

Fuel fisheries subsidies in Mexico

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Back in the day, during fieldwork



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Some stats

In the world

- ▶ ~ US\$35 billion per year to the fishing industry
- ▶ Fuel subsidies account for ~22% of total

In Mexico

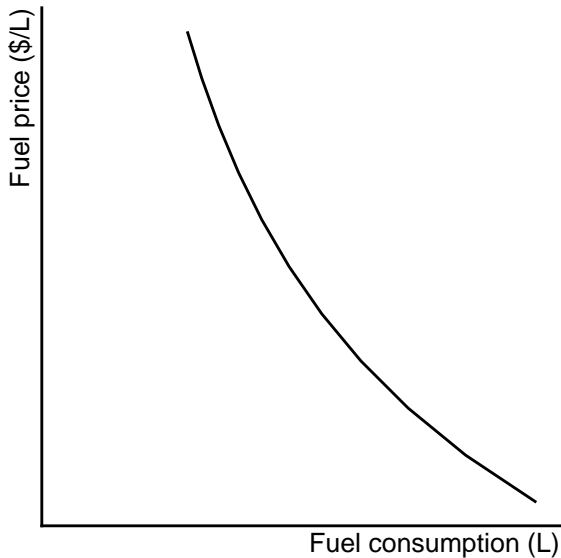
- ▶ US\$200 million per year subsidies
- ▶ US\$30 million per year on fuel

Subsidy reforms

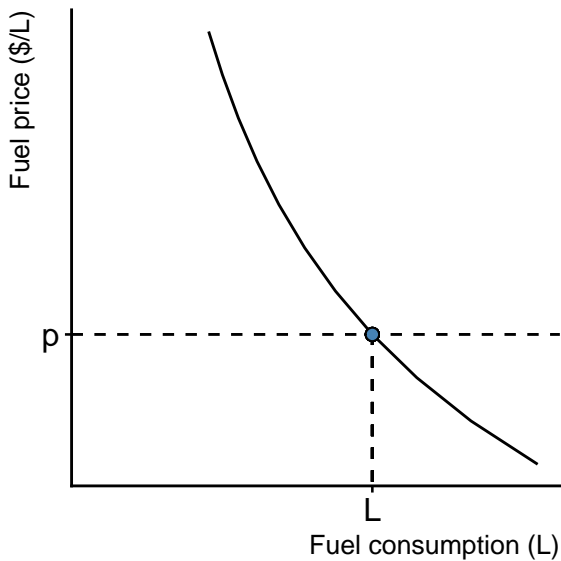
- ▶ WTO has debated subsidy reforms for almost 20 years now
- ▶ SDG 14.6 Seeks to reduce “harmful subsidies”
- ▶ Large uncertainty on how big the upsides would be
- ▶ High political cost on backtracking them

Fuel subsidies in fisheries

Demand curve for the average boat



Fuel subsidies in fisheries



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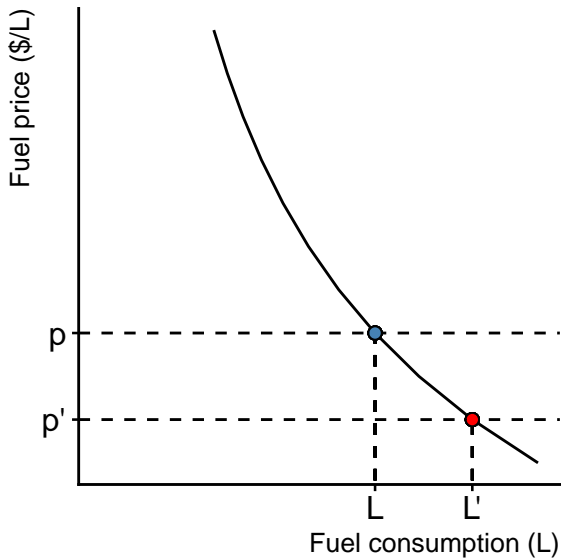


Figure 1: A fuel subsidy induces overfishing

Fuel subsidies in Mexico

$$I_i = (MDL_i \times DPC_i) \times AF$$

Where:

- ▶ I_i is the “Incentive for the acquisition of fuel” for fisher i : The amount of fuel (L) that will be subsidized at $p - 2$
- ▶ MDL_i is the “Maximum daily liters”
- ▶ DPC_i is the “Days per cycle”
- ▶ AF is the “Adjustment factor”

