Putting Economic Research into Practice at Businesses

(to Inform Science and Major Social Challenges)

John A. List, U. Chicago, ANU, and NBER
@Econ_4_Everyone

When Dispatched with this Chore…I Conducted a Survey

- What are the best ways to put economic research into practice?
- What kind of science do you envision generating from such partnerships?

More than 2/3 of respondents mentioned macro or forecasting

“The obvious response is macro modeling to give the business direction”
“Clearly using economic tools to predict recessions”

“John, I know you’re the field experimental guy, but sorry to say your stuff is unimportant for this use case. We need to inject economics by talking to Central bankers, telling execs what interest rates and the stock market will do so they can make informed decisions….we then advance science by writing white papers with our forecasts”

Today's Agenda

1. The Exciting Stuff
    A. Economics of Crime
    B. Project Gigaton

2. The (Sometimes) not so Exciting, but Necessary, Stuff
    A. Teaching
    B. "Lyft" Digit Bias

3. Epilogue: Some examples of the Value of Field Experiments in Partnership with Firms

Thesis: crucial low hanging fruit exist wherein academics and businesses can team up to advance our understanding of critical economic and social issues

➜ We should be doing much more of this kind of research

A. Economics of Crime: Police Discrimination

One Dismal Fact in the U.S.: Huge disparities in law enforcement during police encounters

Traffic stops are the most common cause of police-civilian interaction

Minority drivers are 3-12 percent more likely to receive a speeding citation (Makowsky & Stratmann 2009)

Minority drivers are 10-20 percent less likely to receive leniency from a ticket (Anbarci & Lee, 2014; Goncalves & Mello, 2021)

OPEN QUESTION: Is this racial discrimination?

Two major challenges when interpreting past work

1. Difficult to say whether racial disparities arise from differences in offense rates or discriminatory enforcement

2. Race-based selection into administrative data can lead to underestimating discrimination

    - e.g., if officers only stop the worst offending white drivers and a random sample of minority drivers, then comparisons across race conditional on a stop compare fundamentally different types of people

We must solve the “denominator problem” to overcome these inferential issues

We circumvent these issues using Lyft and FOI data

Lyft driver's smartphone app communicates their location in realtime

- Allows us to know the driver's location and speed
- Also have data on driver and vehicle characteristics, driving time

Combine Lyft data with administrative data from Florida

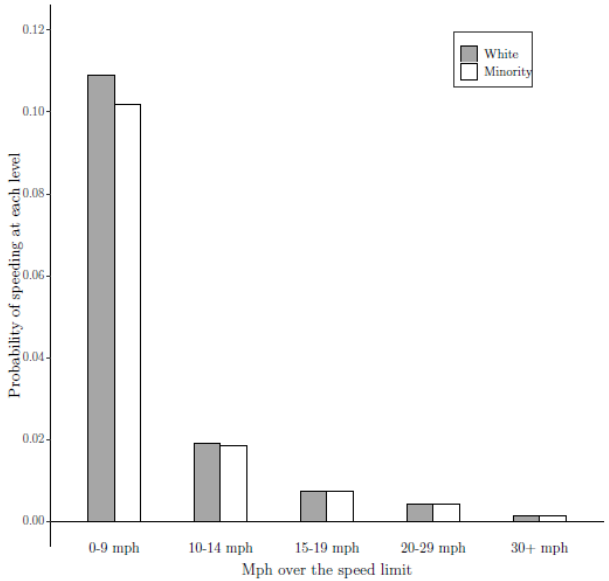
- Allows us to measure traffic stops
- Also have data on road and geographic characteristics

Two Approaches

1. Fixed Effects Approach
    - Control for year, month, day of week, hour of day, geohash, road features, driver characteristics, and vehicle characteristics.

2. Double Machine Learning Approach (Chernozhukov et al., 2017)
    - Identification similar to the fixed effects approach
    - Allow the machine learning algorithm to automatically learn the best specification. e.g., use of raw latitude/longitude and second of the week and day of the year and let the algorithm choose the right way to control for these variables.

FACT 1: No racial differences in speeding behavior



Note: This figure plots the proportion of pings transmitted to Lyft in different speeding buckets. Speeding buckets are constructed by comparing the driving speed received by Lyft to the speed limit reported by the FDOT.

