

What Explains the Varying Cost of Highway Construction in the U.S.?

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This presentation draws from

“Infrastructure Costs”

and

“Can America Reduce Highway Construction Costs? Evidence from the States”

Can We Afford the Infrastructure We Want?

- California's high speed rail and Boston's Big Dig costly and highly publicized
 - outliers or
 - typical projects?
- US costs are multiples of European costs

Gordon and Schleicher, 2015; Barro, 2019

Can We Afford the Infrastructure We Want?

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 - outliers or
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Gordon and Schleicher, 2015; Barro, 2019

Systematic evidence on costs is quite limited.

Mehrotra et al, 2019; Swei and Gillen, 2020

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We look to the Interstate system

- Product relatively constant over time
- Observable over a long time
- With a per unit denominator: miles
- Large investment: \$504 billion 2016 dollars

Four Findings: Facts

1. The cost of a new US highway mile is increasing, 1956 to 1991
 - conditional on pre-determined cost drivers, tripled in real terms, 1960s to 1980s
 - increases concentrated after 1970
2. There is substantial cross-state variation in spending
 - If above-median states capped spending at median, system would have cost 40% less

Four Findings: Why?

Suggestive evidence

3. Cross-state variation in Interstate spending notably higher than that for other public spending
4. Spending increases over time track with greater ancillary highway investment and greater citizen empowerment and concern

Context for Spending Growth

States Have Great Flexibility in Interstate Spending Choices

- 1956 Federal-Aid Highway Act provides interstate funding
 - Plans a 41,000 mile system
 - Virtually all funding limited to initially determined routes
 - Feds pay 90%, states pay 10%
 - Similar federal standards for construction in all states and time
- Construction largely complete by 1993

States Have Great Flexibility in Interstate Spending Choices

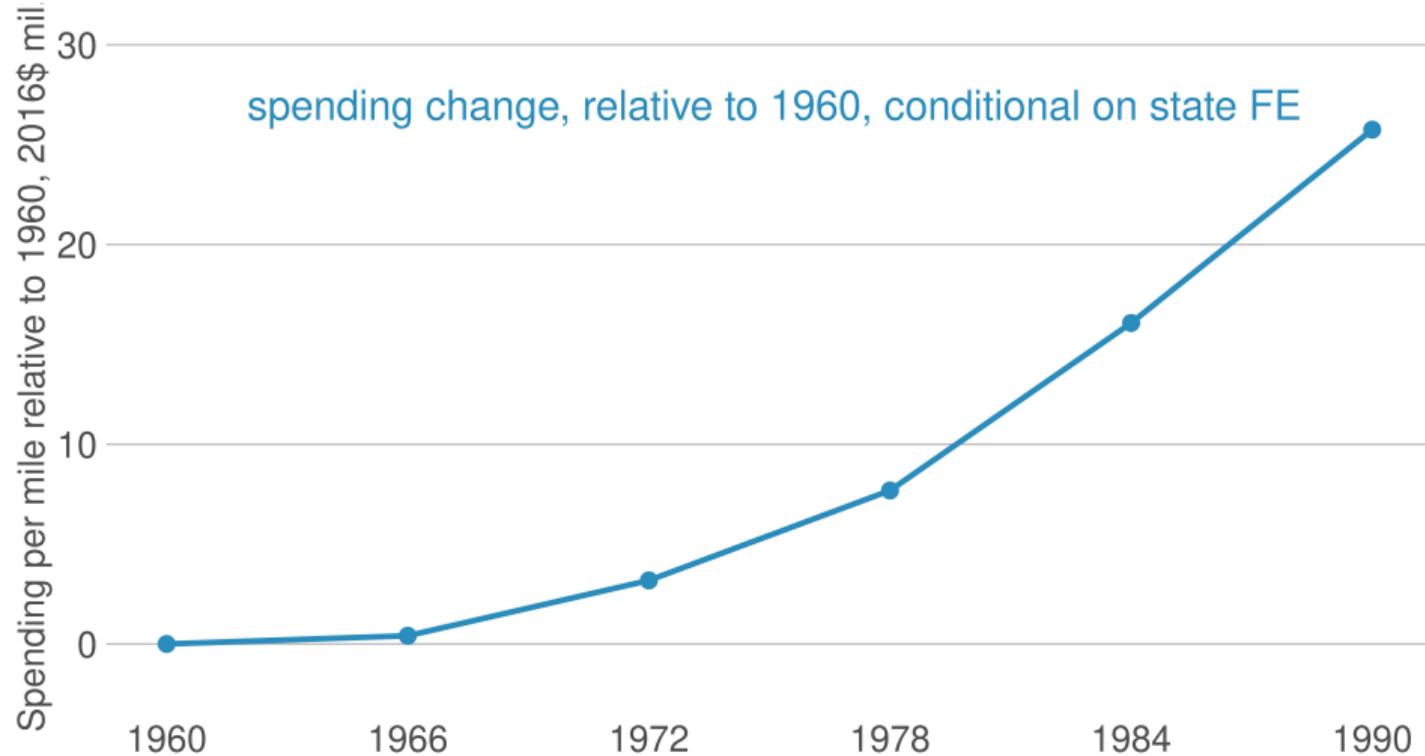
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System is relatively fixed → States choose how much to spend, not how many miles to build