With $AF = 1$, $I_i = E[L]$

An example



Figure 2: Azteca 1 is a tuna purse seiner with a 3,600 HP Diesel engine

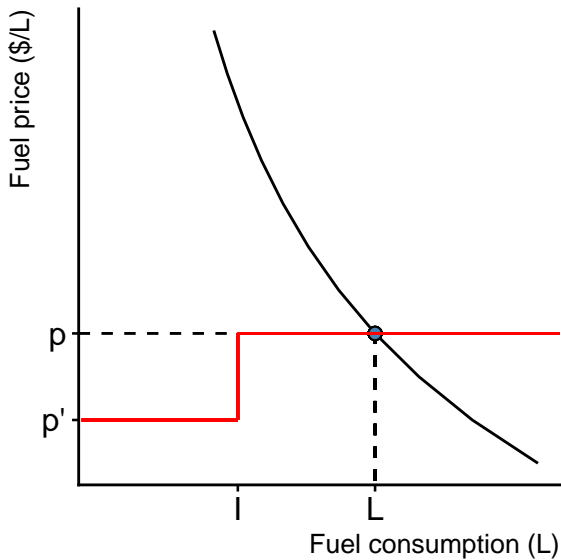
$$I_i = (15455 [l/day] \times 220 [days]) \times 0.4$$

$$I_i = (3.4 \times 10^6 [liters]) \times 0.4$$

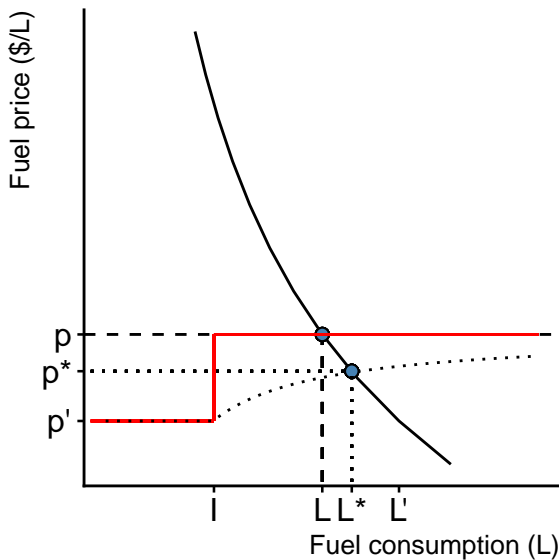
$$I_i = 1.36 \times 10^6$$

- ▶ On any given year, Azteca I is expected to consume 3.4 M liters
- ▶ The subsidy makes it such that 1.36 M of that come at a price $p - 2$

Updating the set up



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The questions

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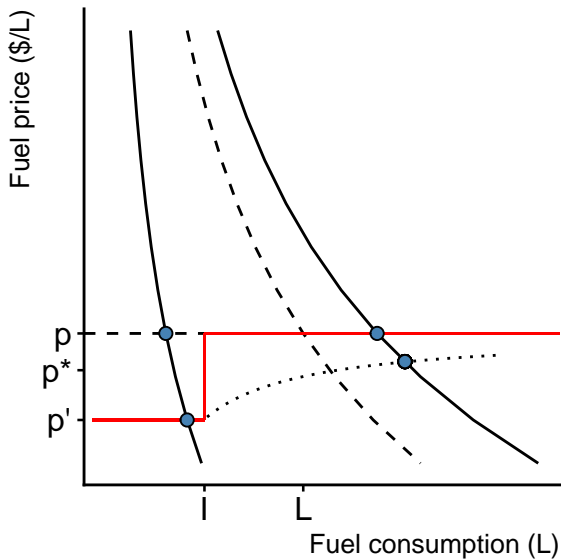
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 - ▶ We would have an estimate the effect of fuel subsidies on fishing effort

There is room for both

Two types of vessels



Empirics

Focus only on “bad” fishers

- ▶ Consider a dummy variable $D_i = \{0, 1\}$ denoting treatment status of vessel i , with 0 indicating no subsidy received and 1 receiving subsidy.
 - ▶ So $Y_i(0)$: fuel consumption if the vessel is unsubsidized
 - ▶ $Y_i(1)$ if subsidized
 - ▶ and we expect $Y_i(1) - Y_i(0) > 0$
- ▶ “Bad” fishers are defined based on $Y_i(0)|D_i = 0$ relative to l_i

$$Y_i = D_i Y_i(1) + (1 - D_i) Y_i(0)$$

$$Y_i = \alpha + \beta_1 D_i + \epsilon_i$$

Empirics

Now consider the “good” fishers

Under the same specification:

$$Y_i = \alpha + \beta_1 D_i + \epsilon_i$$

- ▶ $\beta_1 > 0$ would indicate that fishers respond to average prices
- ▶ $\beta_1 = 0$ would indicate that fishers respond to marginal prices