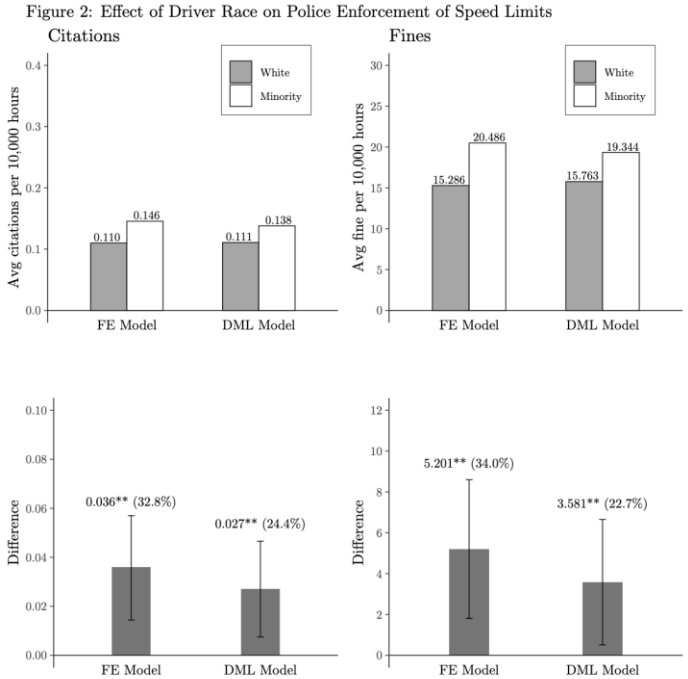
Figure shows the share of pings in different speeding bins

Penalties for speeding increase at each of the different bins

Drivers rarely travel more than 10 mph over the speed limit

White and minority drivers travel at similar speeds

FACT 2: Both approaches show discrimination



Minority drivers are 24 – 33 percent more likely to be stopped for speeding than white drivers traveling the same speed

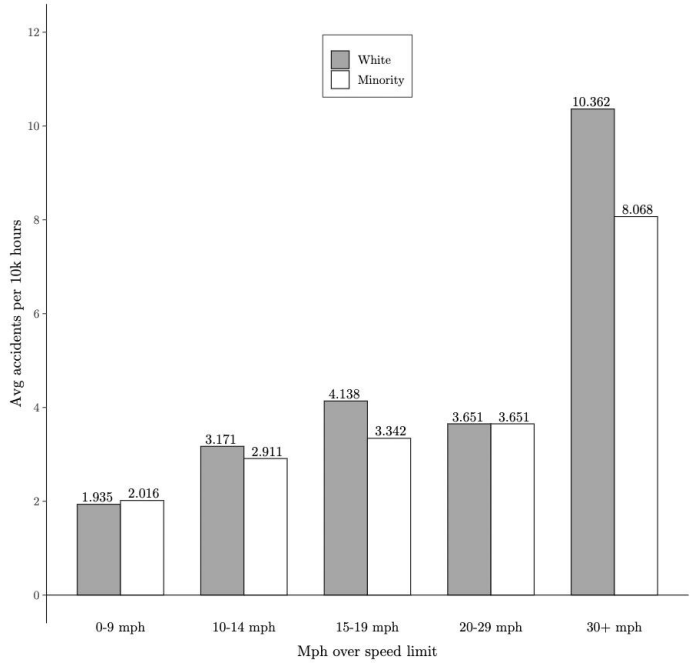
Minority drivers pay 23 to 34 percent more fines than white drivers traveling the same speed

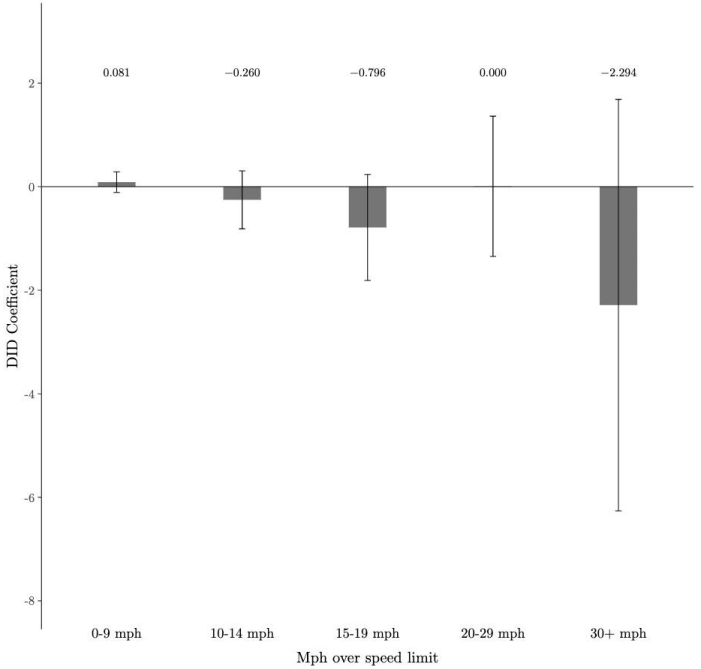
Ruling out alternative interpretations

1. Officers also consider some driving behavior other than speed
    - Examine whether accident rates differ by race either overall or at different speeds

