

# Where is Pollution Moving?

## Environmental Markets and Environmental Justice

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# Motivation

- **Environmental markets (cap and trade, pollution taxes, hybrids)**
  - ▶ Maximize pollution reduction for given cost (cost effective)
  - ▶ Revenues can decrease other taxes or increase public investment
  - ▶ Alternative to “command and control” standards
  
- **Environmental justice**
  - ▶ Inclusive, participatory, respectful, fair treatment of all groups
  - ▶ Equitable environment
  - ▶ Concern: higher pollution levels in low-income, communities of color
  
- **Environmental justice and caution about environmental markets**
  - ▶ Markets do not guarantee a distribution of pollution
  - ▶ Washington's 1631 Carbon Tax, California's cap-and-trade renewal
  - ▶ Mary Nichols appointment to EPA

# Overview: new research

- **Clean Air Act offset markets (“Emissions Reductions Credits”)**
  - ▶ Tradable emissions rights between facilities in same metro area
  - ▶ Among the oldest and most prominent market-based environmental policies
- **Questions: efficiency**
  - ▶ What are costs and benefits of reducing air pollution through these markets?
- **Questions: equity**
  - ▶ Do offset trades move pollution to low income, minority communities?
  - ▶ Generally, how do environmental markets affect environmental inequality?
- **References**
  - ▶ Shapiro, Joseph S., and Reed Walker. 2020. “Is Air Pollution Regulation Too Stringent?” NBER Working Paper 28199.
  - ▶ Shapiro, Joseph S., and Reed Walker. 2021. “Where is Pollution Moving? Environmental Markets and Environmental Justice.” *AEA Papers & Proceedings* 111.

# Overview: new research

- **Data: Efficiency**

- ▶ Public and private data on offset transactions from >100 markets in 16 states)

- **Data: Equity**

- ▶ Publicly available data on offset transactions from 12 markets in two states (12 city × pollutant combinations)
- ▶ Census block group demographics from American Community Survey

- **Results**

- ▶ Efficiency: benefits of pollution reduction 10 × larger than costs
- ▶ Equity: offset trades do not substantially change distribution of pollution across communities

# Existing economics literature

## ● Economics of environmental inequality

- ▶ Currie, Janet, Reed Walker, and John Voorheis. 2020. "What Caused Racial Disparities in Particulate Exposure to Fall?" NBER Working Paper 26659.
- ▶ Banzhaf, Spencer, Lala Ma, and Christopher Timmins. 2019. "The economics of race, place, and pollution." *Journal of Economic Perspectives* 33(1): 185-208.

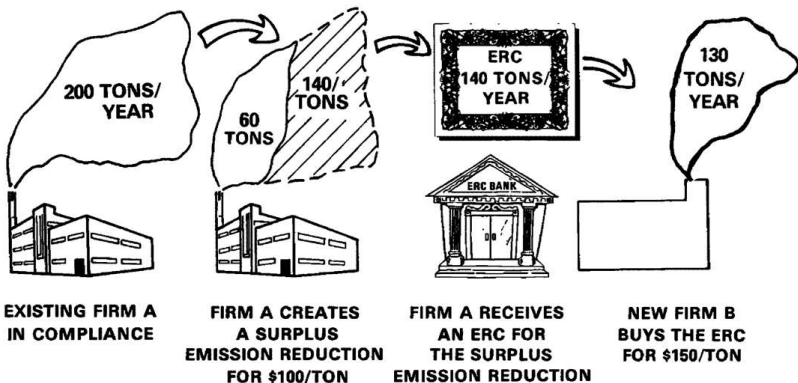
## ● Environmental markets and environmental justice

- ▶ Hernandez-Cortes, Danae, and Kyle C. Meng. 2021. "Do Environmental Markets Cause Environmental Injustice?" NBER Working Paper 27205.
- ▶ Grainger, Corbett, and Thanicha Ruangmas. 2018. "Who Wins from Emissions Trading?" *Environmental and Resource Economics* 71: 703-727.
- ▶ Fowlie, Meredith, Stephen P. Holland, and Erin T. Mansur. 2012. "What Do Emissions Markets Deliver and to Whom?" *American Economic Review* 102(2): 965-93.

