# Discussion of Harris (2025)

"Heterogenous Impacts of Emissions Regulation"

Discussant: Sangmin Simon Oh (Columbia Business School)

Yiran Fan Memorial Conference 2025

# Recap

**Question:** How do local **economic** & **environmental** outcomes respond to state-level emissions regulation?

- # of workers
- wage
- output
- # of establishments

- emissions
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1. New emissions regulation ⇒ employment ↘, output ↘, emissions ↘, R&D ↗, investment ↗
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**Plan for Discussion**

1. Aperitivo: What makes a good (empirical) JMP?
2. Background: State-level Emissions Regulation and Its Implications
3. Point 1: Stylized Facts on Emissions Regulation
4. Point 2: Empirical Analysis at Different Aggregation Levels
5. Point 3: Complementary Empirical Tests

# Aperitivo: What makes a good (empirical) JMP?

# The (Finance) Academic as a Storyteller

# *1. Why do I care?*

*"This is so boring"*
*"Why do I care about this?"*
*"I don't get why this is an important topic"*

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## *1. Why do I care?*

*"This is so boring"*
*"Why do I care about this?"*
*"I don't get why this is an important topic"*

## *2. Isn't this obvious?*

*"Is this new? I thought we knew this already"*
*"Is this supposed to be surprising?"*
*"I don't think I learned anything new"*

# The 5 Archetypes

## (1) Paradigm Lost

Provides new facts that prompt a re-evaluation of current paradigms

- Kuhnian Paradigm Shift:

Common risk factors in the returns on stocks and bonds*

Eugene F. Fama and Kenneth R. French
*University of Chicago, Chicago, IL 60637, USA*

Received July 1992, final version received September 1992

In Search of the Origins of Financial Fluctuations: The Inelastic Markets Hypothesis

Xavier Gabaix and Ralph S.J. Koijen*

December 23, 2023

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## (1) Paradigm Lost

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- Popperian Falsification:

**Time Variation of the Equity Term Structure**

NIELS JOACHIM GORMSEN*

**ABSTRACT**

I study the term structure of one-period expected returns on dividend claims with different maturity. I find that the slope of the term structure is counter cyclical. The counter cyclical variation is consistent with theories of long-run risk and habit, but these theories cannot explain the average downward slope. At the same time, the cyclical variation is inconsistent with recent models constructed to match the average downward slope. More generally, the average and cyclicality of the slope are hard to reconcile with models with a single risk factor. I introduce a model with two priced factors to solve the puzzle.

# The 5 Archetypes

## (2) Measure for Measure

Measures what was once thought immeasurable

- Using new data:

**Asset Pricing with Garbage**

ALEXI SAVOV*

**ABSTRACT**

A new measure of consumption, garbage, is more volatile and more correlated with stocks than the canonical measure, National Income and Product Accounts (NIPA) consumption expenditure. A garbage-based consumption capital asset pricing model matches the U.S. equity premium with relative risk aversion of 17 versus 81 and evades the joint equity premium-risk-free rate puzzle. These results carry through to European data. In a cross-section of size, value, and industry portfolios, garbage growth is priced and drives out NIPA expenditure growth.