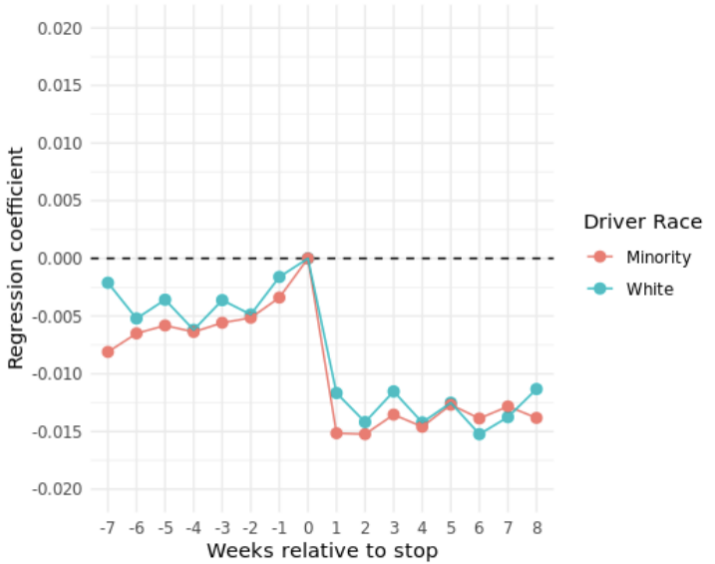
2. Officers make decisions based on their expectations of motorist's future driving behavior
    - Examine whether re-offense rates differ by race

FACT 3: No evidence of racial differences in accidents

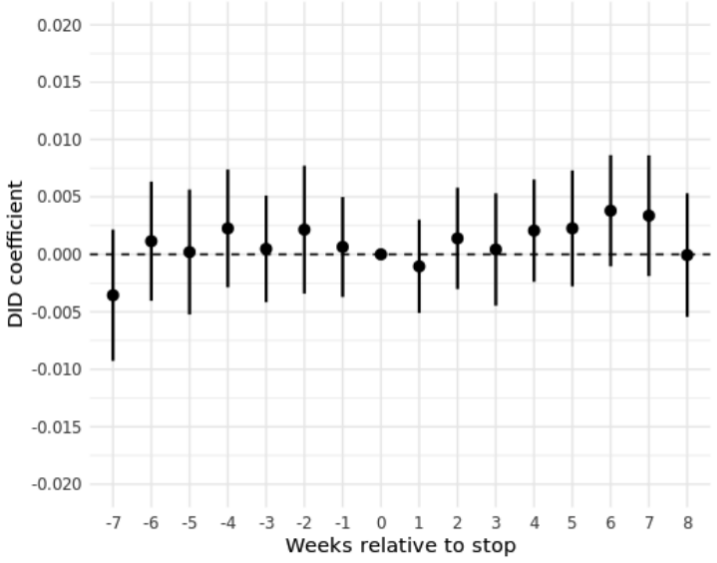




FACT 4: No Racial differences in re-offense rates



(A) Re-offense by Race



(B) Racial Differences in Reoffenses

Conclusions

Police officers stop minority motorists more than white motorists driving the same speed

Lack of racial differences in accident and re-offense rates rule out two key driving behaviors as an explanation of differential treatment.

This study offers an example of how academics and businesses can team up to advance our understanding of critical social issues

High-Frequency Location Data Shows That Race Affects the Likelihood of Being Stopped and Fined for Speeding

Aggarwal, Brandon, Goldszmidt, Holz, List, Muir, Sun, and Yu

What new work am I most excited about in this space?

