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Economics of HB19-1159 *Modify Innovative Motor Vehicle Income Tax Credits*

Legislative Introduction

Colorado currently allows a refundable and transferable state income tax credit for individuals who purchase or lease electric vehicles. This credit while expire in 2021. House Bill 19-1159 *Modify Innovative Motor Vehicle Income Tax Credits* intends to increase and extend the tax credit through 2025. Both the current and proposed credit schedules decrease each year. The bill's proposed tax credit will be allowed for people who purchase or have purchased an electric vehicle between January 2013 and January 2026. The credit is also larger for larger sized vehicles.

Economic Introduction

In the context of public economics this bill attempts to address externalities. Externalities are costs or benefits that effect people because of someone else's actions. In this case, the bill is addressing air pollution from internal combustion vehicles which is mostly thought of as a negative environmental externality. This paper first discusses whether this externality is worthy of government intervention. It then discusses the bill's effectiveness at reducing the negative externalities.

Ultimately the externalities that arise from internal combustion vehicles justify government intervention. However, this paper predicts HB19-1159 will not mitigate those externalities efficiently. Additionally, it will redistribute wealth regressively. Thus, this paper recommends not passing this bill into law. Finally use taxes for internal combustion vehicles could be increased to discourage the externalities.

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Justifying Intervention

Greenhouse gases exist in our atmosphere and to our benefit, they keep the planet at habitable 14 degrees celsius (Cassia). Natural cycles add and remove them from the atmosphere constantly. However, in 1957 scientist Roger Revelle and Hans Suess discovered that most anthropogenic greenhouse gases stay in the atmosphere. They called it a "large scale geophysical experiment" (Revelle). That is because the gasses we are emitting into the atmosphere contribute to the greenhouse effect and will increase the temperature of the planet but the consequences are uncertain.

Scientists have since modeled their prediction of the consequences of increased global temperatures. Some more modern atmospheric scientists have argued that hurricanes will become more severe due to increased temperature (Anthes 4). Others have predicted that some of the US's water sources including the Colorado River are vulnerable to significant reductions in runoffs (Schneider). From most perspectives, these would be negative effects. There are some predictions that certain areas could experience positive effects. For example, some have related longer growing seasons with global warming (EPA). Predictions conflict, they also have high levels of uncertainty. However, there is scientific consensus that physical and ecological systems are going out of equilibrium and that will ultimately be disruptive (Schneider).

The effects mentioned above would create externalities. Some of the externalities have the potential to be catastrophic for people. The difficulty with these externalities is that they do not all exist yet making them hard to measure and harder to price. Regardless it would be beneficial for government to try to mitigate and minimize those externalities by slowing down

the rate at which we emit greenhouse gases. There are many substantial human sources of greenhouse gasses that could be addressed. This bill addresses those from the transportation sector. Currently, internal combustion vehicle exhaust accounts for roughly one third of anthropogenic greenhouse gasses (Morrow 2). That makes it a very good place for government to intervene.

Policy Analysis

When negative externalities arise, government should make someone responsible for the costs to society. The externalities this bill intends to address are predicted to arise and the price is not yet fully understood. There are several policy instruments for this with some being more effective than others. In the transportation sector, policies that increase the cost of driving are ultimately necessary for government to reduce greenhouse gas emission (Morrow 34).

Currently Colorado has a policy to reduce emissions in transportation and that is a tax on fuel. This is a use tax. In economics, it is known as a Pigouvian tax. This type of tax internalizes the external costs onto the person creating the externalities. Pigouvian taxes are known to be very efficient when the societal costs are measurable but they are still the optimal tool for discouraging these unmeasurable externalities(Ng). The fuel tax increases the price of driving internal combustion vehicles thus discourages emissions in the transportation sector. It also provides government with funds that can be used to repair some of the damage done. The bill should be increasing the use tax on fuel to discourage driving combustion vehicles.

Instead it intends to encourage driving electric vehicles. Electric vehicles do emit less greenhouse gasses and have overall lower environmental impact than internal combustion

engines (Hawkins). In economic terms this policy is a Pigouvian subsidy on a substitute of a negative externality creating good. In theory and in practice this policy can reduce the amount of the externalities created but it is costly. The opportunity cost is some other allocation of government money, like the provision of public good. There will also be no additional revenue from this policy that could be used to undo some of the effects of global warming. Finally, it will not increase the cost of driving, and maybe even decrease the overall cost of driving. With this policy, the reduction of externalities from internal combustion vehicles will be marginal at best.

