto makers to adopt innovative, clean technology. Since 1978 globally, “dirty” patents outnumbered “clean technology” patents by a ratio of 3:1.

“If governments do nothing, then path dependency will hurt the economy. If they start acting in a strong, decisive manner it will actually help. A gradual increase in carbon tax won’t work. You need a short, sharp shock and very strong intervention from the beginning. But it needn’t last for a long time.”

Without a financial stick, auto manufacturers tend to innovate in dirty technologies. “Since dirty technologies are currently more developed, they have a larger market share and incremental innovations in dirty technologies are more profitable than incremental innovations in clean technologies. Over time, the gap between clean and dirty technologies would keep widening,” says Hemous. With the right incentives, however, path dependency can help because as fuel taxes prompt more clean innovation, the market for clean cars expands, thus making each future clean innovation more profitable.

The largest innovators in clean technologies are the Japanese and the Germans. Historic price shocks in the price of fuel prompted the development of a stock of clean technologies which forms the basis – or clean path dependency – for future development of future technologies. “Small initial differences add up. You don’t need much initial stimulus to eventually see quite large improvements.”

Short Sharp Shock

To encourage the development of these clean innovations and overcome dirty path dependency, auto makers need a short, sharp price shock, which should combine a high carbon price with high initial clean-innovation R&D subsidies. But in the current economic climate governments are even less likely to increase carbon or fuel taxes since this will push up the costs of

goods for businesses and industry and would be politically undesirable.

“It’s going to be hard to increase the financial pressure. It’s hard to impose tax increases on fuel if you keep everything else the same. There could be a case for rebalancing the tax burden with higher taxes on fuel and lower taxes on labour. That might be easier to accept for the wider population. But there is an additional issue that fuel taxes are a regressive tax, they hurt more the poorer parts of society who have to spend a relatively higher proportion of their income on fuel. So as you increase fuel tax, you have to decrease other consumer taxes to compensate and make it more acceptable for lower income consumers.”

Imposing direct taxes on the auto industry would not work. “If you are going to tax producers that will be reflected in the price of the car. Also, it will act as a disincentive on consumers to buy a new car so they will hang on to their old energy inefficient fossil fuel vehicles.”

Neither do direct sales or production subsidies for clean cars always have the desired effect because it encourages the adoption of clean products rather than clean technology. “Current clean cars exist and that’s good, but we don’t want too many people driving costly clean cars or covering the earth with less efficient solar panels. We may want to delay the adoption of clean products while pushing more research into clean technology innovation.”

Carbon Leakage

One of the big debates in economics at the moment is the issue of carbon leakage which happens when well intentioned governments impose the wrong kind of financial incentives. For example, if governments impose a high green tax on the steel or chemical industry in one region, production will simply move abroad. In other words, if you start taxing pollution on one country, that pollution will move offshore.

A good example where this can happen is the cement industry: the production of cement is very polluting and energy intensive and yet cement can be transported long distances at low cost across the ocean. A recent study (Ponssard and Walker, 2008) estimates that at a price of 50 euros per tonne of CO₂ in Europe, 70 percent of the reduction in domestic emissions will be undone by an increase in foreign emissions. A tax on CO₂ emissions is unlikely to drive a lot of clean innovations in the cement industry, instead it will mostly lead to an increase in cement imports.

Professor Hemous believes that the auto industry, which accounts for around 16.5 percent of global emissions, does not suffer from carbon leakage “because the pollution occurs where you drive the car, not where it is built”. So by encouraging the development of the right kind of clean innovation, the industry could be a catalyst for other industries and producers to shift their dirty path dependency.

“When devising policies for climate change we need to take path dependency into account. It’s urgent. The more you wait the costlier it will be to change from dirty to clean technologies. It’s actually doable now and won’t affect growth or our standard of living. But if we don’t act in the next five years we will reach a tipping point – and it will be too late.”

David Hemous is Assistant Professor of Economics and Political Science at INSEAD. His research paper is titled "[Carbon Taxes, Path Dependency and Directed Technical Change: Evidence from the Auto Industry](#)".

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