

DOCKETED

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Economic Implications of Climate Impacts on Energy: Adding Economics to Energy

Solomon Hsiang
UC Berkeley

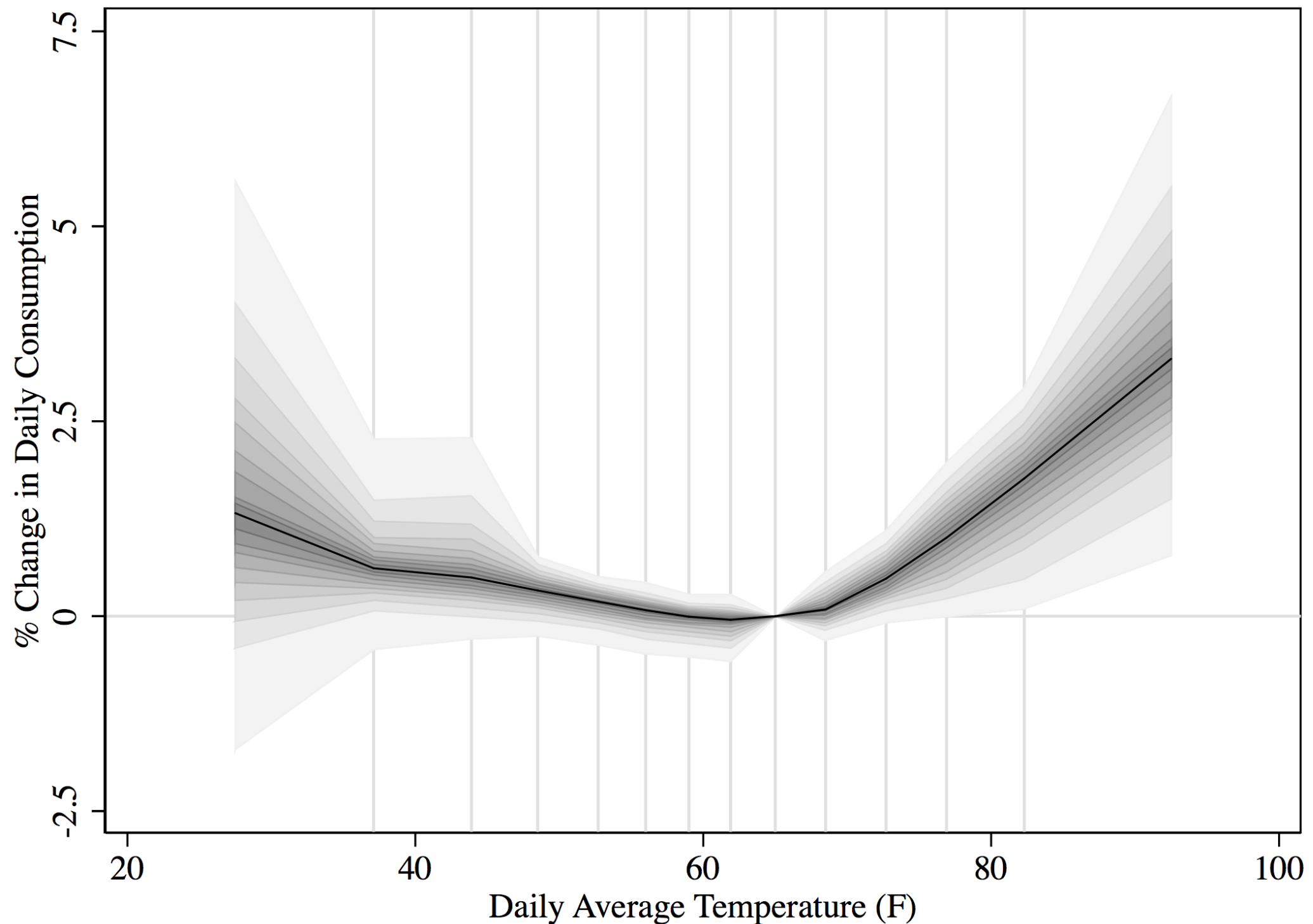
Uses for applied economics

- Statistical approaches simplify complex processes
- Causal inference
- Reality check for model assumptions
- Calibration based on real world behavior
- Behavior may not optimize
- Interlinked markets