Finding 1: Per Mile Spending Increases Over Time,
Inflection Point c. 1970

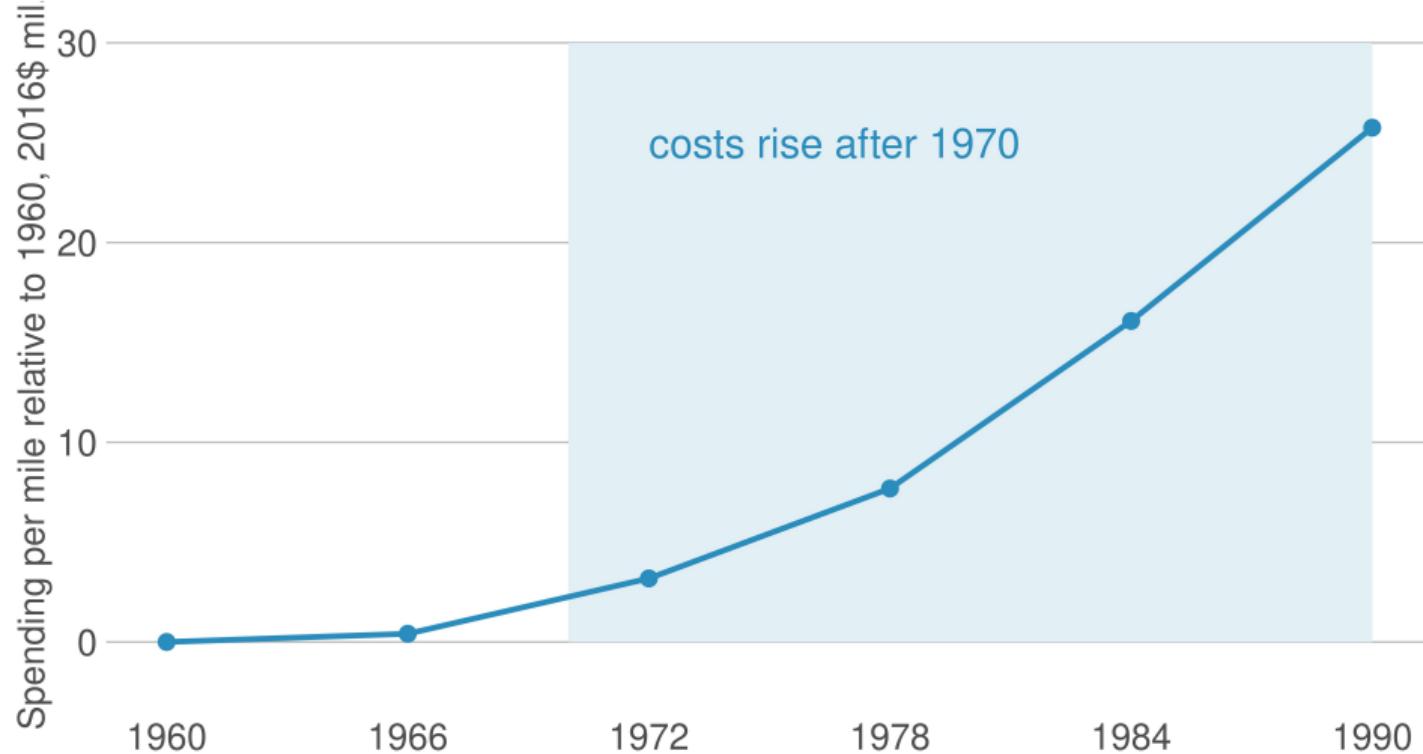
Interstate Spending on the Rise

Year Fixed Effects: Regression of State Spending on State and Year Effects