B. PROJECT GIGATON


“Walmart is on a path to become a regenerative company, one dedicated to placing nature and humanity at the center of our business practices.”
President and CEO, Walmart Inc.
Doug McMillon

Project Gigaton™: Driving action with suppliers toward Regeneration

PLANET

Aiming to reduce or avoid 1 billion MT of emissions by 2030

Cumulative 750+ million MT CO2e avoided and 5,200+ suppliers engaged since 2017

+175 million MT CO2e avoided in FY2022

- **Energy**
  - Renewable Energy
  - Energy Efficiency
- **Nature**
  - Regenerative Agriculture
  - Forestry
- **Waste**
  - Food, Solid Waste Reduction
  - Recycling, Composting
- **Packaging**
  - Recycled Content
  - Recyclability
  - Reduction
- **Transportation**
  - Optimized Shipping
  - Zero Emission Vehicles
- **Product Use & Design**
  - Design Optimization
  - Sustainable Sourcing

Major Contributors

EDF ENVIRONMENTAL DEFENSE FUND

WWF

ProjectGigaton™

“PRICE” OF DOING SCIENCE IN BUSINESSES

Need to show your value

One Form

A. Teaching

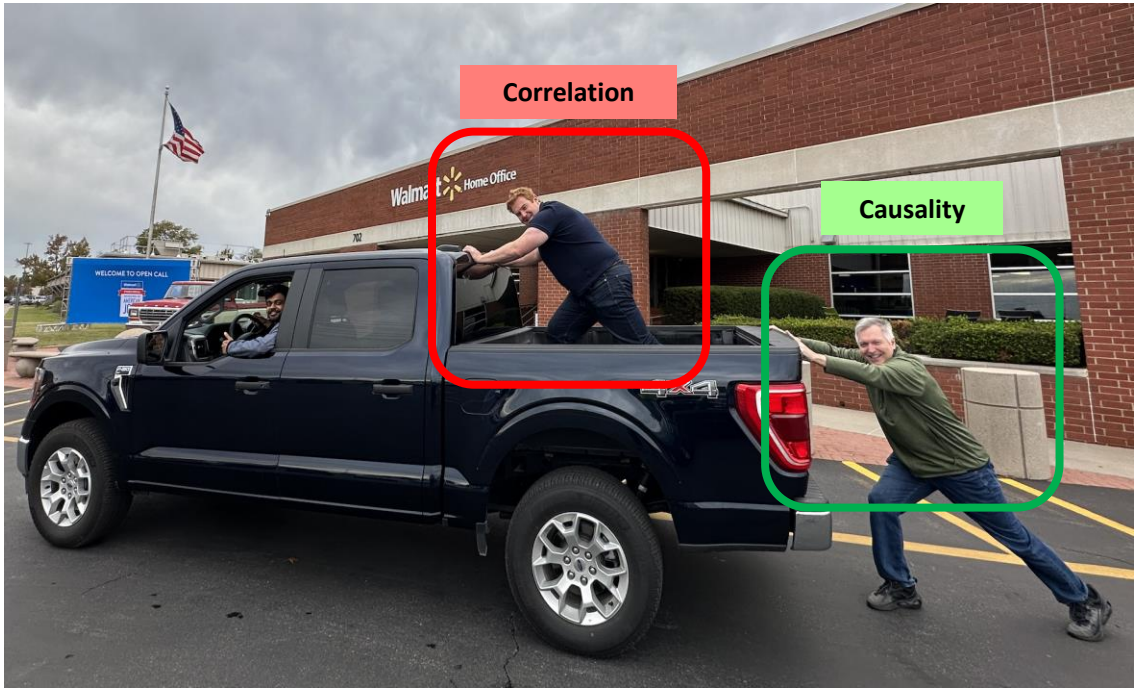
Distinguishing between correlation and causality can accelerate ideas that *cause* improvements

Decision makers must consider whether the available **evidence is actionable (causal) or non-actionable (correlational)**

Decisions based on actionable evidence **ensure that the truck is moving forward**

Decisions based on Non-actionable evidence:

- **Weigh the truck down**
- Have an **opportunity cost**



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A (Scientifically) More Interesting Form

