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

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

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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\textsubscript{2} emissions

* Note that Japan has already met its 2020 statutory target as of 2013
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

<table>
<thead>
<tr>
<th>Fiscal policy type</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Vehicle tax/fee based on CO₂</td>
<td>Paid at time of purchase or annually</td>
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<tr>
<td>Subsidy for efficient vehicles</td>
<td>One-time</td>
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<tr>
<td>Feebate</td>
<td>A mix of tax and incentives</td>
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<tr>
<td>Fuel taxes/CO₂ taxes</td>
<td>Paid upon refueling; set by fuel type;</td>
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<tr>
<td>Infrastructure support</td>
<td>Road pricing, VMT taxes, charging stations, discounted electricity</td>
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Vehicle tax is a common measure in Europe
What is a feebate program

- Feebates = fee + rebate
  - Higher efficiency vehicles receive rebates
  - Lower efficiency vehicles pay fees
Fix fuel economy/CO$_2$ or Cost?

- Standards mandate a specific amount of fuel economy/CO$_2$ 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/CO$_2$ 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
<table>
<thead>
<tr>
<th>International Experience</th>
<th>Canada</th>
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<tr>
<td></td>
<td>French bonus/malus</td>
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<tr>
<td></td>
<td>Mauritius</td>
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<td>UK</td>
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This is a Feebate Program

![Graph showing the relationship between fuel consumption, rebate, and fee. The graph depicts a line that starts at a positive rebate and decreases as fuel consumption increases, indicating a fee. The point where the line crosses the x-axis is labeled as the (Pivot point).]
This is NOT a Feebate Program
Canadian Incentives

- Toyota Yaris – 6.4 l/100km
  - Sales +49%
- Honda Fit – 6.6 l/100km
  - Sales +3%

Canada discontinued rebates early – ran out of money because too many vehicles were shifted to < 6.4 l/100km
France: annually adjust feebate

CO\textsubscript{2}-based Bonus-Malus system (feebate) in France 2008-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>FEE (€)</th>
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<td>2008-2009</td>
<td></td>
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<tr>
<td>2017</td>
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The graph shows the CO\textsubscript{2} fees and rebates over the years 2008 to 2017.
The design of the rebate influences how manufacturers respond.

- 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 CO₂ = 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 tool

A tool that helps policy maker design feebate system
Feebate Tool: Control Panel

Tool designed to educate, inform, and allow experimentation

**FEEBATE FUNCTION CONTROL PANEL**

**QUICK START**
- Current country: Australia
- Start year: 2015
- Change country or upload new data
- View Results
- Run

**PIVOT POINT CONTROL**
- Annual adjustment based on observed changes
- Revenue neutral system
- Revenue to the government [mUSD/year]: 0

**METRICS**
- CO2 Emissions
- UNITS
- Kilometers
- Liters

**REBATE FUNCTION SHAPE CONTROL**
- Shape examples: Linear
- How many sections: 1
- Section limits, g of CO2 / Kilometer: 0, 384
- Shape of the individual sections: SLOPED, N/A
- Rebate/fee value: 50 USD per g of CO2 / Kilometer
- Pivot Point #: 202

* 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)
   • < 1.15 x self-verification value (PEMS test)

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
  http://theicct.org/feebate-simulation-tool

- Best Practices for Feebate Program Design and Implementation
  http://www.theicct.org/best-practices-feebate-program-design-and-implementation

- Review and comparative analysis of fiscal policies
  http://www.theicct.org/review-and-comparative-analysis-fiscal-policies

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