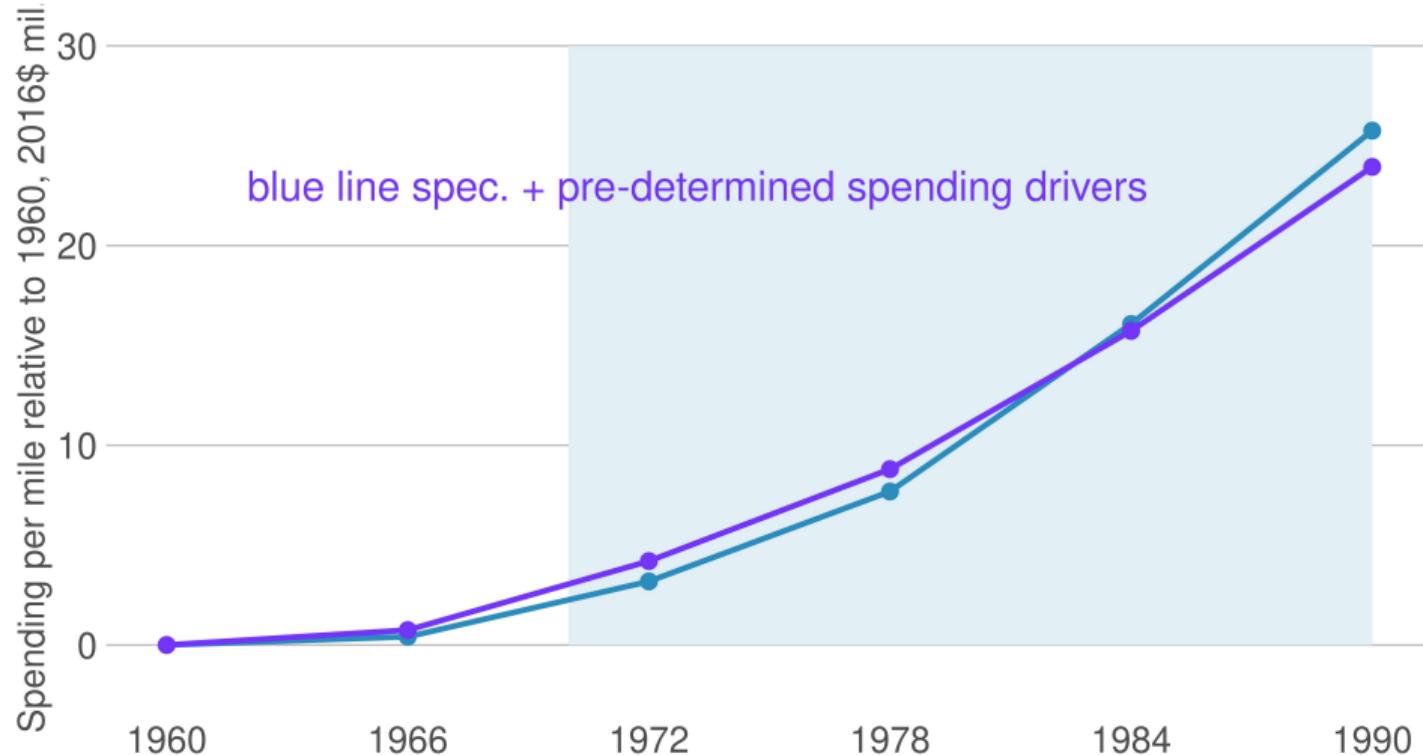
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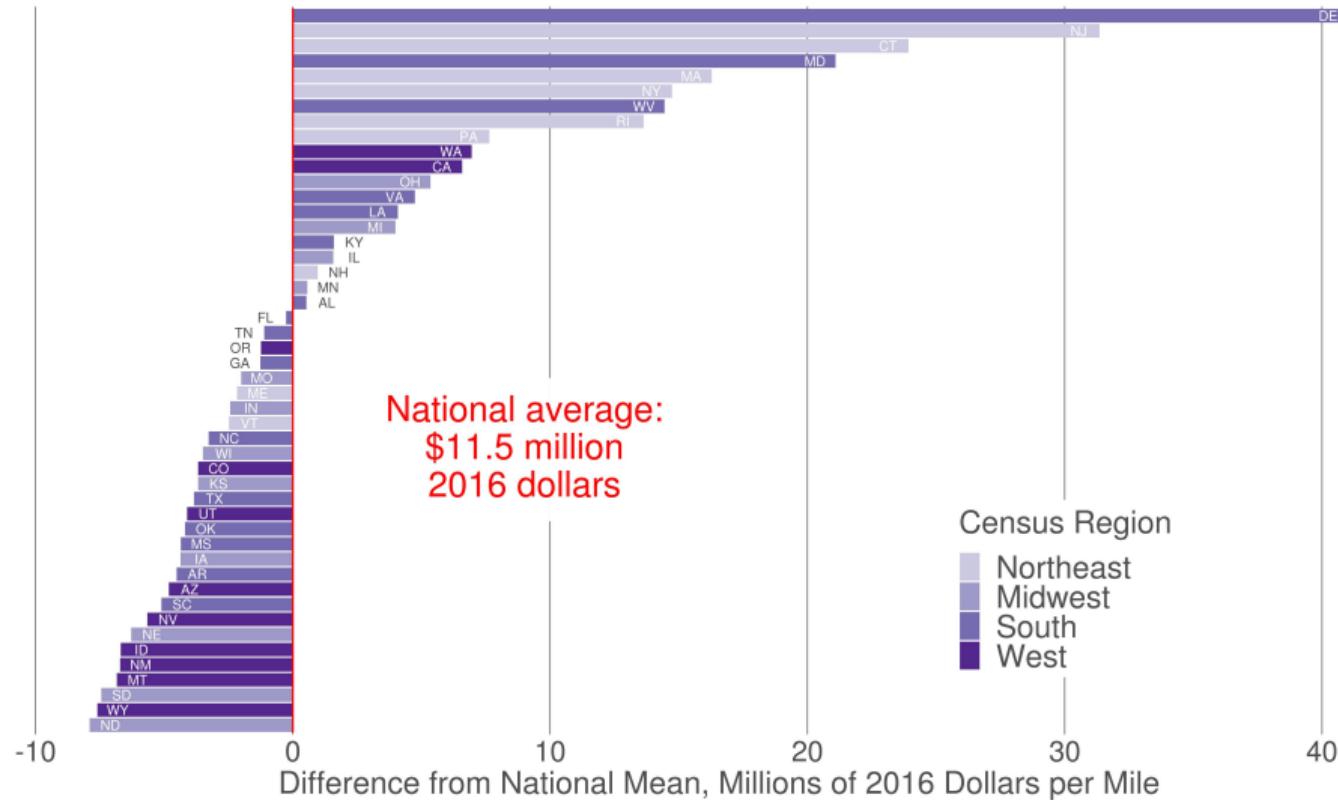
Spending: Conditional on Pre-Determined Geographic Covariates