B. Science the Entire Exec Team Views as a Win/Win

Rideshare Pricing

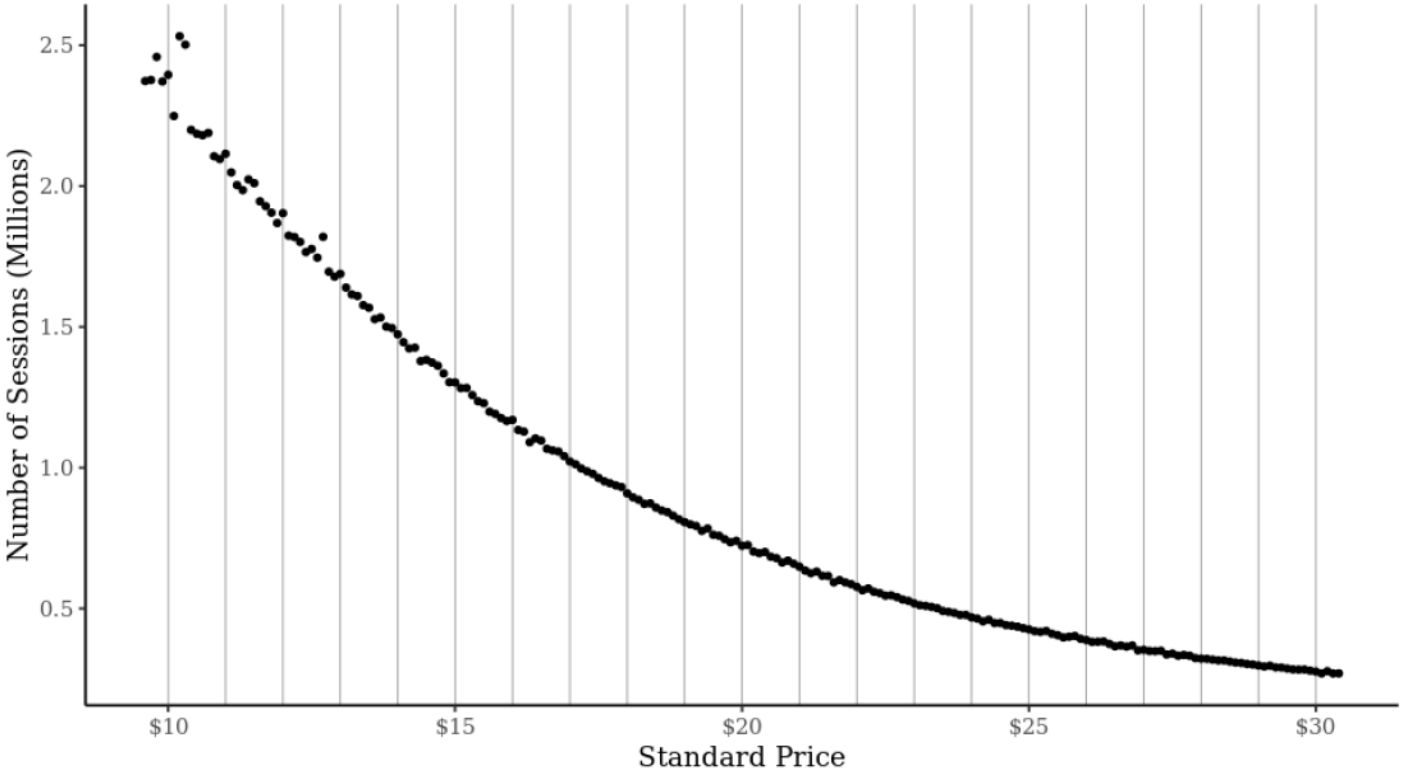
When you open your App.....

$7.94 versus $7.93

$8.00 versus $7.99



If true, then why do Lyft prices look like this?



Field Experiment

We designed a natural field experiment that was rolled out to the entire Lyft platform for ~2 months (Nov. 18th 2019 to Jan 22nd 2020).