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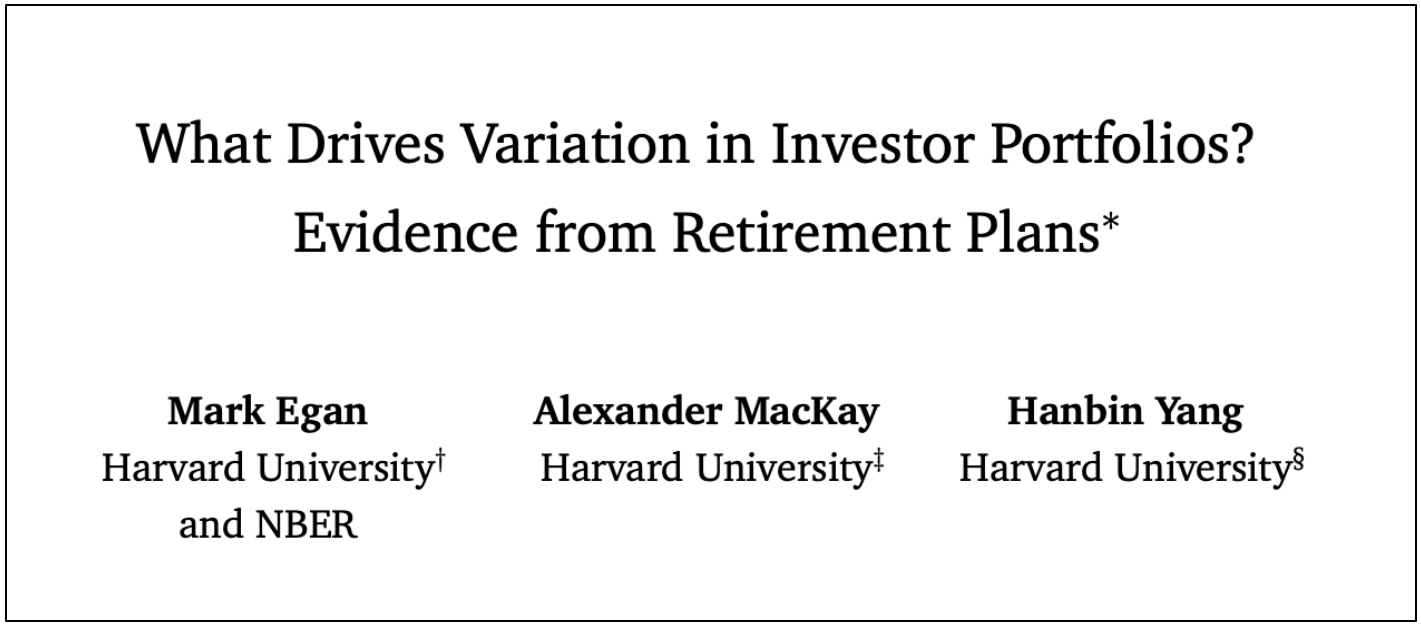