# Overview

- **Design of Pollution Offset Markets**
- Results: Efficiency
- **Results: Equity**
- Conclusions

## AVAILABLE ERCs ATTRACT NEW FIRMS



# Offset Market Design

*The State of Texas*

## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Certificate Number:

2697



Number of Credits:

21.8 tpy VOC

### *Emission Reduction Credit Certificate*

This certifies that  
*Scan-Pac Mfg., Inc.*  
31502 Sugar Bend Drive  
Magnolia, Texas 77355

is the owner of 21.8 tons per year of volatile organic compound (VOC) emission reduction credits established under the laws of the State of Texas, transferable only on the books of the Texas Commission on Environmental Quality, by the holder hereof in person or by duly authorized Attorney, upon surrender of this certificate.

The owner of this certificate is entitled to utilize the emission credits evidenced herein for all purpose authorized by the laws and regulations of the State of Texas and is subject to all limitations prescribed by the laws and regulations of the State of Texas. This certificate may be used for credit in the following counties:

Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller

Effective Date of the Emission Reduction: May 15, 2013

Regulated Entity Number: RN100219989

County of Generation: Montgomery

Generator Certificate: Original

- Scan-Pac, a Houston manufacturing plant, built a thermal oxidizer
- Decreased VOC emissions by 21.8 tons per year, received this offset
- Sold this offset to Enterprise Products, an oil company, for \$3.6 million

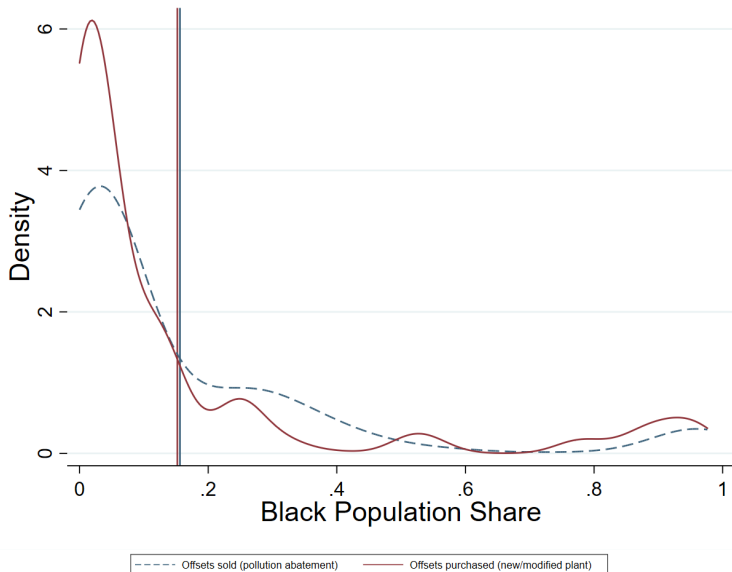


# Methodology: Equity

- Demographics
  - ▶ Draw 1-mile circle around each plant
  - ▶ American Community Survey: share Black, Hispanic, median income
  - ▶ Compare plants selling versus buying offsets
- Advantages of this approach
  - ▶ Simple comparison: where is pollution moving?

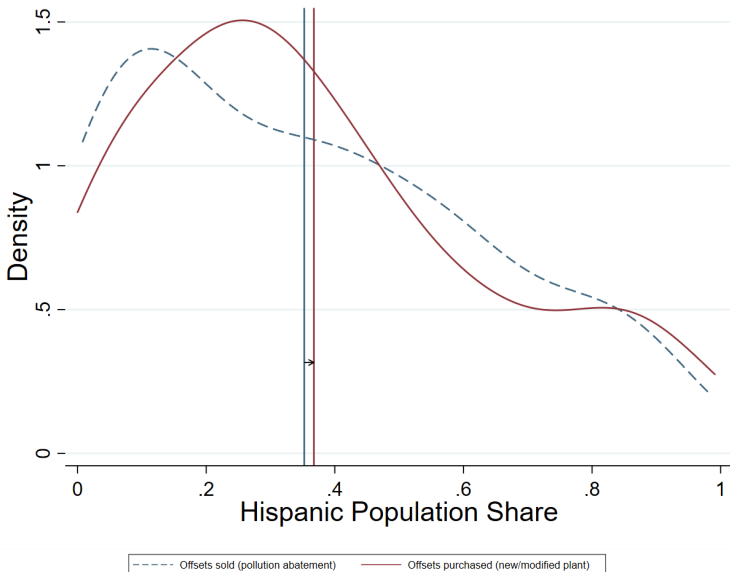
# Where is Pollution Moving?