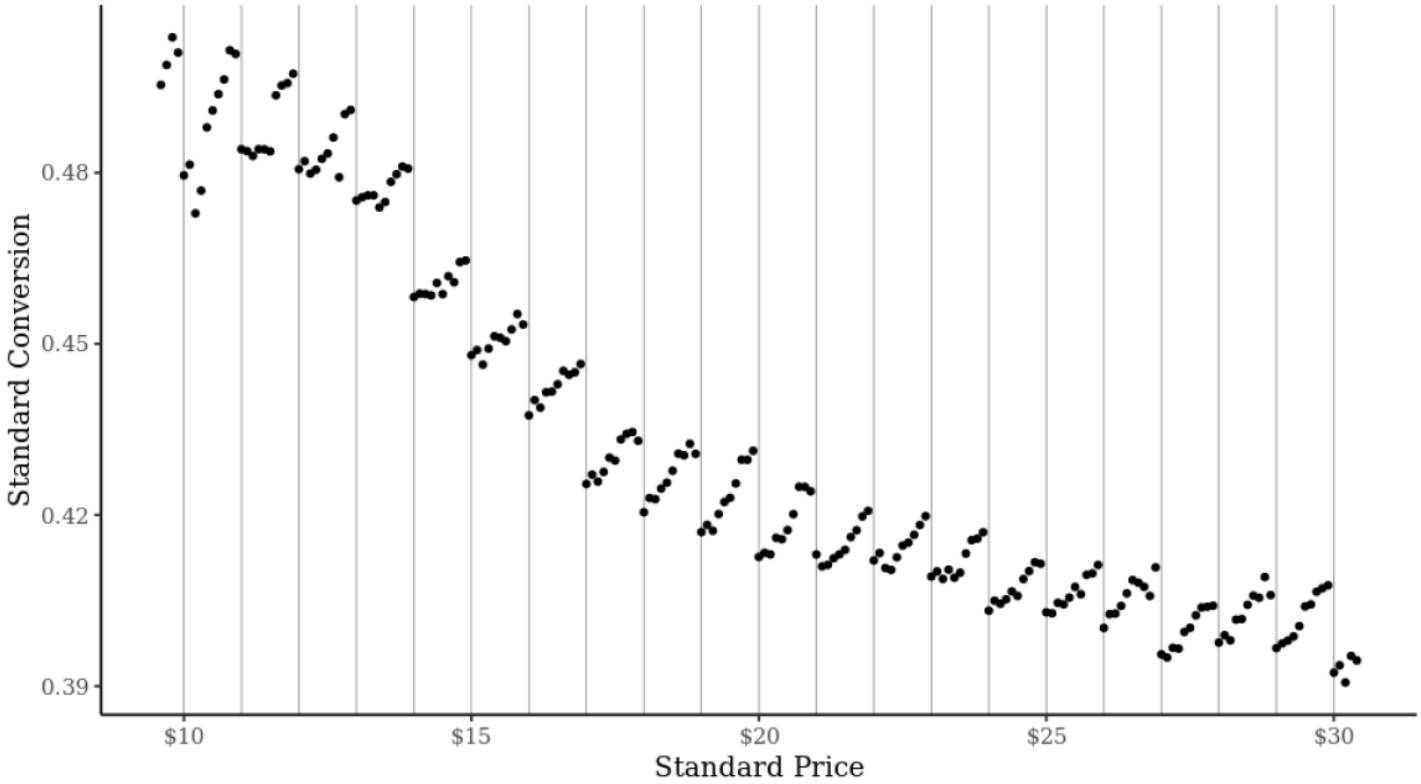
Randomization occurred at the consumer level and involved ~21M unique passengers and ~177M sessions.

The experiment included a control group + 5 experimental treatments:

1. Control (no change to normal operation): 50% of sample
2. Standard Down, Shared Down: 10% of sample
3. Standard Down, No change Shared: 10% of sample
4. Standard Down, Shared Up: 10% of sample
5. No change Standard, Shared Down: 10% of sample
6. No change Standard, Shared Up: 10% of sample

"Down" – lowered by up to $.10 to the nearest 99-cent mark

"Up" – increased by up to $.10 to the nearest round-dollar mark


Standard Conversion
0.48
0.45
0.42
0.39
$10
$15
$20
$25
$30
Standard Price

	Forecasted Profit per User
Standard Down; Shared Down	0.30%
Standard Down; Shared Flat	0.23%
Standard Down; Shared Up	0.16%
Standard Flat; Shared Down	0.07%
Standard Flat; Shared Up	-0.07%

Quick Summary

Law of Demand is much more behavioral than most surmise.

Question regarding "behavioral firms": Why has it taken so long for a sophisticated company like Lyft to account for left-digit bias of consumers?

If the most effective experimental treatment was used for all passengers for one year: **$ZZZM in profit**

However, we don't think this is optimal—we discuss in the study what is optimal, and this change would yield an increase in **profits of $ZZZZM/year**

Left-Digit Bias at Lyft

Coauthors: Ian Muir, Devin Pope, and Gregory Sun

WE ARE JUST SCRATCHING THE SURFACE!