With Controls for Population Density, Share in Water and Wetlands, and Slope



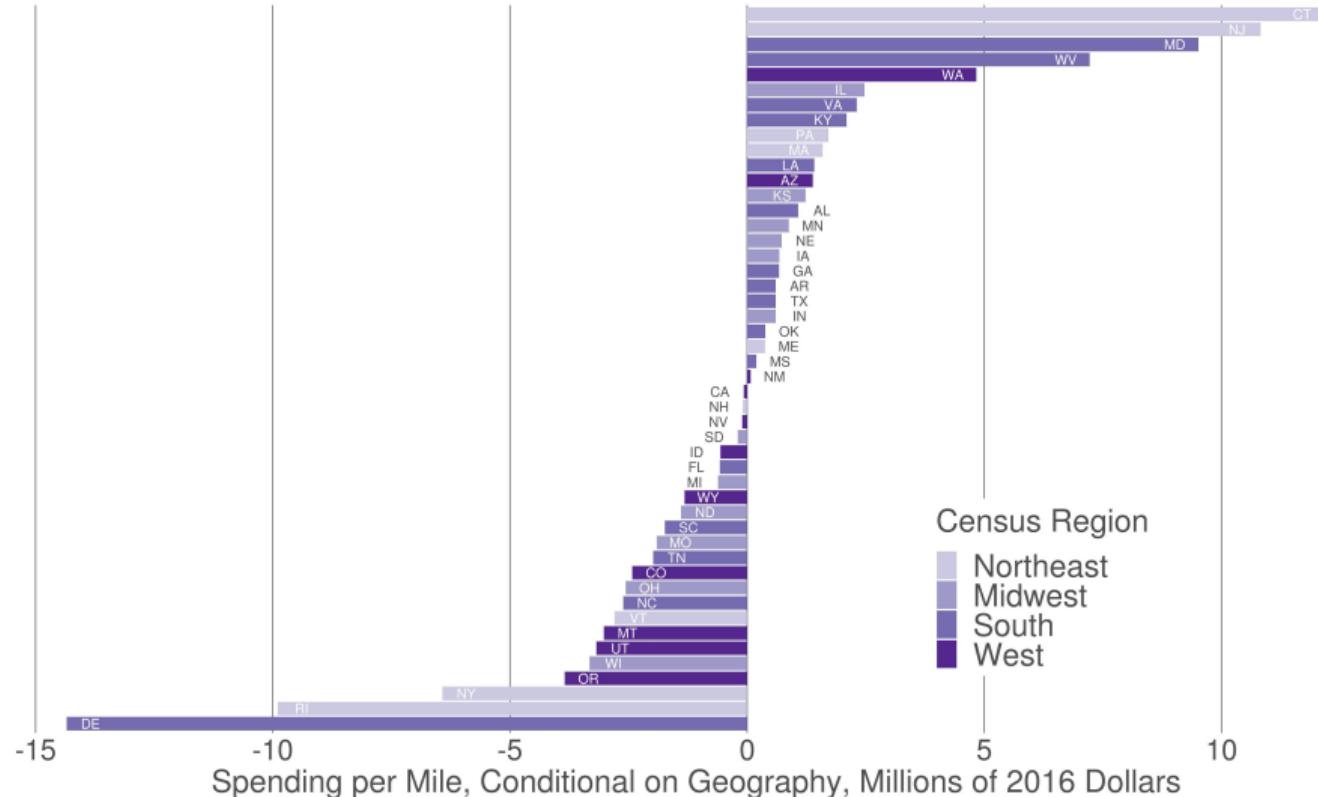
Finding 2: Substantial cross-state variation in spending

Interstate Spending per Mile by State, 1956 to 1993



Variance Meaningful Conditional on Geographic Covariates

Interstate Spending per Mile, 1956 to 1993, Conditional on Pre-Existing Geographic Cost Determinants



What Drives These Cost Patterns?

