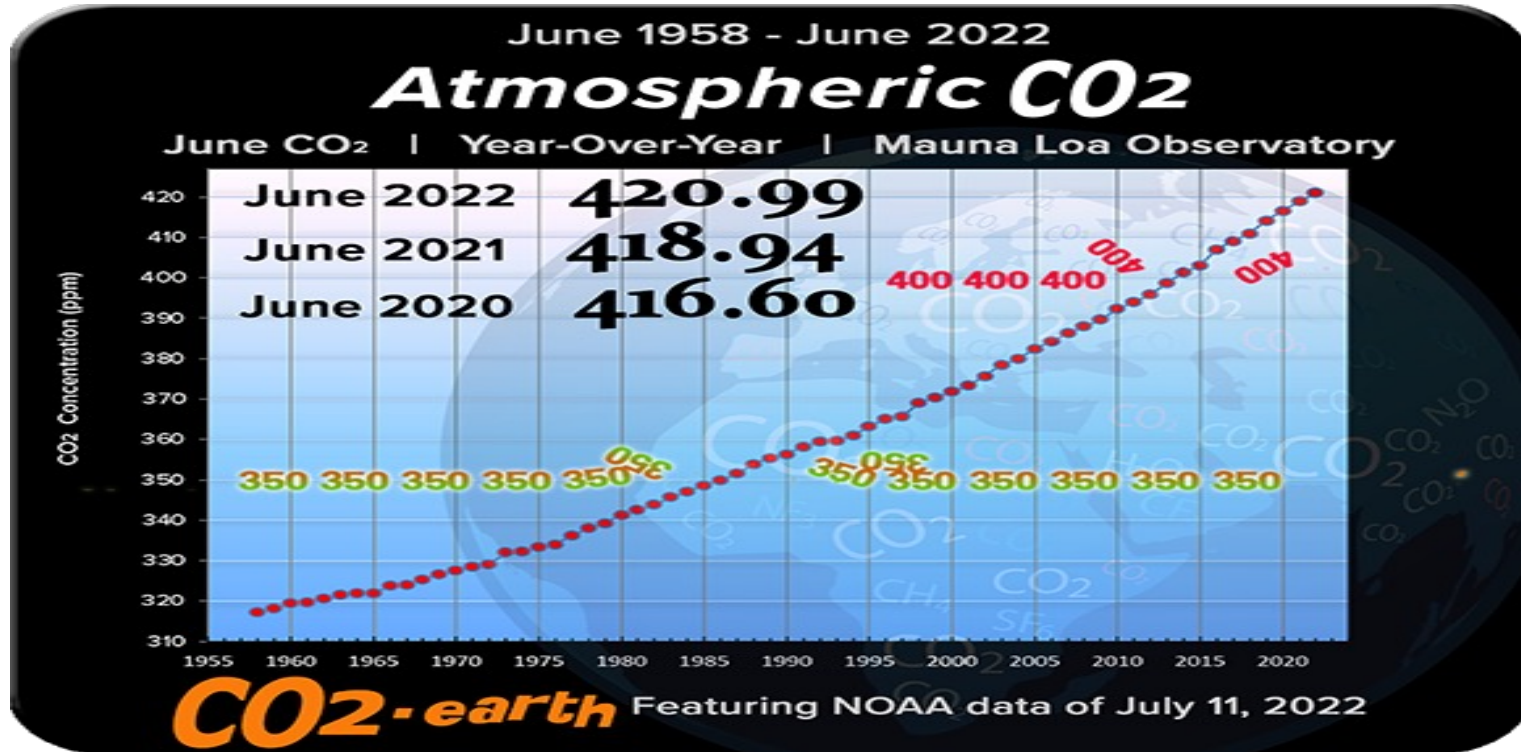


# Adapting to Climate Change

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Kahn, Matthew E., and Somik Lall. *Will the Developing World's Growing Middle Class Support Low Carbon Policies?*. No. w30238. National Bureau of Economic Research, 2022.



# What “Rules of the Game” Will Accelerate the Pace of Climate Change Adaptation?

- How can markets help us adapt to the challenges of climate change?
- How do government policies promote effective adaptation?
- How do government policies hinder effective adaptation?
- What role can real estate markets play in encouraging adaptation?
- How can the mortgage market and insurers play the role of the “adult in the room”?