VOT is much larger, more heterogeneous, and more dependent on “the time of time” than we think

The Value of Time in the United States: Estimates from Nationwide Natural Field Experiments

w/Goldszmidt, Metcalfe, Muir, Smith & Wang

Understanding The Gender Pay Gap

The Gender Earnings Gap in the Gig Economy: Evidence from over a Million Rideshare Drivers w/Cook, Diamond, Hall, & Oyer

Understanding Generosity

Some Generosity Work

Bharat K. Chandar & Ali Hortaçsu & John A. List & Ian Muir & Jeffrey M. Wooldridge, 2019. "Design and Analysis of Cluster-Randomized Field Experiments in Panel Data Settings" NBER WP #26389, National Bureau of Economic Research, Inc.

Bharat Chandar & Uri Gneezy & John A. List & Ian Muir, 2019. "The Drivers of Social Preferences: Evidence from a Nationwide Tipping Natural Field Experiment" NBER WP #26380, National Bureau of Economic Research, Inc.

What is the Value of Job Flexibility?

“Reservation Wages and Workers’ Valuation of Job Flexibility, Evidence from a Natural Field Experiment” NBER WP #27807, National Bureau of Economic Research, Inc..

w/Chen, Ding, & Mogstad

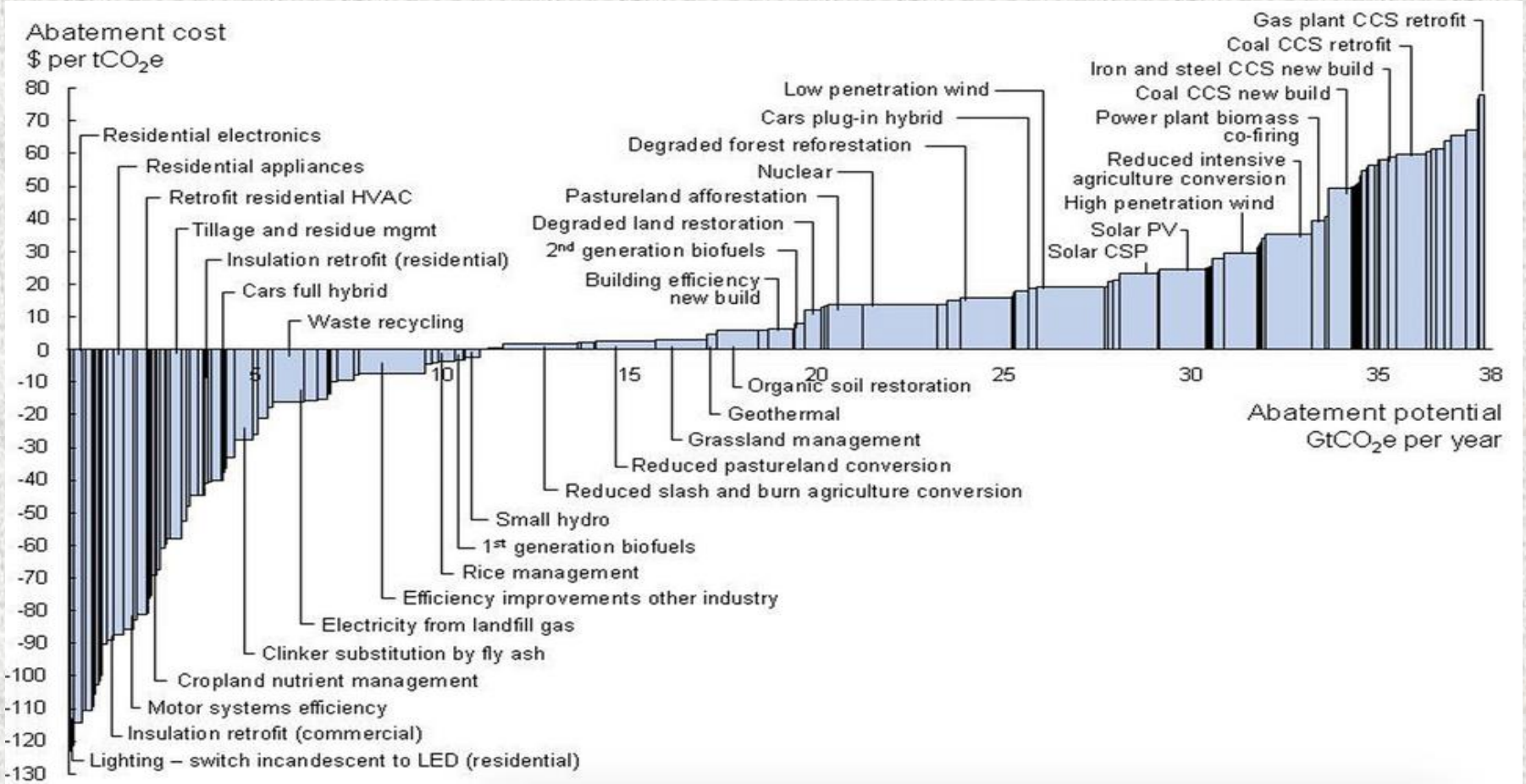
Learning By Doing is Fundamental to Understanding Productivity Differences