Weaknesses

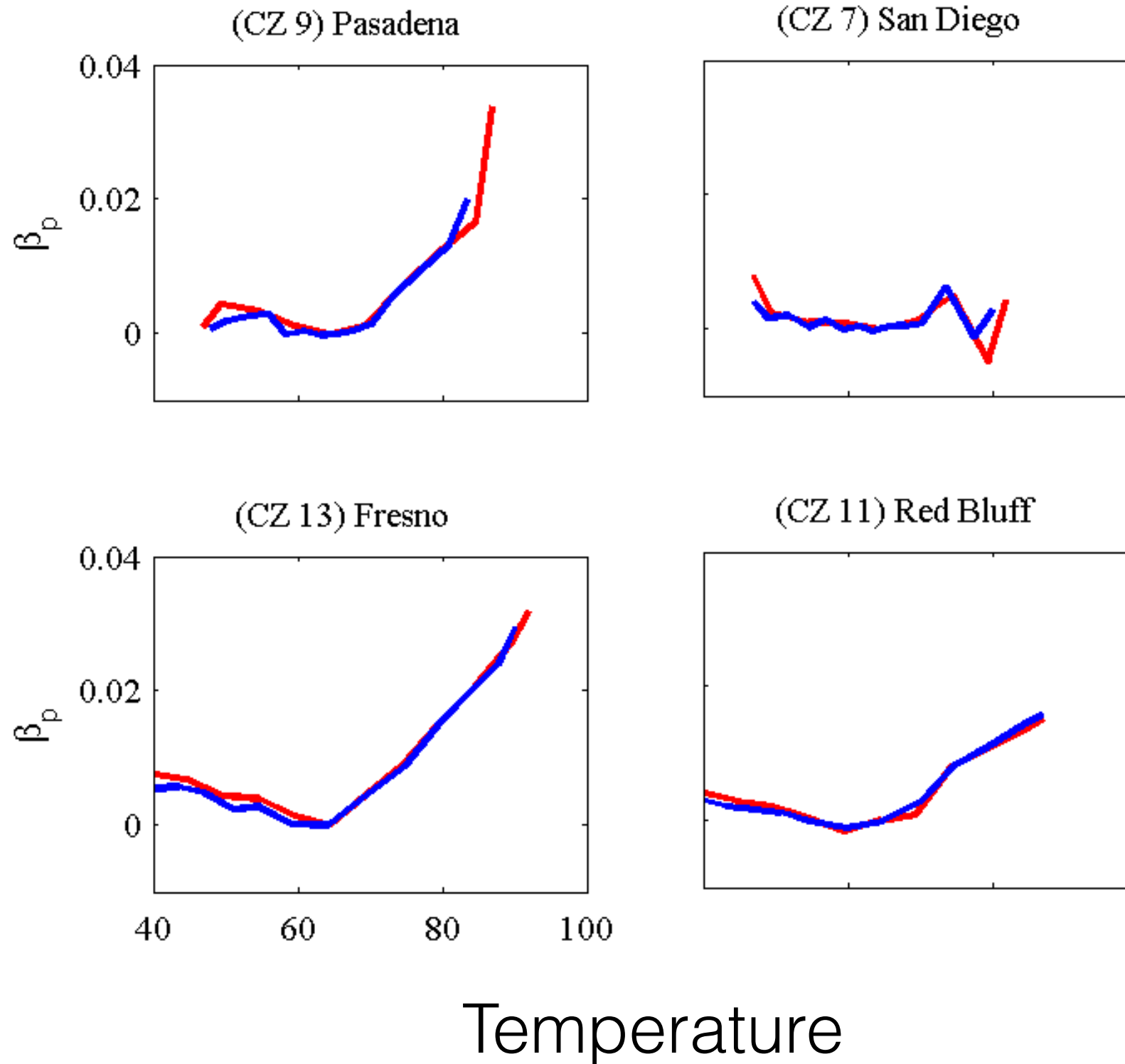
- Statistical approaches simplify complex processes
- Gaps in knowledge
- Future environment is unprecedented
- Future behavior may differ from past
- Innovations are unknowable
- Insufficient market linkages