What Could Drive Cost Increase and Cross-State Variation?

1. Labor costs
2. Materials costs
3. Technical features
 - design standards
 - type and location of projects
4. Bidding and procurement
 - procurement institutions
 - market concentration in construction
4. Regulatory environment
 - environmental regulation
 - litigation threat
 - eminent domain costs
5. Political institutions
 - jurisdictional fragmentation
 - common or civil law
6. Project management
 - management quality
 - economies of scale

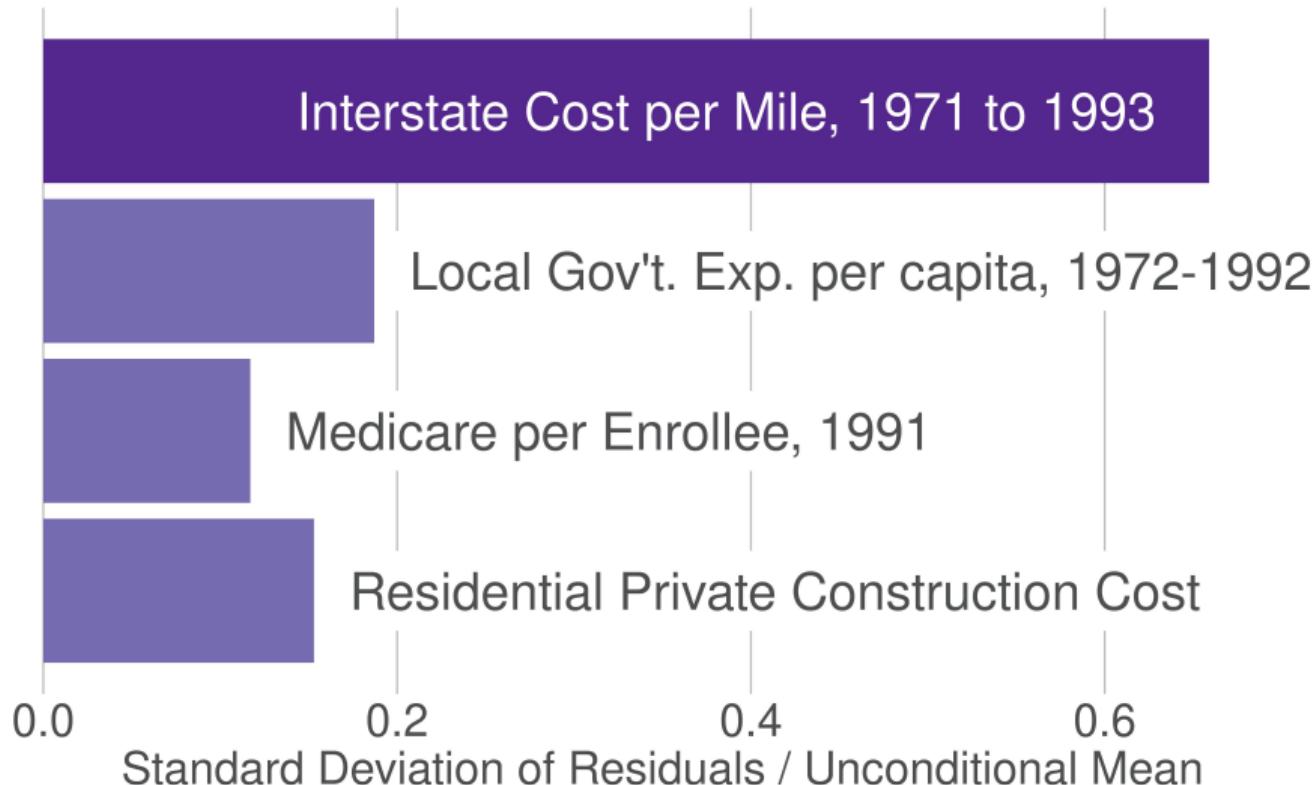
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Finding 3: Cross-state Variation in Spending Exceeds
Other Public Spending

Conditional Variation in Interstate Spending Large

Std. Dev. of Residuals Divided by Mean, 1971-1993



Finding 4: Timing of Increase Tracks with Heightened
Citizen Empowerment and Concern

Statistically, Income and Home Price Explain Increase in Spending

- Conditional on state income and home price measures, we see no increase in Interstate spending per capita
- In other words, as people become wealthier **after 1970**, they purchase “more” highways
- What makes a highway “more”?
 - ramps to enter and exit
 - depressed highways to preserve above-ground features
 - noise walls

But is this increase in demand the whole story? Why only after 1970?

