Fiscal incentives and Feebates as tools for improving efficiency in transport sector

Zifei Yang Researcher

Taller sobre Propuestas para Impuestos e Incentivos para Promover la Importación de Vehículos Más Limpios y Eficientes en el Perú

Lima, Perú, 8-9 Enero 2018





Overview

- Why improve fuel efficiency?
- Fiscal measures and feebate
- International experience and best practices
- Feebate tool
- Simplified enforcement proposal



Need to improve vehicle fuel efficiency

Higher fuel efficiency = less CO_2 emissions



Standards or feebates are needed to improve fuel efficiency

- Most customers value only 1 to 3 years of fuel savings
 - Cost of technology is known and paid at vehicle purchase
 - Fuel savings are highly uncertain and occur many years into the future
- Standards or tax/feebates are needed to fill the "gap" between value of fuel savings to society and individual customers



Fiscal measures and feebate



Fiscal measures to improve vehicle fuel efficiency

Fiscal policy type	Characteristics			
Vehicle tax/fee based on CO_2	Paid at time of purchase or annually			
Subsidy for efficient vehicles	One-time			
Feebate	A mix of tax and incentives			
Fuel taxes/CO ₂ taxes	Paid upon refueling; set by fuel type;			
Infrastructure support	Road pricing, VMT taxes, charging stations, discounted electricity			



Vehicle tax is a common measure in Europe

One-time tax					\frown	Annual tax				
33 European countries	CO ₂ emissions	Engine features	Vehicle features	Price	Fuel	CO ₂ emissions	Engine features	Vehicle features	Price	Fuel
Austria	CO ₂ emissions						Engine power			
Belgium	CO ₂ emissions, Euro standards	Cylinder capacity	Age		Fuel type	CO 2 emissions				Fuel type
Bulgaria							Engine power	Age		
Croatia	CO 2 emissions			Price	Fuel type		Engine power	Age		
Cyprus	CO ₂ emissions					CO 2 emissions				
Czech Republic	Euro standards				Fuel type		Engine capacity			
Denmark			Equipment	Price	Fuel type	Fuel consumption		Weight		Fuel type
Estonia										
Finland	CO ₂ emissions			Price		CO 2 emissions				
France	CO 2 emissions					CO 2 emissions				
Germany						CO 2 emissions	Cylinder capacity			Fuel type
Greece	CO 2 emissions			Price		CO 2 emissions	Engine capacity			
Hungary	Euro standards	Engine capacity			Fuel type		Engine capacity	Age		
Iceland	CO 2 emissions					CO 2 emissions				
Ireland	CO 2 emissions			Price		CO 2 emissions				
Italy		Engine power				Euro standards	Engine power			
Latvia						CO 2 emissions				
Liechtenstein								Weight		
Lithuania										
Luxembourg						CO 2 emissions				Fuel type
Malta	CO 2 emissions		Length	Price	Fuel type	CO 2 emissions		Age		
Netherlands	CO 2 emissions, fuel consumption				Fuel type	CO 2 emissions		Weight		Fuel type
Norway	CO 2 emissions, NOx emissions		Weight							Fuel type
Poland		Engine capacity		Price						
Portugal	CO 2 emissions	Cylinder capacity			Fuel type	CO 2 emissions	Cylinder capacity			Fuel type
Romania							Engine capacity			
Slovakia							Cylinder capacity	Age		
Slovenia	CO 2 emissions			Price	Fuel type		Cylinder capacity			
Spain	CO 2 emissions					1	Engine power			
Sweden						CO 2 emissions				Fuel type
Switzerland							Cylinder capacity, enigne power	Weight		
Turkey		Engine power		Price		1	Engine capacity	Age		
United Kingdom	CO 2 emissions				Fuel type	CO 2 emissions			Price	Fuel type
Number of countries	18	6	. 4	9	10	17	15	10	1	9

What is a feebate program

- Feebates = fee + rebate
 - Higher efficiency vehicles receive rebates
 - Lower efficiency vehicles pay fees



Fix fuel economy/CO₂ or Cost?