Calibrate against empirically measured energy demand, actual behavior

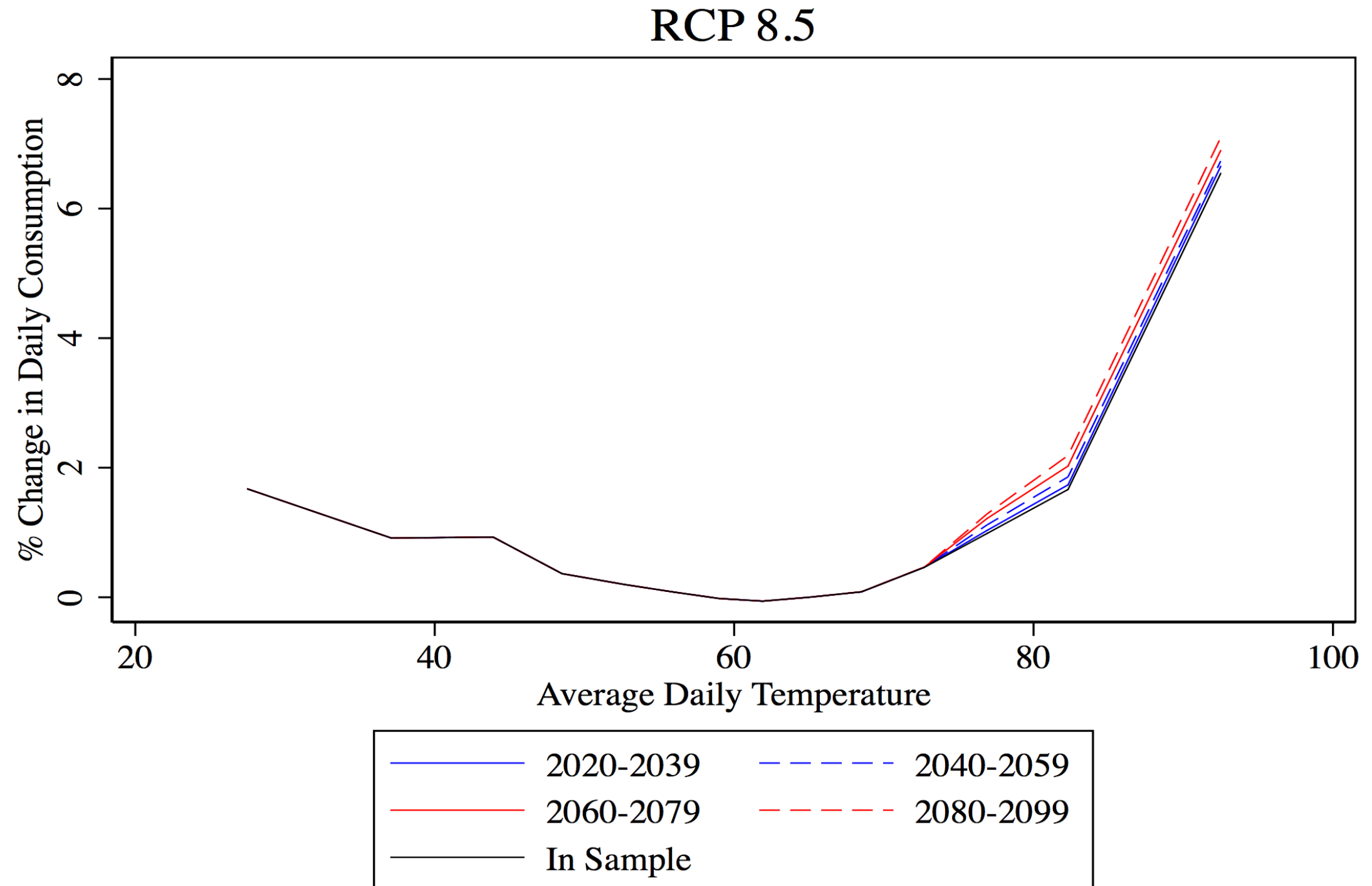


Not all CDDs are equal, AC adoption matters

Electricity
demand

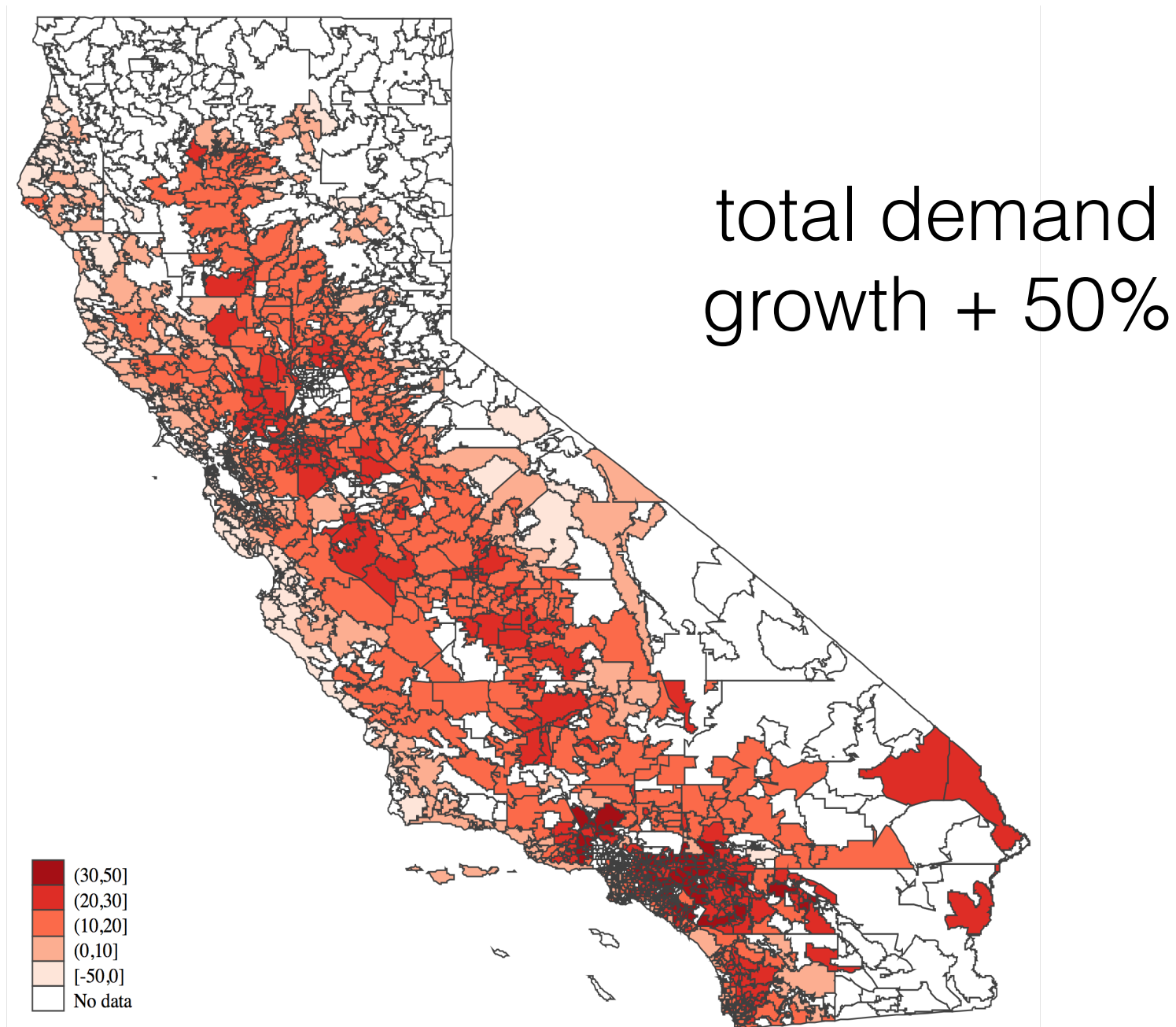


Warming will cause greater AC adoption



Warming will cause greater AC adoption

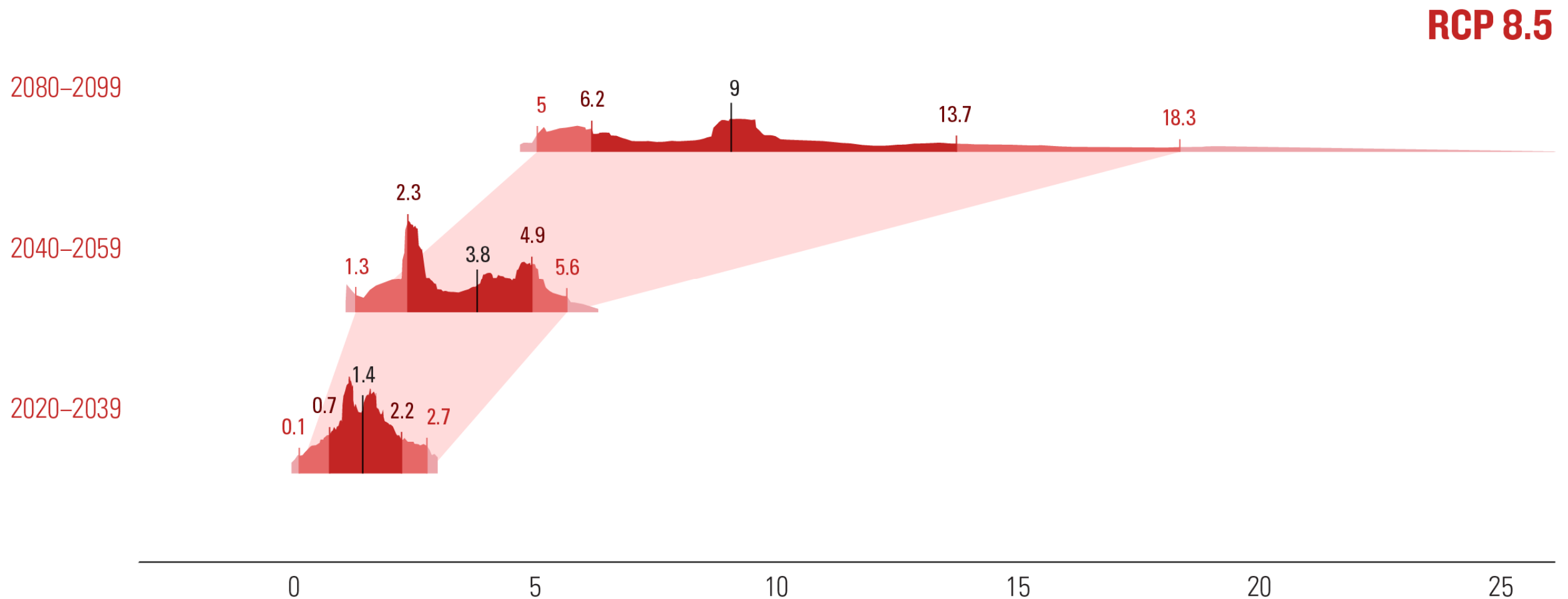
