

Thoughts on the economics of vehicle emission standards in light of the VW scandal

Motor vehicle pollution is a problem within the highly urbanised cities of Australia where vehicles are estimated to contribute up to 70% of total urban air pollution (NSW EPA, 1999).

According to the ABS (2010), transport accounts for around 15% of Australia's greenhouse gas emissions in which road transport accounted for 86% of all transport emissions. In an effort to reduce the level of harmful emissions emitted from motor vehicles, Australia, like other countries has chosen to directly set and regulate emission limits for all new vehicles.

A study by Reynaert (2015) found that car manufacturers choose to comply with the regulation by adopting new technology to develop cleaner and more fuel efficient cars. However, in September 2015, the world's number one light vehicle manufacturer, Volkswagen (VW), was found to have cheated car emissions tests in the United States using the now infamous "defeat device" software on its 'clean' diesel vehicles. It has been reported that around 11 million vehicles worldwide are affected with VW vehicles testing around 15 to 35 times the legislated limits in the United States.

The scandal brings to light the options available to government to reduce motor vehicle emissions whether that be through regulation as currently adopted or through other mechanisms such as taxes and pricing.



Current regulatory approach

In Australia, the approach adopted by government to reduce motor vehicle emissions has been through the regulation of vehicle emission standards. Emissions standards have been regulated since 1972.

Before new standards are implemented, a regulatory impact statement (RIS) must be undertaken. The purpose of the RIS is to assess the potential impacts of a new regulation and to determine whether the proposed regulation will achieve its objectives. An important component of the RIS is to assess from an economic viewpoint if the benefits will exceed the costs of the proposed regulation.

Since 1999 there have been three RIS completed for proposed changes to the motor vehicle emission (and fuel) standards. The cost-benefit analysis (CBA) undertaken as part of these RISs generally considered whether any costs of the proposed regulation (e.g. increased car purchase price) would be outweighed by the potential environmental, health and fuel consumption benefits.

A summary of the CBAs completed for motor vehicle emission standards in Australia is shown in Table 1. Overall, the CBAs estimated that the implementation of more stringent motor vehicle emissions would result in a small economic net benefit. For example, the Euro5/6 emission standard applied to petrol cars was forecast to return a BCR of 1.37, while the standard applied to diesel cars was expected to provide a higher economic benefit with a BCR of 1.63.

Problems with the regulatory approach

A recent study by Jacobsen and van Benthem (2015) showed that the effectiveness of emission standards (regulation) is dependent on how the market and consumers respond.

For instance, the introduction of emissions standards has led to an increase in car fuel efficiency. However, an unintended consequence of improved fuel efficiency is that drivers of more fuel efficient cars decide to take advantage of the lower cost per kilometre of travel and drive more than before. This is referred to as the “rebound effect” and any saving in emissions from more fuel efficient cars is offset by increased driving.

Jacobsen and van Benthem noted that in the US the average increase in driving distance was 10% to 15% as it costs less per mile after the introduction a change to fuel standards (see also Gillingham, 2011). Additionally, increased driving results in other costs to the community (negative externalities) in the form of increased congestion and crashes.

A second problem is that when new vehicle prices rise due to tightened motor vehicle emission standards it incentivises used vehicle owners to postpone the decision to scrap their old vehicles. This leads to a larger used vehicle fleet that also has a lower average fuel efficiency.

Table 1: Results of cost benefit analysis, discount rates shown in brackets

Proposed adoption of Standard	Date introduced	Year of RIS	Costs	Benefits	NPV	BCR
Euro 3	1/1/05 – 1/1/06	1999	\$1.8b	\$2.4b	\$541m (7% DR)	1.29
Euro 4	1/7/08 – 1/7/10	2004	-	-	-\$1,145m (5% DR)	-
Euro5/6	1/11/13 (new models only) and 1/11/16	2010	\$1.5b	\$2.1b	\$579 (7% DR)	1.37
Euro 5/6 (diesel vehicles only)	1/7/17 – 1/7/18	2010	\$1.2b	\$2.0b	\$807m (7% DR)	1.63

Jacobsen and van Benthem found that that 13-16% of the expected fuel savings from fuel-economy standards will leak away through the used car market. This “used car leakage” occurs as the regulation is typically applied to new cars only. In economics, this leakage effect is known as the Gruenspecht effect, after economist Howard Gruenspecht.

These effects have often been overlooked by economists and policy makers.

The alternative to regulation?

Reducing the amount of motor vehicle emissions is an important societal goal and reducing vehicle emissions will help us reach our goal of cutting carbon emissions as a nation. However, the current regulatory approach results in unintended consequences and the VW scandal has reignited this issue.

So, what is the alternative to regulation? Well, the alternative to using emission standards is already in place. In Australia, it is known as the fuel excise tax.

While emission standards apply to new and used cars in different ways, a fuel excise tax does not differentiate between new and old cars. Under a fuel excise tax, all vehicles pay based on the amount of driving they undertake.

Importantly however is that a fuel tax incentivises consumers to driver less in the short term and buy more fuel efficient vehicles in the longer term. According to a study by Goodwin, Dargay and Hanly (2003) a real 10% fuel price increase will reduce vehicle distance travelled by 1% within a year and 3% after 5 years, while fuel consumption will decline by 2.5% in the short term and 6% in the longer term.

Using a fuel tax is the preferred approach to reduce emissions according to the majority of economists recently surveyed in a poll by researchers at the University of Chicago (2012). They found that 92.5% of economists surveyed preferred fuel taxes over motor vehicle emission standards, while only 22.5% of non-economists surveyed preferred fuel taxes.

Concluding remarks

The problem for policy makers is weighing up the competing objectives of different regulatory and tax options. For example, fuel excise is mostly viewed as a way to fund transport infrastructure rather than a mechanism to curb harmful climate change. On the other hand, motor vehicle emission standards are viewed as a way to reduce emissions only.

The difference is that the fuel excise can do both – reduce emissions and provide a funding source for infrastructure investment.

It is noted that the current fuel excise regime has its flaws and critics. The Harper Review (2015) recently recommended that cost reflective road pricing be introduced to improve the efficiency of infrastructure investment. To ensure that the proposed reform is revenue-neutral, the Harper Review suggested that indirect taxes, such as fuel excise should be reduced.

The unintended consequences of the regulatory approach is that the emission reduction forecasts contained in the regulatory impact statements may be a lot lower than expected. Future regulatory impact statements should consider the “rebound” and Gruenspecht effects so that policy makers are fully informed of the effectiveness of the proposed regulation and whether alternatives such as road pricing or fuel excise are a better way to go.

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