What Drives Variation in Investor Portfolios?
Evidence from Retirement Plans*

**Mark Egan**
Harvard University†
and NBER

**Alexander MacKay**
Harvard University‡

**Hanbin Yang**
Harvard University§

# The 5 Archetypes

## (3) The Usual Suspects

Offers simple explanations for seemingly puzzling facts

**Deviations from Covered Interest Rate Parity**

WENXIN DU, ALEXANDER TEPPER, and ADRIEN VERDELHAN*

**ABSTRACT**

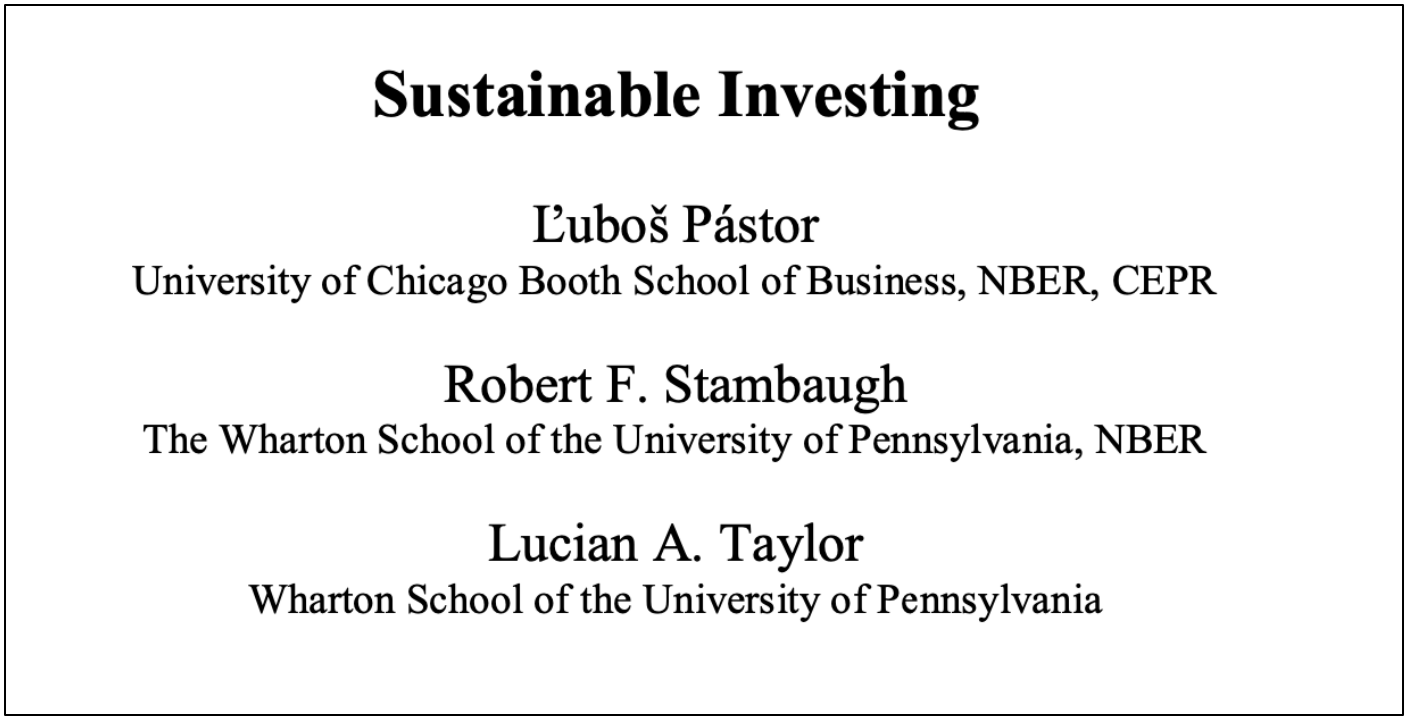
We find that deviations from the covered interest rate parity (CIP) condition imply large, persistent, and systematic arbitrage opportunities in one of the largest asset markets in the world. Contrary to the common view, these deviations for major currencies are not explained away by credit risk or transaction costs. They are particularly strong for forward contracts that appear on banks' balance sheets at the end of the quarter, pointing to a causal effect of banking regulation on asset prices. The CIP deviations also appear significantly correlated with other fixed income spreads and with nominal interest rates.

# The 5 Archetypes

**(4) Timely Insights**

Provides commentary and analysis on recent developments and trends

- New Trends:



**Sustainable Investing**

Ľuboš Pástor
University of Chicago Booth School of Business, NBER, CEPR

Robert F. Stambaugh
The Wharton School of the University of Pennsylvania, NBER

Lucian A. Taylor
Wharton School of the University of Pennsylvania

# The 5 Archetypes

## (4) Timely Insights

Provides commentary and analysis on recent developments and trends

- Canary in the Mine:

*Econometrica*, Vol. 84, No. 3 (May, 2016), 1265–1287

### SHADOW INSURANCE

BY RALPH S. J. KOIJEN AND MOTOHIRO YOGO[1]

Life insurers use reinsurance to move liabilities from regulated and rated companies that sell policies to shadow reinsurers, which are less regulated and unrated off-balance-sheet entities within the same insurance group. U.S. life insurance and annuity liabilities ceded to shadow reinsurers grew from $11 billion in 2002 to $364 billion in 2012. Life insurers using shadow insurance, which capture half of the market share, ceded 25 cents of every dollar insured to shadow reinsurers in 2012, up from 2 cents in 2002. By relaxing capital requirements, shadow insurance could reduce the marginal cost of issuing policies and thereby improve retail market efficiency. However, shadow insurance could also reduce risk-based capital and increase expected loss for the industry. We model and quantify these effects based on publicly available data and plausible assumptions.