Figure 7: EXTENSIVE MARGIN ADJUSTMENT: PROJECTED PERCENT INCREASES IN AVERAGE HOUSEHOLD ELECTRICITY CONSUMPTION 2080-2099 OVER 2000-2015



Auffhammer (2015)

Probabilistic risk assessment for demand changes due to warming

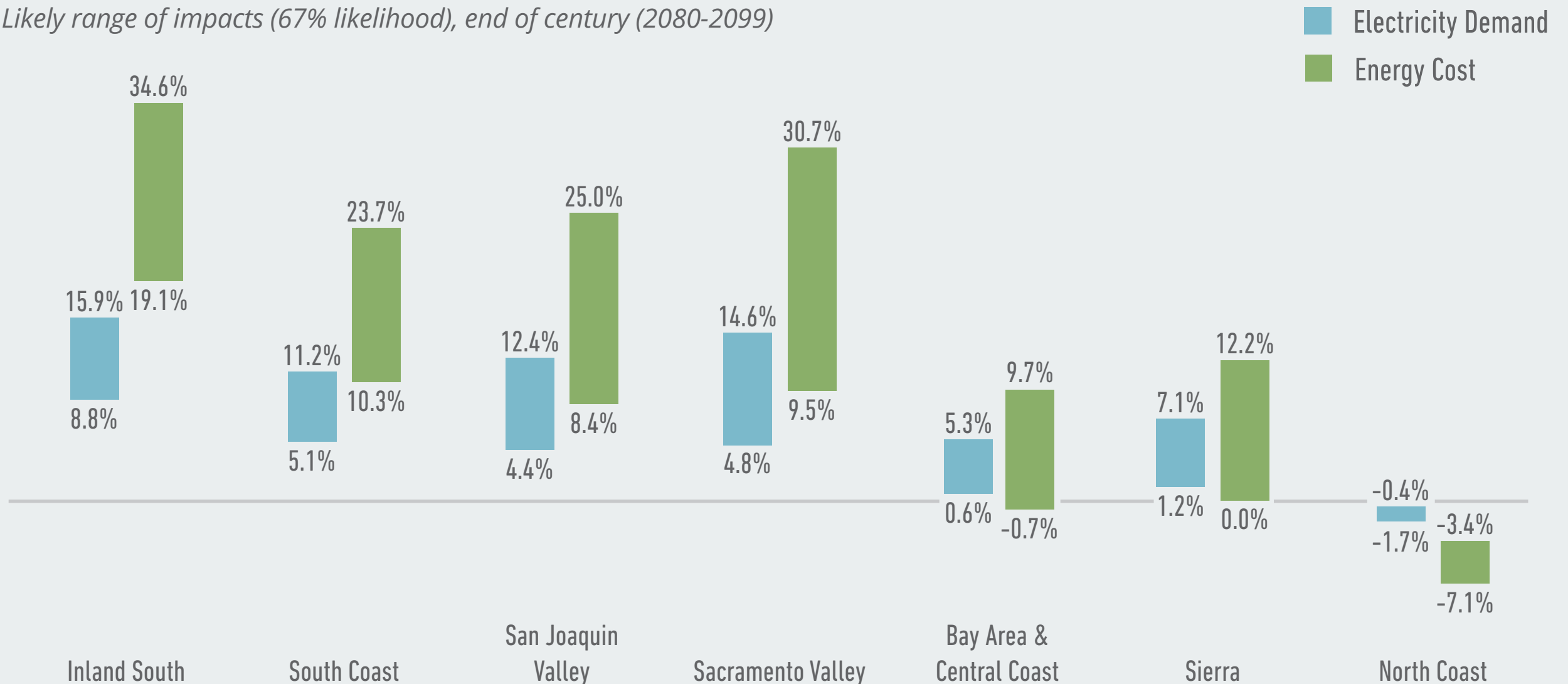
Figure 10.2: National Change in Electricity Demand
Percent