Additional Explanation: Citizen Voice

- In the late 1960s and early 1970s
- Rise of institutions that allow for greater citizen voice in government
- An amalgam of the environmental movement, civil rights movement, and growing homeowner organization
- Plus changes in judicial doctrine and statute that give citizens more tools to challenge government decisions

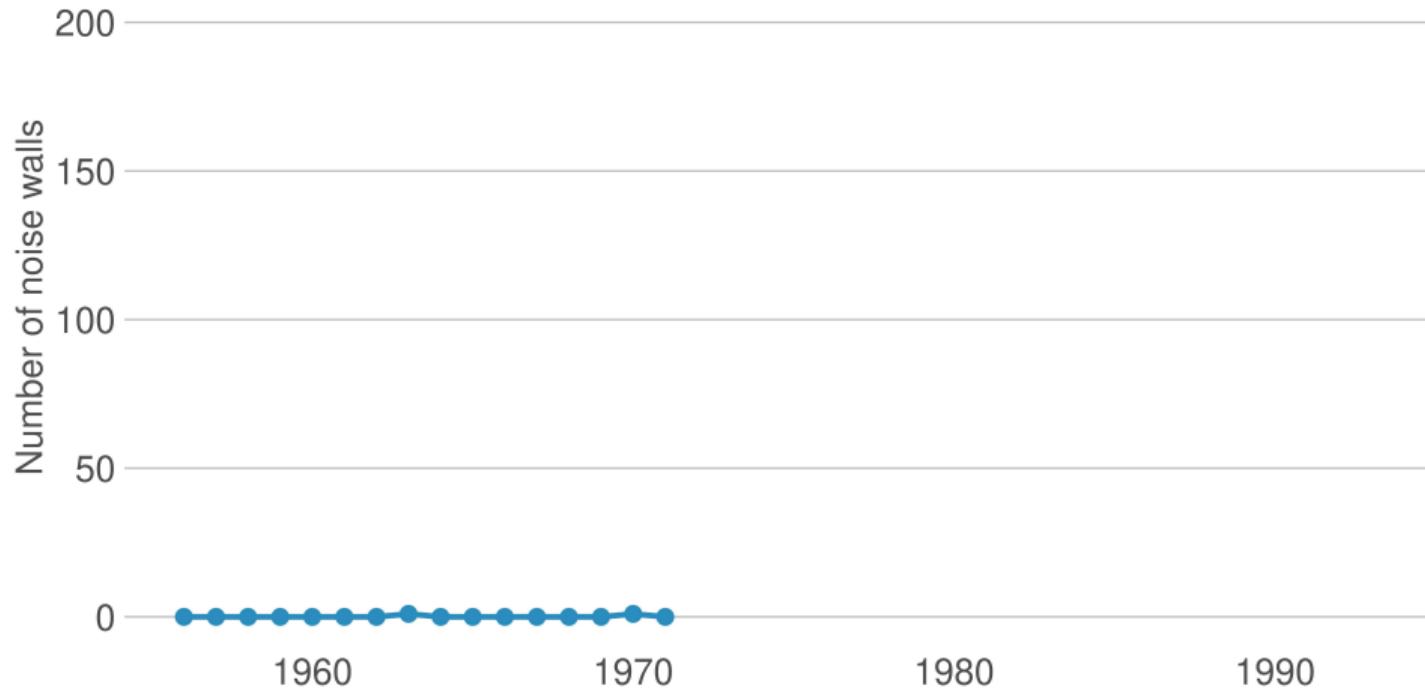
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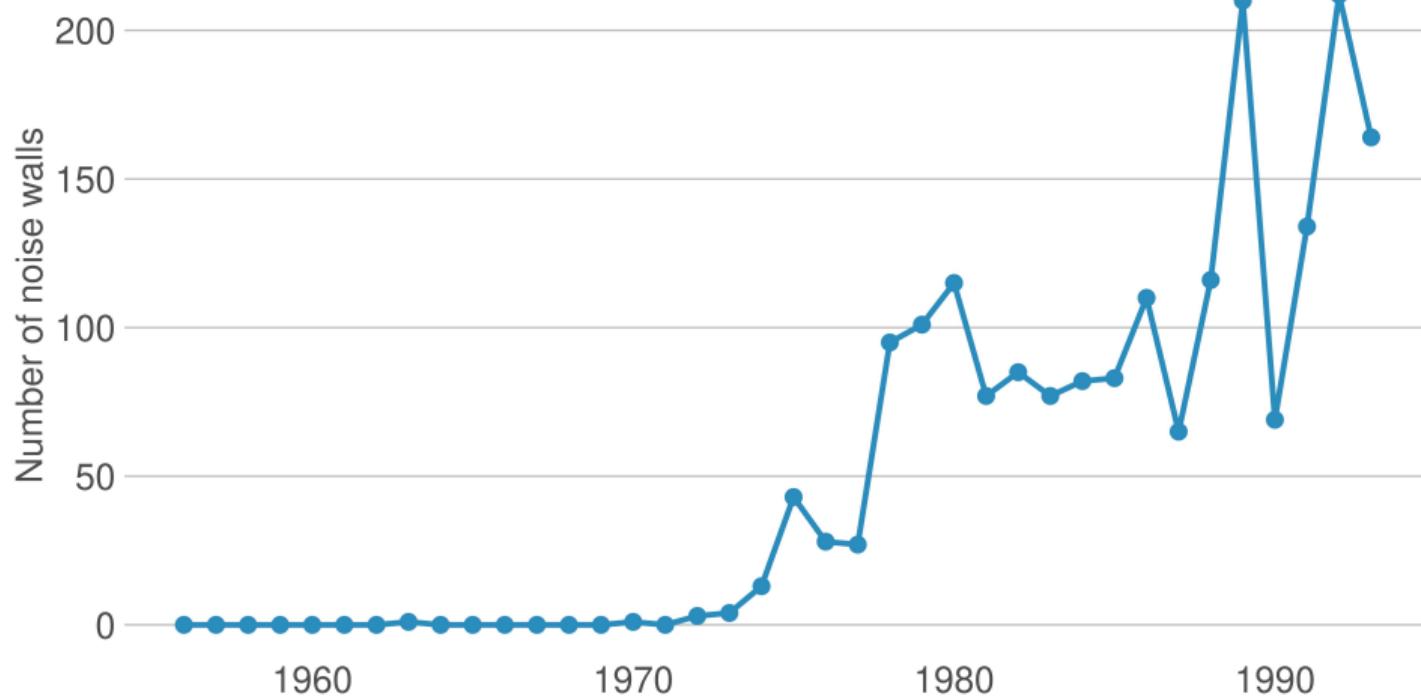
Two pieces of evidence here – more in the paper