# The 5 Archetypes

## (5) Post Mortem

Uncovers the underlying causes and consequences of significant events

*Econometrica*, Vol. 82, No. 6 (November, 2014), 2197–2223

### WHAT EXPLAINS THE 2007–2009 DROP IN EMPLOYMENT?

BY ATIF MIAN AND AMIR SUFI[1]

We show that deterioration in household balance sheets, or the *housing net worth channel*, played a significant role in the sharp decline in U.S. employment between 2007 and 2009. Counties with a larger decline in housing net worth experience a larger decline in non-tradable employment. This result is not driven by industry-specific supply-side shocks, exposure to the construction sector, policy-induced business uncertainty, or contemporaneous credit supply tightening. We find little evidence of labor market adjustment in response to the housing net worth shock. There is no significant expansion of the tradable sector in counties with the largest decline in housing net worth. Further, there is little evidence of wage adjustment within or emigration out of the hardest hit counties.

KEYWORDS: Great Recession, employment, household debt, new worth, house prices.

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- Hand-collected dataset of 120 state-level GHG rules
- Quantitative measure of regulatory stringency from stock returns
- Firm response to state-level (climate) regulation

⇒ Big Picture: Important to highlight novelty in measurement and why that is something that we should be excited about

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## Timely Insights

Provides commentary and analysis on recent developments and trends

- Answer the question of "Do state regulations cut carbon without killing jobs?"
  - Whether firms cut emissions
  - How they reshape firm activities
  - Who bears the costs

⇒ Big Picture: (1) Emphasize the gap in our knowledge, and (2) Tie the empirical analyses together to highlight the question you are answering

# Background: State-level Emissions Regulation

# A Taxonomy of State-level Emissions Regulation

**[1] Cap-and-trade / Cap-and-invest system**
Impose a declining aggregate cap and sell tradable allowances.

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- California AB 32 Cap-and-Trade (since 2013)
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**[2] Clean Energy Portfolio Mandates**
Require a rising share of zero-carbon electricity

- New York CLCPA + CES
  - 70 % renewables by 2030, 100 % zero-emissions by 2040
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**Others**: Vehicle GHG mandates, mandatory GHG reporting, maximum emissions rates per unit of output

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Firms keep operation in the regulated state but adjust how they do business

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- Pricing and cross-subsidization (within state)
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# Point 1: Stylized Facts on Emissions Regulation

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- State, type of regulation, date enacted, and industries affected
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6 NYCRR Part 496 Statewide Greenhouse Gas Emission Limits

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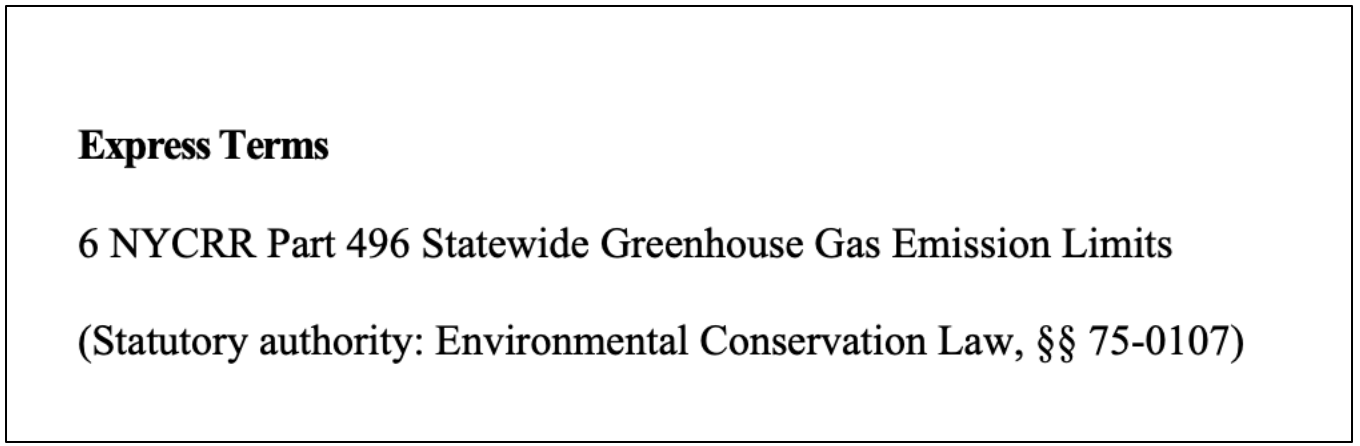