Densities of Community Characteristics: Offset Origins Versus Destinations



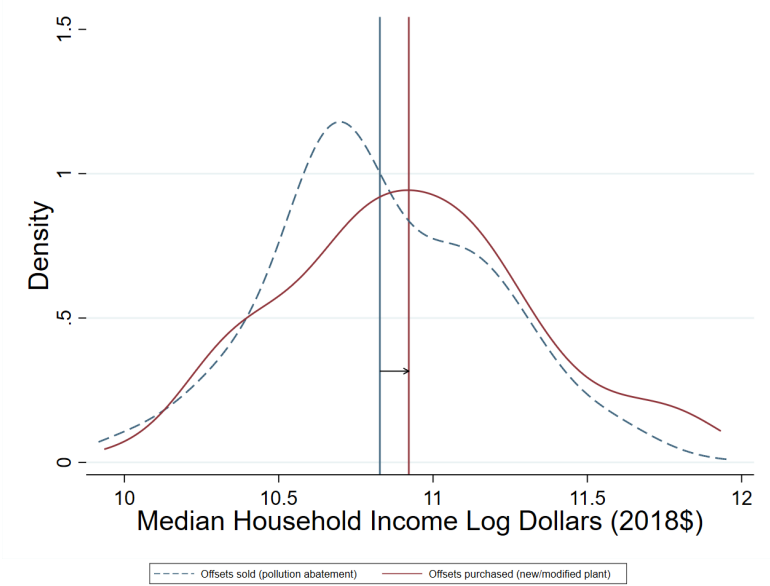
# Where is Pollution Moving?

Densities of Community Characteristics: Offset Origins Versus Destinations



# Results: Equity

Densities of Community Characteristics: Offset Origins Versus Destinations

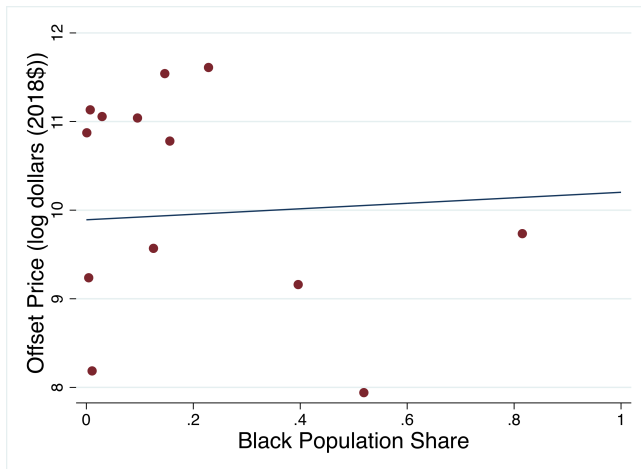


## Additional Results: Equity (if time)

- Why do plants selling and buying offsets have similar community demographics?
- Ideally, observe marginal cost of pollution control at each plant
- Rough proxy: plant level offset price

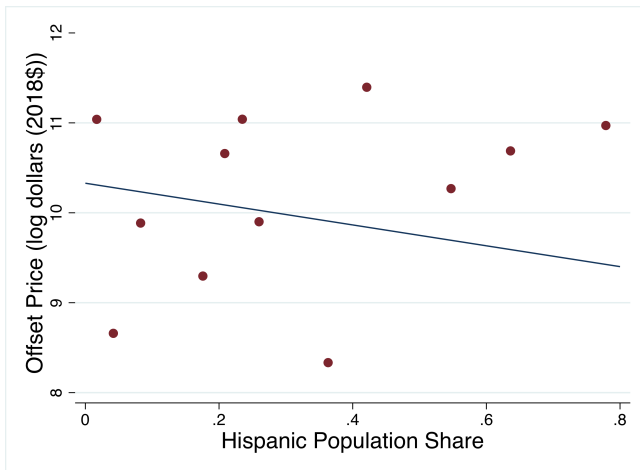
# Additional Results: Equity

Offset Prices Versus Community Characteristics



# Additional Results: Equity

Offset Prices Versus Community Characteristics



# Additional Results: Equity

Offset Prices Versus Community Characteristics