- Evidence of citizen accommodation: noise walls
- Evidence of politician attention: Congressional speech

We Built No Noise Walls Before 1970

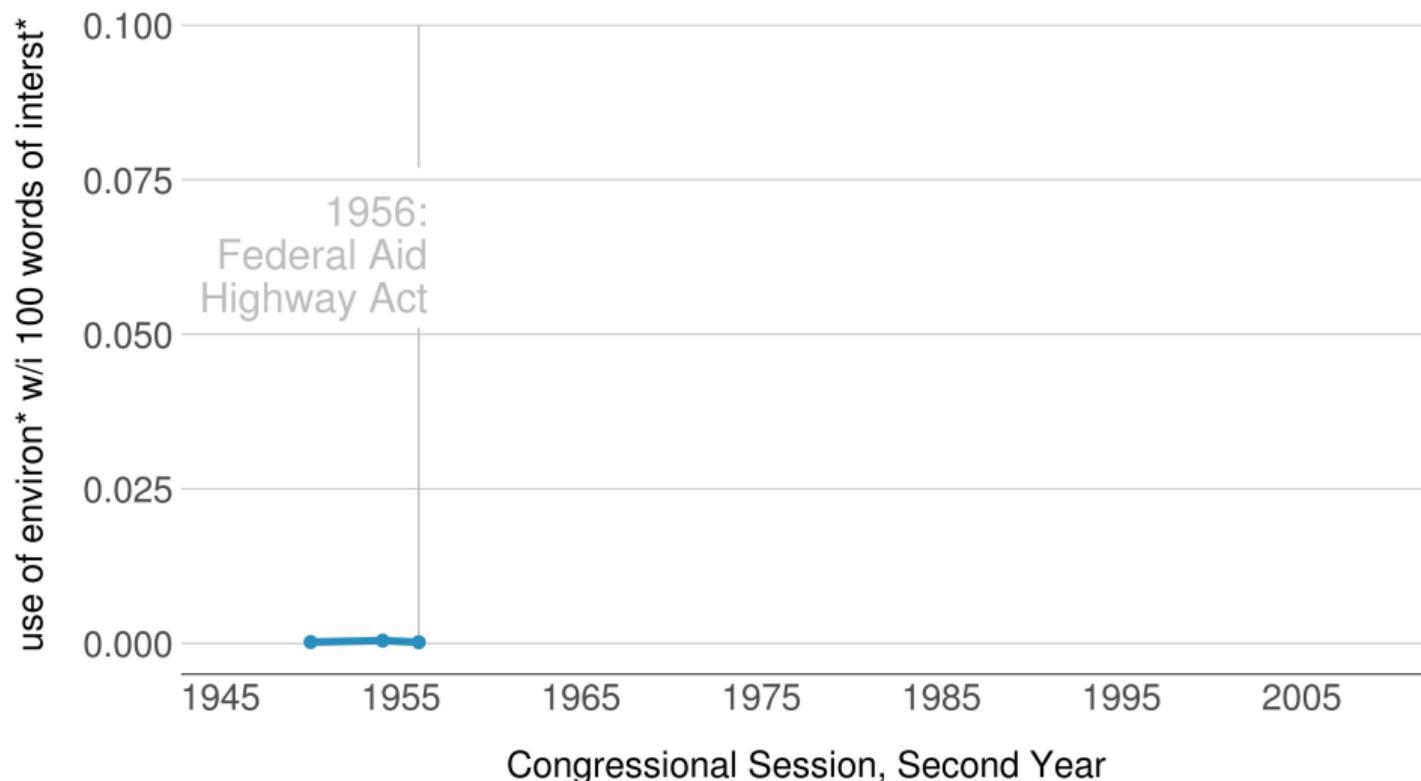


Noise Walls Are Children of the 1970s



