



## Background

This study investigates the impact of government taxes on the automobile market, with an analysis of the Chinese automobile market with change in the engine size-based vehicle consumption tax.

| January, 1994 to March, 2006 |          | April, 2006 to August, 2008 |          | Since September, 2008 |          |
|------------------------------|----------|-----------------------------|----------|-----------------------|----------|
| Engine Size                  | Tax rate | Engine Size                 | Tax rate | Engine Size           | Tax rate |
| >2.2 Litre                   | 8%       | >4 Litre                    | 20%      | >4 Litre              | 40%      |
| 1-2.2 Litre                  | 5%       | 3-4 Litre                   | 15%      | 3-4 Litre             | 25%      |
| <=1 Litre                    | 3%       | 2.5-3 Litre                 | 12%      | 2.5-3 Litre           | 12%      |
|                              |          | 2-2.5 Litre                 | 9%       | 2-2.5 Litre           | 9%       |
|                              |          | 1.5-2 Litre                 | 5%       | 1.5-2 Litre           | 5%       |
|                              |          | 1-1.5 Litre                 | 3%       | 1-1.5 Litre           | 3%       |
|                              |          | <=1 Litre                   | 1%       | <=1 Litre             | 1%       |

## Research Questions

- What are the impacts of the engine displacement (size) tax on vehicle engines?
  - Did the policy actually help to drive the automakers to downsize the engines?
  - Are vehicle engine sizes clustered around the cutoff points of the tax?
- Are other vehicle attributes affected?
  - Change in fuel efficiency for better or for worse?
  - Are vehicle sizes or class distributions altered?

## Data

- China Passenger Car Association and China Automobile Market Research Association publishes model-level monthly sales data 2008-2016
- Trim-level specification data since 2001 retrieved from [Autohome.com.cn](http://Autohome.com.cn)

## Methods

$$c_{jy} = \alpha + \beta Y_{jy} + \varepsilon_{jy}$$

$c_{jy}$  are the change of vehicle  $j$  in model year  $y$  compared with the previous model year (tax rate cutoff, whether it's turbocharged, fuel efficiency);

$\rightarrow$  are changes or potential changes of the model update

$\varepsilon_{jy}$  is an error term.

A model update is identified by detecting change in wheelbase

## Trends

