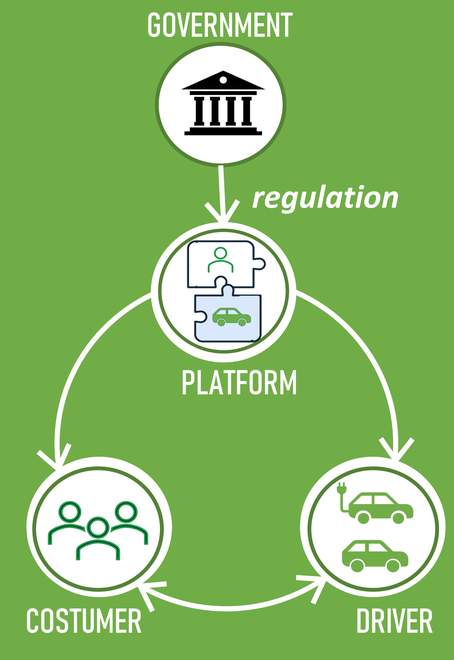
Regulatory Policies to Electrify Ridesourcing Systems

Zhichen Liu[1] Zhibin Chen[2] Yafeng Yin[1] Zhengtian Xu[3]
[1]University of Michigan [2]NYU Shanghai [3]The George Washington University

Ridesourcing vehicles are destined to be the next special fleet for electrification. Government can design regulatory policies to speed up the electrification process, benefiting both drivers and customers.



MAIN FINDINGS: Analytical framework established to examine 3 policies

Penalty	Surcharge	Commission cap
for high-level electrification	for high-level electrification least cost-efficient	for low-level electrification most cost-efficient

MORE DETAILS?
Scan for a presentation!

Contact:
zhichliu@umich.edu

MOTIVATION

- Vehicle miles traveled (VMT) contributed by a ridesourcing vehicle is **3** times as many as a private vehicle.
- Current electrification level in the ridesourcing sector is less than **5** %.

What can the government do?

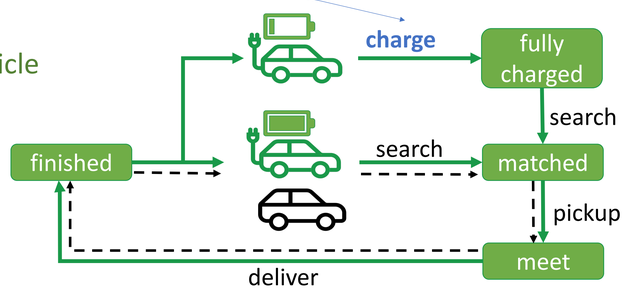
? ban Conventional Vehicles (driver shortage)
? offer direct subsidies (huge investment)
√ design regulatory policies to steer the ridesourcing system towards electrification (self-sustainable!)

Part 1: MODEL ELECTRIFIED RIDESOURCING SYSTEM

Main finding 1: EV drivers face trade-offs

*CV: earnings = income - operation cost
EV: earnings = income (↓) - operation cost (↓) - vehicle cost (↑)
due to additional charging downtime

* CV: Conventional Vehicle
EV: Electric Vehicle



Main finding 2:

e-VMT rate < **e-fleet rate**
proportion of trips completed by EVs *proportion of drivers using EVs*

total fleet = serving CV + serving EV (total EV) + charging EV
(only a fraction of EVs in serve)

Insight 1: Promoting the adoption of EVs is not enough. We must invest in chargers and reduce charging downtimes to put more EVs in service.
Insight 2: E-VMT rate is a better measure for emission reduction.

POLICY INSIGHTS

- **AP** and **TB** are viable choices if targeted at high e-VMT rates, say 90%.
- **CC** is only effective for low-level e-VMT rates but is the most cost-efficient.

fewer commissions → drives benefit
cheaper trips → costumers benefit

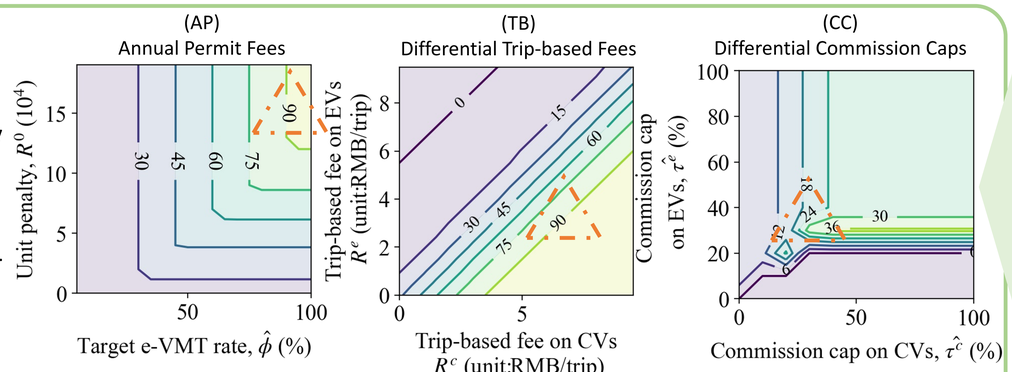


Figure: Contours of the e-VMT rates under regulatory policies

Part 2: DESIGN REGULATORY POLICIES

Government considers **3** policy options
- **(AP) Annual Permit Fees**: Platform is charged with an annual permit fee if it fails to achieve the target e-VMT rate.
- **(TB) Differential Trip-based Fees**: Platform is charged with a higher fee for one trip delivered by CVs than one delivered by EVs.
- **(CC) Differential Commission Caps**: Government sets a higher commission cap on EVs than that on CVs.