Emprics: All together

- ▶ Consider another dummy, $R_i = \{0, 1\}$, that denotes if a vessel is to the left or right of the kink

$Y_i(0, 0)$: Unsubsidized vessels to the left

$Y_i(1, 0)$: Subsidized vessels to the left

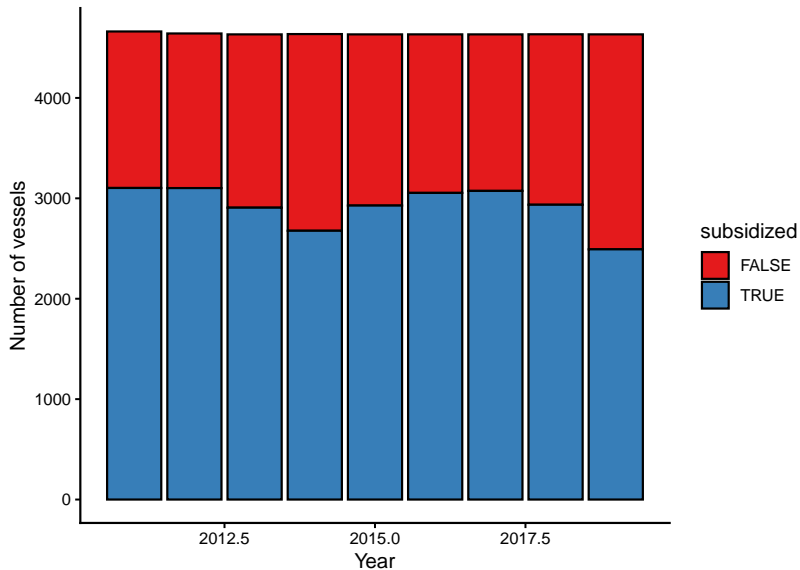
$Y_i(0, 1)$: Unsubsidized vessels to the right

$Y_i(1, 1)$: Subsidized vessels to the right

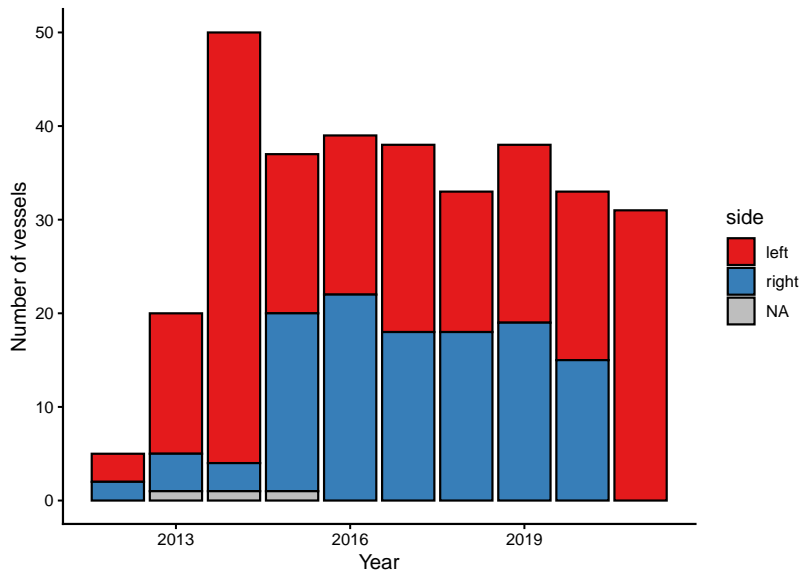
$$Y_i = \alpha + \beta_1 R_i + \beta_2 D_i + \beta_3 R_i \times D_i + \epsilon_i$$

- ▶ β_1 is the causal effect of subsidies on fuel consumption
- ▶ β_3 is the causal effect of a “block pricing” fuel subsidy on consumption

Figures: subsidized



Figures: left/right



Figures: all