- Standards mandate a specific amount of fuel economy/CO₂ reduction, but cost is uncertain
 - If costs are too high, market may not accept vehicles
 - No incentive to do more than the absolute minimum
- Feebates fix the cost-effectiveness of improvements, but reduction is uncertain
 - Continuous incentive to improve FE
 - Automatically adjusts to technology changes
 - Amount of fuel consumption/CO2 reduction is uncertain



Feebate advantages

- Easier to establish and enforce than standards
 - Requires much less data & expertise
 - Avoids need to determine "best" standard
- Continuous incentive for manufacturers to add technology
- ✓ Bolsters FE in consumer decision making
- Can be revenue-raising or revenue-neutral
- Easier to maintain if properly constructed
- ✓ Works equally well for imported vehicles

Disadvantage: Revenue flows change as vehicle efficiency improves – requires pivot point adjustments



International Experience

Canada French bonus/malus Mauritius UK



This is a Feebate Program



Fuel Consumption



This is NOT a Feebate Program



Fuel Consumption



Canadian Incentives



France: annually adjust feebate



The design of the rebate influences how manufacturers response

Tax-optimized vehicles





Link to the report: Optimizing to the last digit: how taxes influence vehicle CO2 emission level http://www.theicct.org/sites/default/files/publications/Tax_Step_Analysis_201510.pdf

Gradually optimize feebate system





France: CO₂ emissions

- 2001–2007 avg. reduction new vehicle $CO_2 = 1$ g/km per year
- 2008: emissions drop 9 g/km and 2009 by 7 g/km, Ministry of Transport attributes to introduction of bonus/malus system





Source: Les véhicules particuliers en France (Ademe), March 2011

Costs of system: France and Mauritius

- Due to success of feebate system, it costs:
 - French government:
 - Approx. 300 M€ per year direct costs
 - About 300 M€ decline in VAT revenues, due to higher sales of smaller and cheaper cars.
 - Mauritius government:
 - More than Rs 1 billion (28 M U\$) from 2011 to 2013, due to more efficient vehicles are being imported.



Source: Cuenot, F. (2009), CO₂ emissions from new cars and vehicle weight in Europe; How the EU regulation could have been avoided and how to reach it?, Energy Policy (in press) Mr. Deepnarain Prithipaul (2016). Implementation of the Feebate Tax System Case of Mauritius

Best practices of feebate program

- Continuous and linear feebate rate line
 - Breaks or discontinuities should be avoided
- Rate set to incentivize use of technology developed for the US, Europe, Japan, and China
- Pivot point set to make the system sustainable (and self-funding if desired)
- Mechanism to periodically adjust pivot point to adjust revenue flow as efficiency improves



Feebate toolA tool that helps policy
maker design feebate
system



Feebate Tool: Control Panel

Tool designed to educate, inform, and allow experimentation





* Developed by ICCT & UNEP for GFEI

Enforcement

Much easier than enforcing standards



Simplified Enforcement Proposal

- 1) Manufacturers self-certify fuel economy and/or CO2 over the NEDC for each vehicle
- 2) Values compiled in a database, with vehicle descriptions
 - Option: establish FE labels and report values on vehicle
- 3) Government conducts confirmatory tests on in-use vehicles:
 - Certified emission laboratory tests (contract with Chile?)
 - PEMS system while following the official velocity trace
- 4) Vehicle passes if the confirmatory CO2 emissions are:
 - < 1.1 x self-certification value (laboratory test)</p>
 - < 1.15 x self-verification value (PEMS test)</pre>
- 5) If vehicle fails, automatic fine is imposed on manufacturer or importer for each vehicle sold with the same self-certified value



Implications

 Opportunity for Peru to establish a properly constructed feebate program with effective enforcement

 Opportunity for Peru to lead the world and establish a model program others can follow



More information...

- Feebate Simulation Tool and User Guide <u>http://theicct.org/feebate-simulation-tool</u>
- Best Practices for Feebate Program Design and Implementation <u>http://www.theicct.org/best-practices-feebate-program-design-and-implementation</u>
- Review and comparative analysis of fiscal policies <u>http://www.theicct.org/review-and-comparative-analysis-fiscal-policies</u>
- Contact
 Zifei Yang, <u>zifei.yang@theicct.org</u>
 John German, John@theicct.org