# The Air Conditioner is a leading example of how markets help us adapt

- Barreca, Alan, Karen Clay, Olivier Deschenes, Michael Greenstone, and Joseph S. Shapiro. "Adapting to climate change: The remarkable decline in the US temperature-mortality relationship over the twentieth century." *Journal of Political Economy* 124, no. 1 (2016): 105-159.
- Over the 20<sup>th</sup> century, deaths from heat have fallen sharply due to air conditioning
  - Rising incomes
  - **The Boskin Report's** optimism price per unit of hedonic quality down ⇒ People use markets to protect themselves.
  - A free market transaction between buyers and sellers. No government policy here
  - Rising Aggregate demand for solutions to anticipated challenges → innovation
- Acemoglu, Daron, and Joshua Linn. "Market size in innovation: theory and evidence from the pharmaceutical industry." *The Quarterly journal of economics* 119, no. 3 (2004): 1049-1090.
- Globalized free trade facilitates adaptation through innovation due to the extent of the market!

# Government policies that promote effective adaptation?

- The National Science Foundation and open science focused on understanding the emerging geography of climate risk such as fire risk, flood risk and extreme heat risk.
- Encouraging Local Government competition – migration and “Vote with your feet” as some areas will feature low taxes and low levels of protection while others will feature high taxes and higher levels of resilience investment
- More Controversial:
  - The Army Corps of Engineers Projects (federal human capital but financed locally not with “other people’s money”)
  - Building codes Baylis, Patrick W., and Judson Boomhower. *Mandated vs. Voluntary Adaptation to Natural Disasters: The Case of US Wildfires*. No. w29621. National Bureau of Economic Research, 2022.

# How do government policies hinder effective adaptation ?

- Public Insurance and the Crowding Out Hypothesis
  - Annan, Francis, and Wolfram Schlenker. "Federal crop insurance and the disincentive to adapt to extreme heat." *American Economic Review* 105, no. 5 (2015): 262-66.
  - Baylis, Patrick, and Judson Boomhower. *Moral hazard, wildfires, and the economic incidence of natural disasters*. No. w26550. National Bureau of Economic Research, 2019.
  - The National Flood Insurance Program's subsidized insurance
- Insurance market price caps for flood and fire insurance (implicit cross-subsidies)
  - Muffled scarcity price signals due to limited water markets (Gary Libecap's work)
  - Coasian bargaining limited by property rights enforcement issues (Terry Anderson's work)

# Market Mechanisms for Allocating Water Would Reduce the Pain!!

My Drive - Google Drive x Project Overview\_2023.do x Sign out x Mail - Matthew E. Kahn - x As the Colorado River Shr x +

nytimes.com/2023/01/27/climate/colorado-river-biden-cuts.html?smid=nytcore-ios-share&referringSource=articleShare

Gmail YouTube Maps

CLIMATE

The New York Times

GIVE THE TIMES

Account

## *As the Colorado River Shrinks, Washington Prepares to Spread the Pain*

The seven states that rely on the river for water are not expected to reach a deal on cuts. It appears the Biden administration will have to impose reductions.

# Center City Single Family Zoning and other Land Use Regulations Deflect People into the Fire Zones!

Opinion

OP-ED CONTRIBUTOR

## Fires Aren't the Only Threat to the California Dream

By Enrico Moretti

Nov. 3, 2017

4 MIN READ

- Optimism about policy reform from Gary Becker
- Becker, Gary S. "Public policies, pressure groups, and dead weight costs." *Journal of public economics* 28, no. 3 (1985): 329-347.



# What role can real estate, insurance, and finance markets play in encouraging adaptation?

- Think of Phoenix in the year 2030 or Miami in the year 2040.
- Will a “day of reckoning” take place?
- Asset owners in places that fail to adapt will suffer a wealth loss --- this creates a resilience interest group
- Kahn, Matthew E. *Climatopolis: how our cities will thrive in the hotter future*. Basic Books (AZ), 2013.