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**Suggestion 1**: Distill a set of stylized facts on the nature of these regulation.

- Reason 1: Interesting + Provides more color for the empirical analysis
- Reason 2: Institutional Details = DGP, which disciplines our concerns about identification

# My Personal Wishlist for Stylized Facts

**1. Regulatory Landscape (who, what, where)**

- Geographic diffusion (state-level heatmap and/or adoption curve)
- Sectoral footprint (top NAIC industries and their CO2e share)

⇒ **Q. What sample of the population are we talking about?**

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**2. How are these regulations determined / adopted?**

- Legislative vs. executive orders
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- Political or economic triggers: party flips, energy-price shocks, federal incentives

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**3. Exposure at different aggregation levels**

- Facility level: % of GHGRP sites covered, median baseline CO2e across facilities
- Firm level: distribution of revenue / assets share in treated states
- Industry level: share of each industry's national CO2e subject to at least one rule.

⇒ **Q. Which variation does each level of aggregation provide?**

# Point 2: Empirical Analysis at Different Aggregation Levels

# Analysis at Three Levels of Aggregation

| Question | Facility | Firm | Industry × State |
|---|---|---|---|
| Pure compliance cost | | | |
| Intra-firm shifting | | | |
| Inter-state relocation | | | |
| Welfare incidence (workers / investors) | | | |
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**Suggestion 2a**: Emphasize the complementary nature of these analyses

- Facility level: pins down intensive-margin compliance elasticities but misses reallocation
- Firm level: captures within-firm shifting and results on profits (but not wages)
- Industry × State level: full GE footprint but blurs the micro mechanisms

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**Suggestion 2b**: Variance Decomposition of Emissions

- Quantify how much of the industry-level response is explained by (i) plant-level compliance, (ii) intra-firm reallocation, and (iii) entry/exit or interstate migration

# Point 3: Complementary Empirical Tests

# Potential Concerns Re: Empirical Design

**Current empirical design relies on:**

- Parallel trends across (1) brown vs. clean industries and (2) target vs. non-target states
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2. Policy Bundles (= confounders)
   - States that pass GHG rules often roll out RPS, green subsidies, or enforcement sweeps at the same time.

> As a cap & invest program, the Climate Commitment Act not only caps and reduces emissions, but also invests in accelerating the transition to a thriving, globally-competitive clean energy economy, with mechanisms built in that can start to heal inequities in pollution exposure, participation, and health impacts. The Climate Commitment Act integrates with an array of climate-jobs-and health centric policies passed by the legislature, including the Clean Energy Transformation Act (CETA) program to achieve a zero emissions power sector and a new Clean Fuels Standard that unifies the Pacific West Coast.

Washington State (2021)

# Complementary Empirical Tests

**Suggestion 3a. Border Discontinuity Design**

- **Core Idea:** Treat the state line as a quasi-experimental threshold
- Adjacent counties share labor markets, weather, and industry mix (potentially)
- Compare facilities sitting just inside a **treated** state that adopts a new GHG rule with their immediate neighbors on the **untreated** side

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**Suggestion 3c. Placebo Test**

- **Core Idea:** There should be null effects when the compliance costs are absent
- Examine sectors exempt from the rules (e.g. information sector)
- Examine SO2 or NOx emissions at the same facilities
- Examine “false” regulation (aspirational targets that never received implementing rules)

# Final Thoughts

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…but the Chicago Econ/Booth alumni are here to help! **Good luck!**