The other justification for a Pigouvian subsidy such as that proposed by the bill is the presence of positive externalities. Unfortunately, it is difficult to imagine any significant positive externalities that arise due to electric car consumption. It should also be mentioned that in welfare economics, the failure to impose a Pigouvian tax on negative externalities is in effect a negligent version of a Pigouvian subsidy given to the activity that produces the negative externalities.

The other issue with the bill's proposed policy is that it is regressive. Policy is regressive when it redistributes wealth in the direction towards people who are better off. Electric vehicles are more expensive than internal combustion vehicles. The least expensive electric car on the market is a Nissan volt which currently costs $22,000 while their most affordable car costs $12,000 (Nissan). This bill will redistribute to those who can afford the more expensive electric vehicles.

Legislative Recommendations

Because of the potentially catastrophic consequences of current anthropogenic greenhouse gas emissions, internal combustion vehicle use creates negative externalities.

Those externalities justify government intervention to discourage emissions in the transportation sector. HB19-1159 will encourage electric vehicle use with the intention that it will reduce internal combustion vehicle use. This policy will make only a limited reduction in emissions and ultimately redistribute wealth to the wealthy. Thus, this analysis recommends not passing HB19-1159. However, the analysis does recommend increasing the use tax on transportation fuel to discourage internal combustion vehicle use and reduce emissions.

Conclusion

In summary, overwhelming scientific consensus suggests that anthropogenic greenhouse gas emissions are increasing the greenhouse effect and warming the planet. Consequences of this are uncertain however the ecological and physical imbalances created by rapidly warming the planet could be catastrophic to society. Transportation accounts for a large portion of those emissions. Government has an opportunity to reduce emissions in the transportation sector and mitigate some of the associated externalities. HB19-1159 attempts to do this. However, this policy will be ineffective and regressive. Instead government needs to increase the cost of creating emissions by increasing the tax on fuel.

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Work Cited

Anthes, Richard A, et al. “Hurricanes and Global Warming Potential Linkages and Consequences.” *American Meteorological Society*, May 2006, doi:10.1175/ BAMS-87-1-XXX.

Nerudová, Danuše, and Marian Dobranschi. “Pigouvian Carbon Tax Rate: Can It Help the European Union Achieve Sustainability?” *Competitiveness, Social Inclusion and Sustainability in a Diverse European Union*, 2016, pp. 145–159., doi:10.1007/978-3-319-17299-6_8

Cassia, Raúl, et al. “Climate Change and the Impact of Greenhouse Gasses: CO2 and NO, Friends and Foes of Plant Oxidative Stress.” *Frontiers in Plant Science*, vol. 9, 2018, doi:10.3389/fpls.2018.00273.

Revelle, Roger, and Hans E. Suess (1957). "Carbon Dioxide Exchange between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO2 During the Past Decades." *Tellus*. https://geosci.uchicago.edu/~archer/warming_papers/revelle.1957.CO2_buffer.pdf

Schneider, Stephen H. "The greenhouse effect: science and policy." *Science*, vol. 243, no. 4892, 1989, p. 771+. *Academic OneFile*, http://link.galegroup.com.colorado.idm.oclc.org/apps/doc/A7355177/AONE?u=coloboulder&sid=AONE&xid=d9858da0.

Morrow, W. Ross, et al. “Analysis of Policies to Reduce Oil Consumption and Greenhouse-Gas Emissions from the US Transportation Sector.” *Energy Policy*, vol. 38, no. 3, 2010, pp. 1305–1320., doi:10.1016/j.enpol.2009.11.006.

EPA. “Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases.” *EPA*, Environmental Protection Agency, 23 Jan. 2017, www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases.

Ng, Yew-Kwang. “Welfare Economics.” *International Encyclopedia of the Social & Behavioral Sciences (Second Edition)*, 1983, doi:10.1007/978-1-349-06612-4. https://www.sciencedirect.com/topics/economics-econometrics-and-finance/pigouvian-tax

Hawkins, T. R., Singh, B. , Majeau-Bettez, G. and Strømman, A. H. (2013), Comparative Environmental Life Cycle Assessment of Conventional and Electric Vehicles. Journal of Industrial Ecology, 17: 53-64. doi:10.1111/j.1530-9290.2012.00532.x https://onlinelibrary.wiley.com/doi/full/10.1111/j.1530-9290.2012.00532.x

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