# A Location's Real Estate Price Dynamics Reflect Changing Fundamentals

- Progress in Climate Science plays the role of “Paul Revere”
- Fewer regrets in real estate purchases
- Comparative Advantage challenges the claim that areas will become “unlivable”
  - Miami still has offsetting charms and there is an increasing set of engineering and natural capital strategies for protecting such places.
  - It will attract those who desire that bundle.
  - An extremely hot Phoenix in the year 2040, will attract many home buyers who live there 8 months a year (Cape Cod West in a WFH economy!)

# The Rise of “Honest Brokers” Providing Information about Pinpoint Climate Risks

RISK  
FACTOR

615 WARNER AVE, LOS ANGELES, CA 90024

Partnerships & Pricing Methodology Help

Risk Overview

Flood Factor 9/10


Fire Factor 2/10


Heat Factor 6/10


Fire Risk Report


Fire Maps


Fire Damages

 Wildfire Risk Overview

 Current & Future Risk

 Wildfire Intensity

 Home Vulnerability

 Historic Wildfires

WILDFIRE RISK OVERVIEW

Does this property have risk?

2 /10

Minor  
FIRE  
FACTOR™

Yes, based on this property's distance to wildfire risk areas and burnable vegetation, it has a **Minor Fire Factor®**.

This risk is due to the property being located in the ember zone of potential wildfires nearby or due to a low, but non-zero probability of wildfire reaching this property.

Unlock Pro Features

# Housing Search and Property Specific Exposure to Place Based Climate Risk

- Trusted and easy to access climate risk report cards reduces the “Lemons” Problem.
- Home buyers value this information!
- Our Redfin + First Street Foundation Field Experiment
- Treatment group was given access to the property specific Flood scores
  - this influenced their search behavior!
  - Both Red State and Blue State searchers respond to this information!

# Private Insurers and Mortgage Lenders as the “Adults in the Room”

- Imagine if the government retreats from participating in the insurance market
- Imagine if the government retreats from playing an active role in the mortgage backed security market
- Spatial risk pricing for insurance and mortgages would send proper adaptation signals
- Premiums would be lower on “higher ground”!
- Lenders would offer lower interest rates and a higher loan to value ratio in relatively safer areas
- The resulting capital stock would be more resilient
- Future natural disasters would cause less economic damage

# The Economics of Protecting Poor People from Climate Shocks

- Poor people and poor places have the least capacity to adapt to place based shocks
- The climate change challenge creates an economic growth imperative!
- Milton Friedman's proposal to issue housing vouchers in order to facilitate geographic mobility.
- Offering localities incentives to Up zone in relatively safer places to reduce concerns about "climate gentrification"
- Encouraging localities to experiment with pilot projects to accelerate our learning
- The Boskin Report's optimism about the declining quality adjusted price of adaptation products

# Conclusion : I am Highly Optimistic about our ability to adapt

- Due to adaptation fueled by economic growth, the death toll from natural disasters is declining around the world;
- In the recent past, economic growth has been slightly slowed by extreme temperatures
- We will use market price signals to reduce the negative impact of climate change on our quality of life and our productivity and on our capital stock.
- Anderson, Sarah E., Terry L. Anderson, Alice C. Hill, Matthew E. Kahn, Howard Kunreuther, Gary D. Libecap, Hari Mantripragada, Pierre Mérel, Andrew J. Plantinga, and V. Kerry Smith. "The critical role of markets in climate change adaptation." *Climate Change Economics* 10, no. 01 (2019): 1950003.
- My ongoing research focuses on creating empirical benchmarks of adaptation progress

# A Confession: I Checked My Work with ChatGPT

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Will we adapt to climate change



It is likely that humanity will adapt to climate change in some ways, but the extent and success of these adaptations will depend on a variety of factors such as the severity and speed of climate change, available resources and technology, and political and social will. Some potential adaptations could include:



- Developing and implementing new technologies and infrastructure to reduce greenhouse gas emissions and mitigate the impacts of climate change
- Shifting to more resilient and sustainable agricultural practices
- Adapting to changes in weather patterns and extreme events through improved early warning systems and emergency response planning
- Relocating communities and infrastructure in vulnerable areas to safer locations



# My 2010 and 2021 books on the microeconomics of Adapting to Climate Change