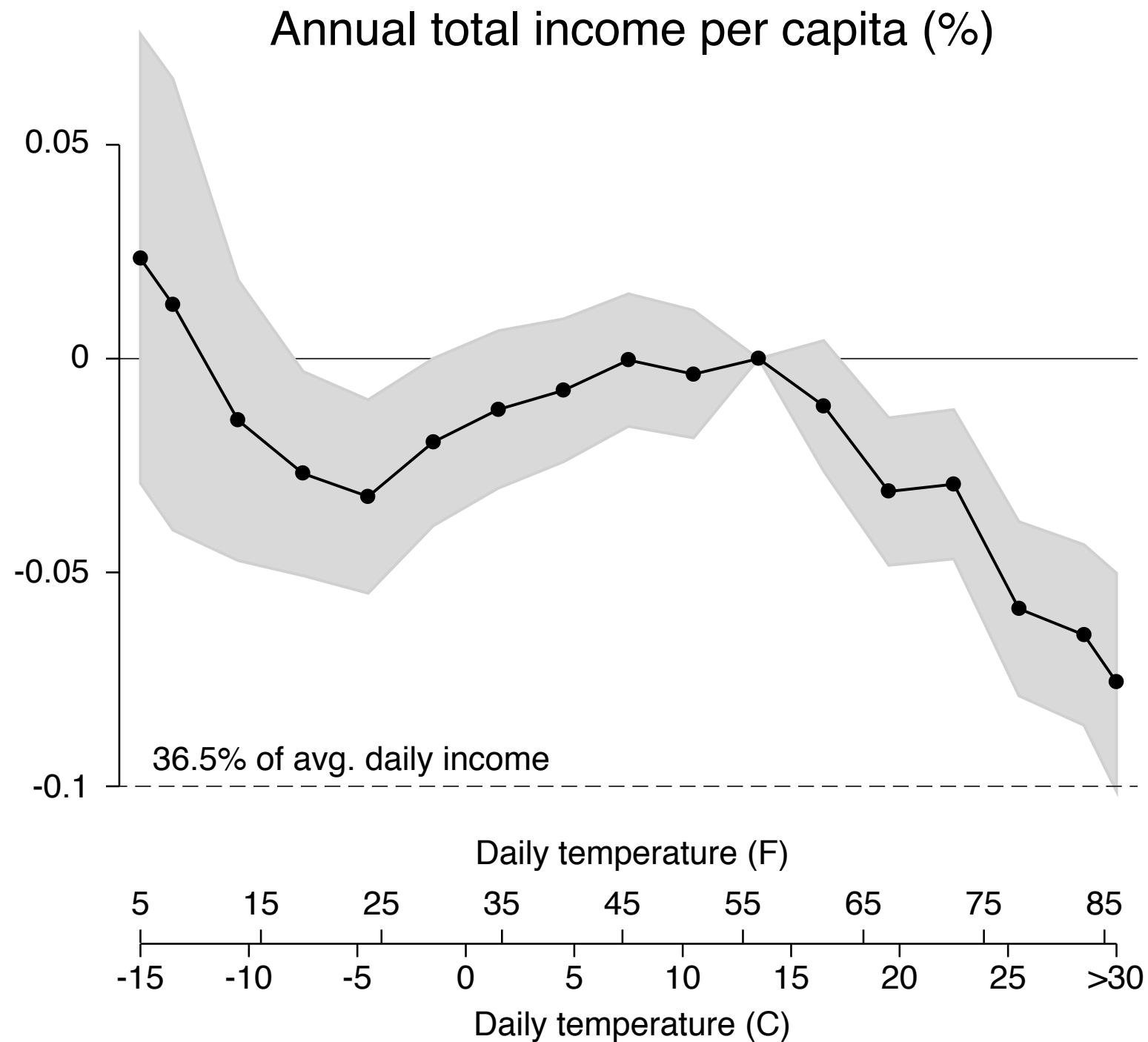
Probabilistic risk assessment for demand changes due to warming

Figure 6: Projected Change in Electricity Demand and Energy Costs by Region

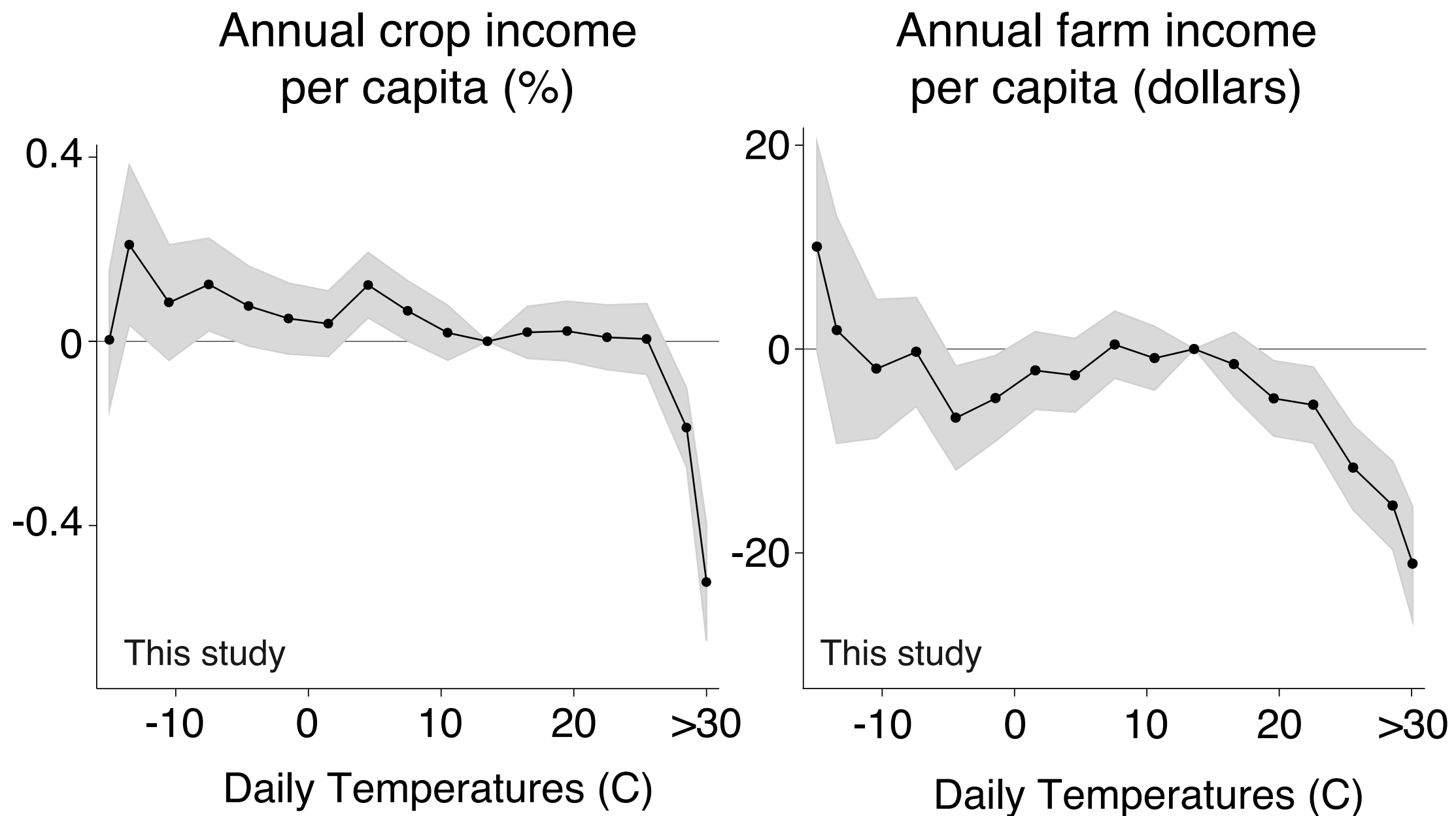
Likely range of impacts (67% likelihood), end of century (2080-2099)