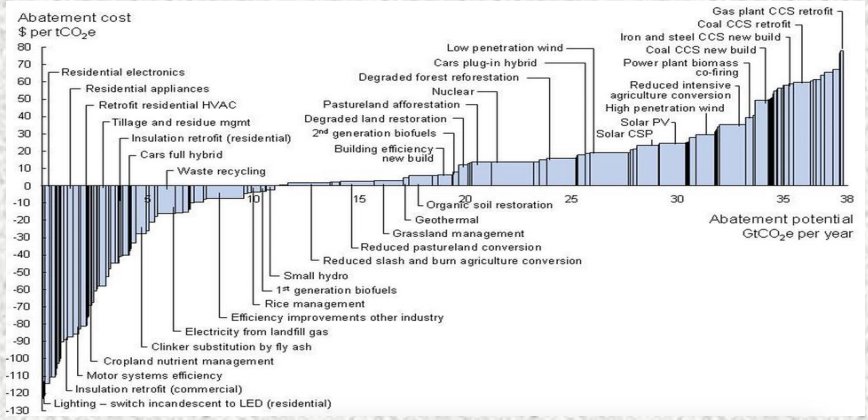
“Toward an Understanding of Learning By Doing: Evidence from an Automobile Assembly Plant”

w/Levitt & Syverson

Tackling Externalities From Inside The Firm

The Impact of Management Practices on Employee Productivity: A Field Experiment with Airline Captains
w/Gosnell and Metcalfe


Abatement cost
$ per tCO2e
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
Residential electronics
Residential appliances
Retrofit residential HVAC
Tillage and residue mgmt
Insulation retrofit (residential)
Cars full hybrid
Waste recycling
Lighting – switch incandescent to LED (residential)
Insulation retrofit (commercial)
Motor systems efficiency
Cropland nutrient management
Clinker substitution by fly ash
Electricity from landfill gas
Efficiency improvements other industry
Rice management
1st generation biofuels
Small hydro
Reduced slash and burn agriculture conversion
Reduced pastureland conversion
Grassland management
Geothermal
Organic soil restoration
Building efficiency new build
2nd generation biofuels
Degraded land restoration
Pastureland afforestation
Nuclear
Degraded forest reforestation
Cars plug-in hybrid
Low penetration wind
Solar CSP
Solar PV
High penetration wind
Reduced intensive agriculture conversion
Power plant biomass co-firing
Coal CCS new build
Iron and steel CCS new build
Coal CCS retrofit
Gas plant CCS retrofit
5
10
15
20
25
30
35
38
Abatement potential
GtCO2e per year



2x the negative MAC of McKinsey identified lowest-hanging fruit

-$250

Coming Soon!

Loyalty

Two studies on Customer Retention: Memberships and “Consume for Rewards” (pending lawyer approval)

Income Targeting is not as important as you think…..

“Evaluating the Evidence on Daily Income Targeting with Experimental and Observational Data” (pending author approval)

My View of the Landscape

- Yesterday's economist visited the pin factory to scribe general economic theories.
- Today's economist models natural disruptions that affect the pin factory and occasionally generates data from the pin factory to test economic theories.
- Tomorrow's economist will surgically control the assignment mechanism in an ethically responsible manner to provide causal evidence of the inner workings of the pin factory *and* generate data necessary to understand if learnings from that environment will transfer to other environments, be them spatially, temporally, or scale differentiated.

In Closing: Generation Next, Collaboration with



- Due to the historical outgrowth of field experiments from social experiments, it is unsurprising that most are done in partnerships with governments and NGOs
- However, field experiments in the private sector are a largely untapped opportunity
- Some low hanging fruit:
  - DEI, optimal worker incentive schemes, hierarchal arrangements, social structures and networks relating to workplace design, firm compliance with rules and regulations, worker malfeasance, wellness and health programs.

http://www.fieldexperiments.com

Why Economists Should Run Field Experiments and 14 Tips for Pulling One Off
Journal of Economic Perspectives 2011 Summer