Climate drives income drives energy use



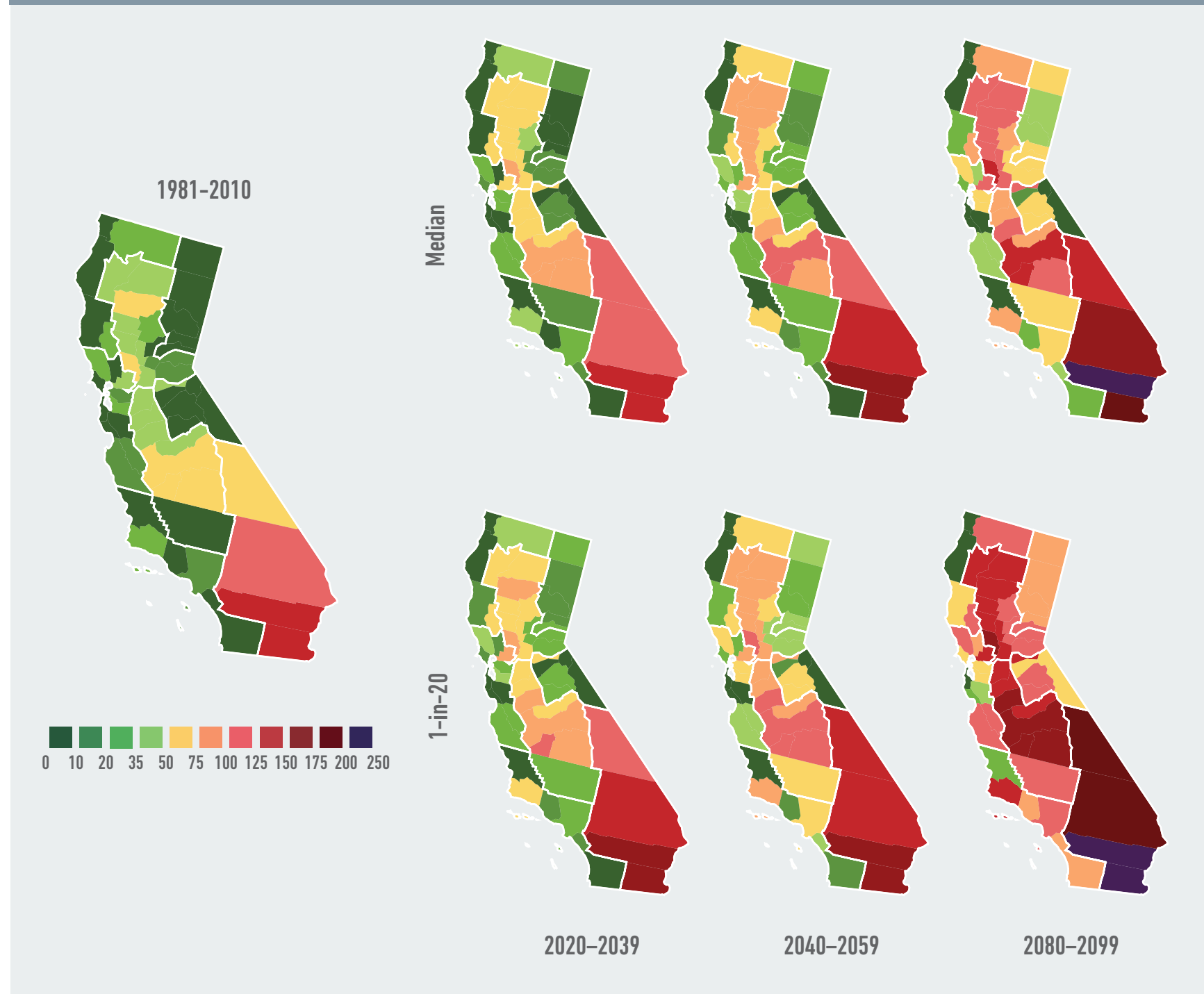
Climate drives agricultural income



Where will 40M more live?

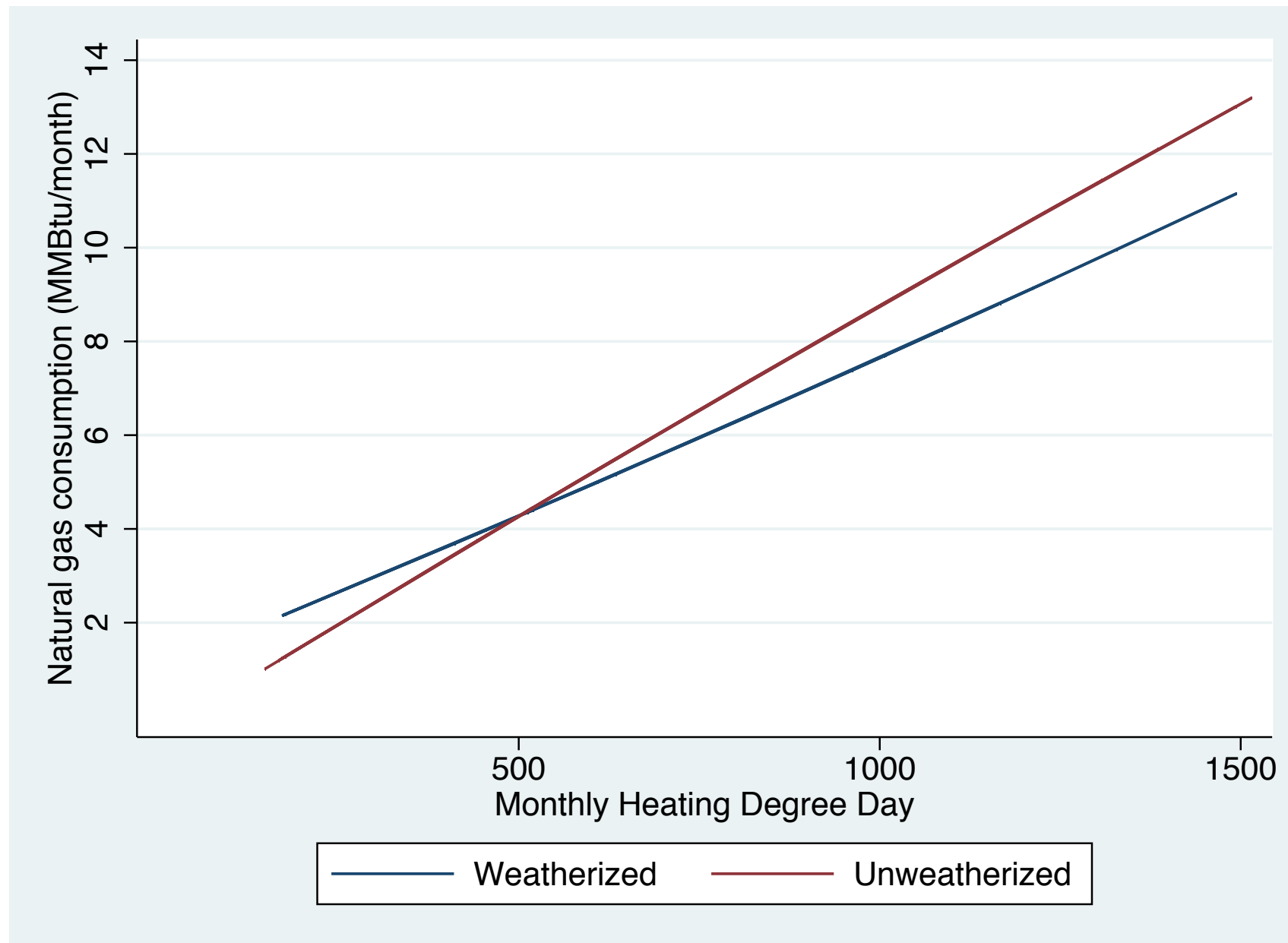
Housing, Jobs, and Population growth

Figure 2: Average Days Over 95°F

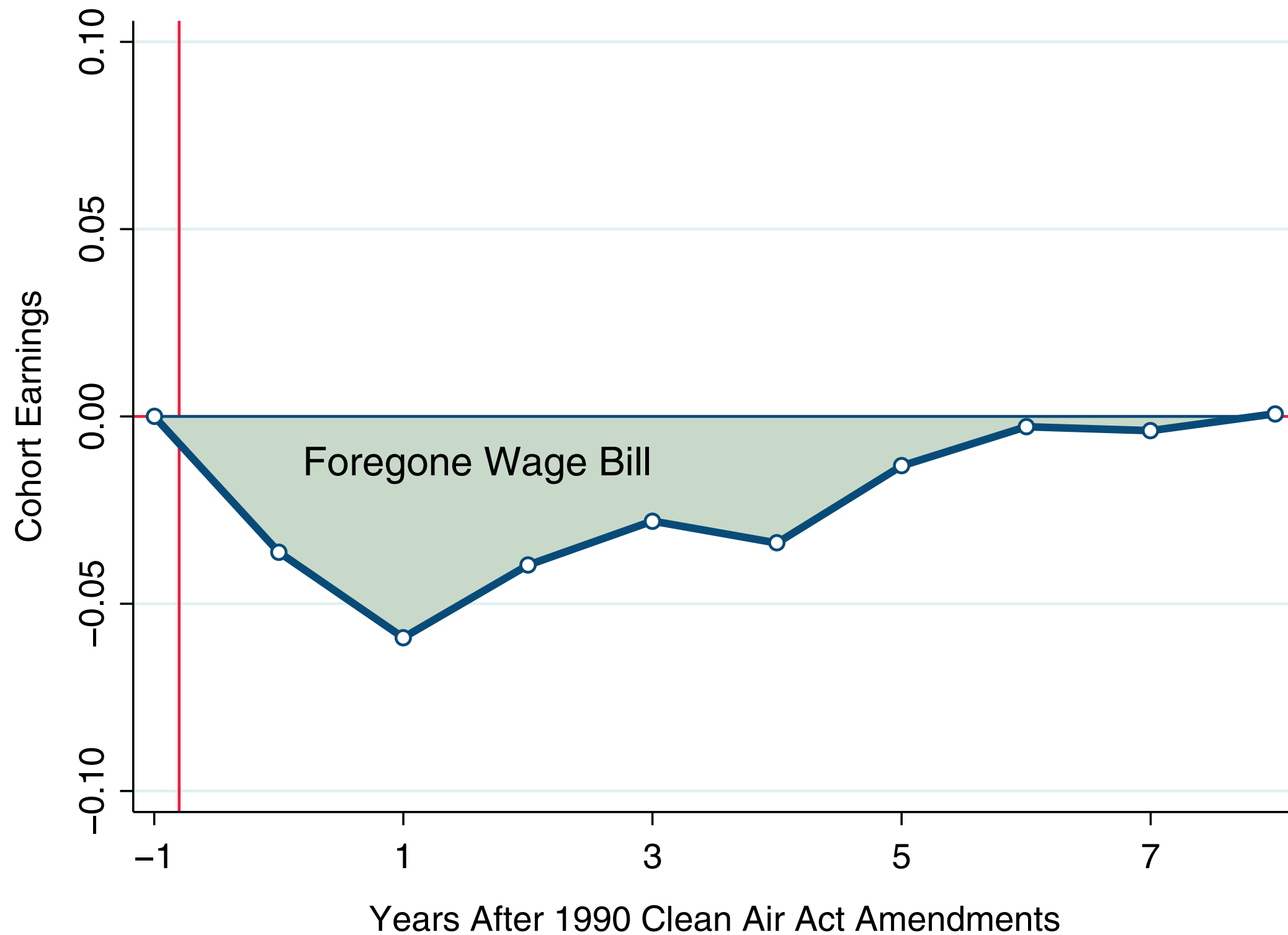


Evaluation of actual efficiency gains

Figure 4: Building energy performance at weatherized versus unweatherized homes

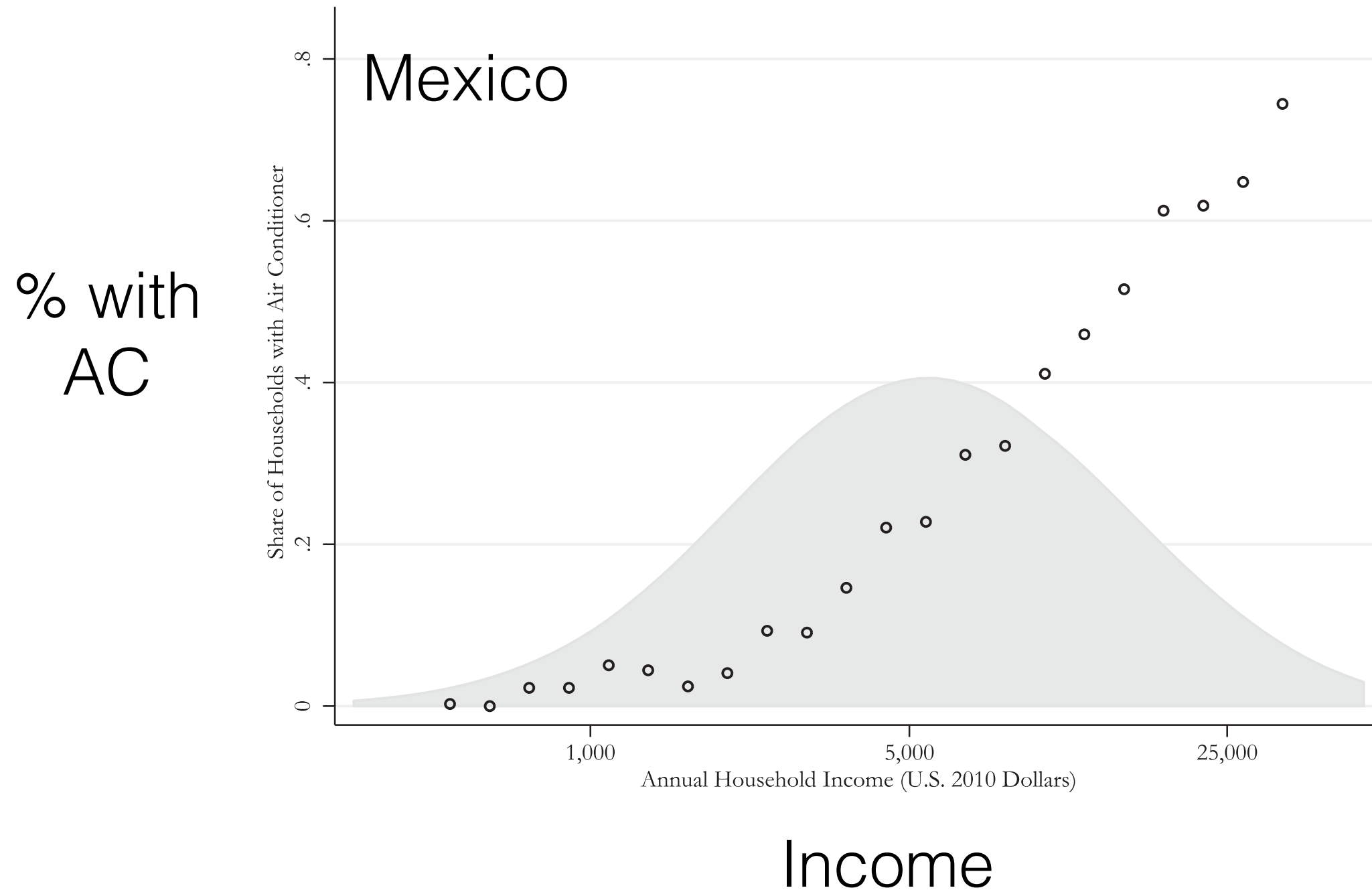


Accounting for transition costs



Walker (QJE, 2013)

Pursue innovation for export to emerging economies



What can empirical economics do for energy modeling in California?

- energy demand given capital (intensive margin)
- capital demand given climate (extensive margin)
- climate affects income affects energy demand
- population growth, migration & land markets
- measure actual efficiency gains
- identify transition costs of regulation
- identify opportunities for innovation (and its export)

Thank you

shsiang@berkeley.edu