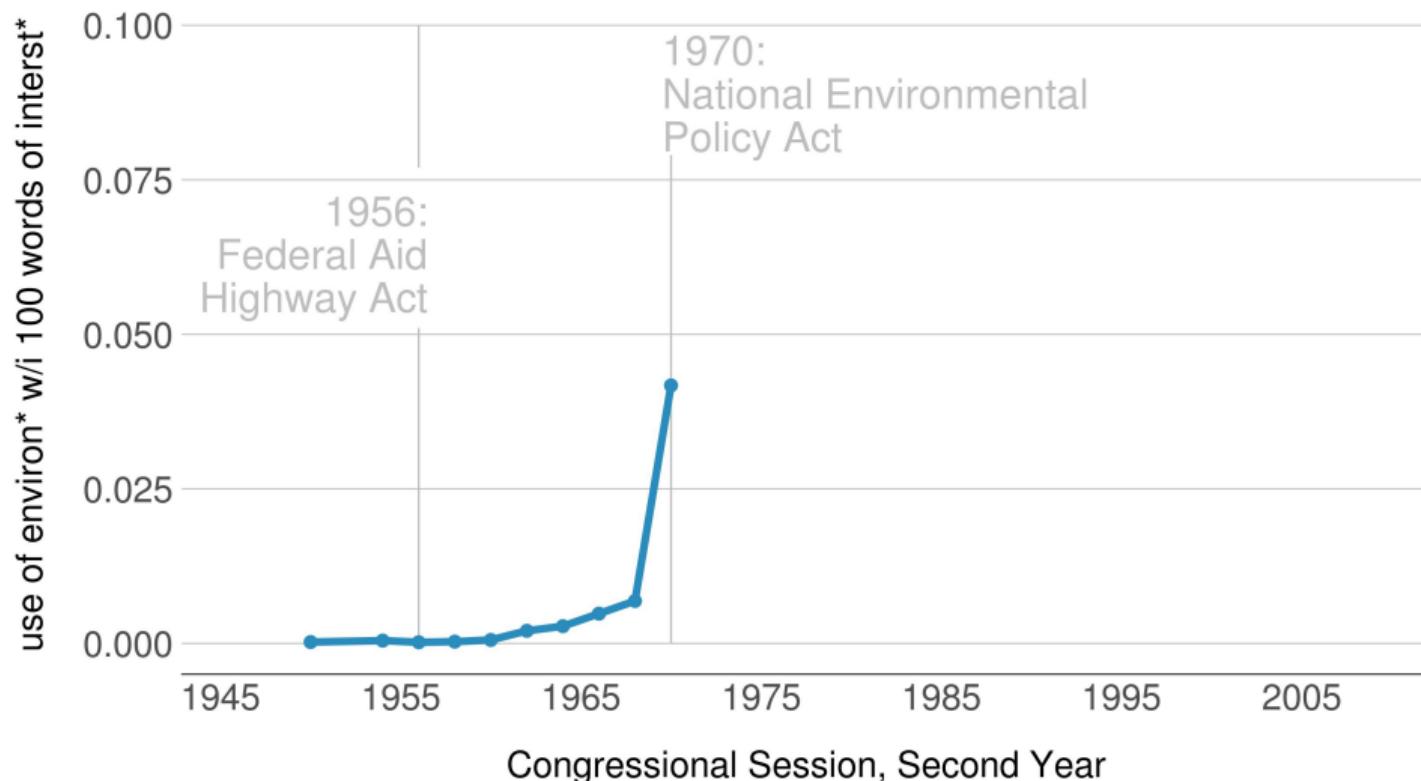
1950s: Politicians Rarely Use “Environment” near “Interstate”

Times Stem “Environ” Appears within 100 Words of “Interst” Divided by Number of “Interst”



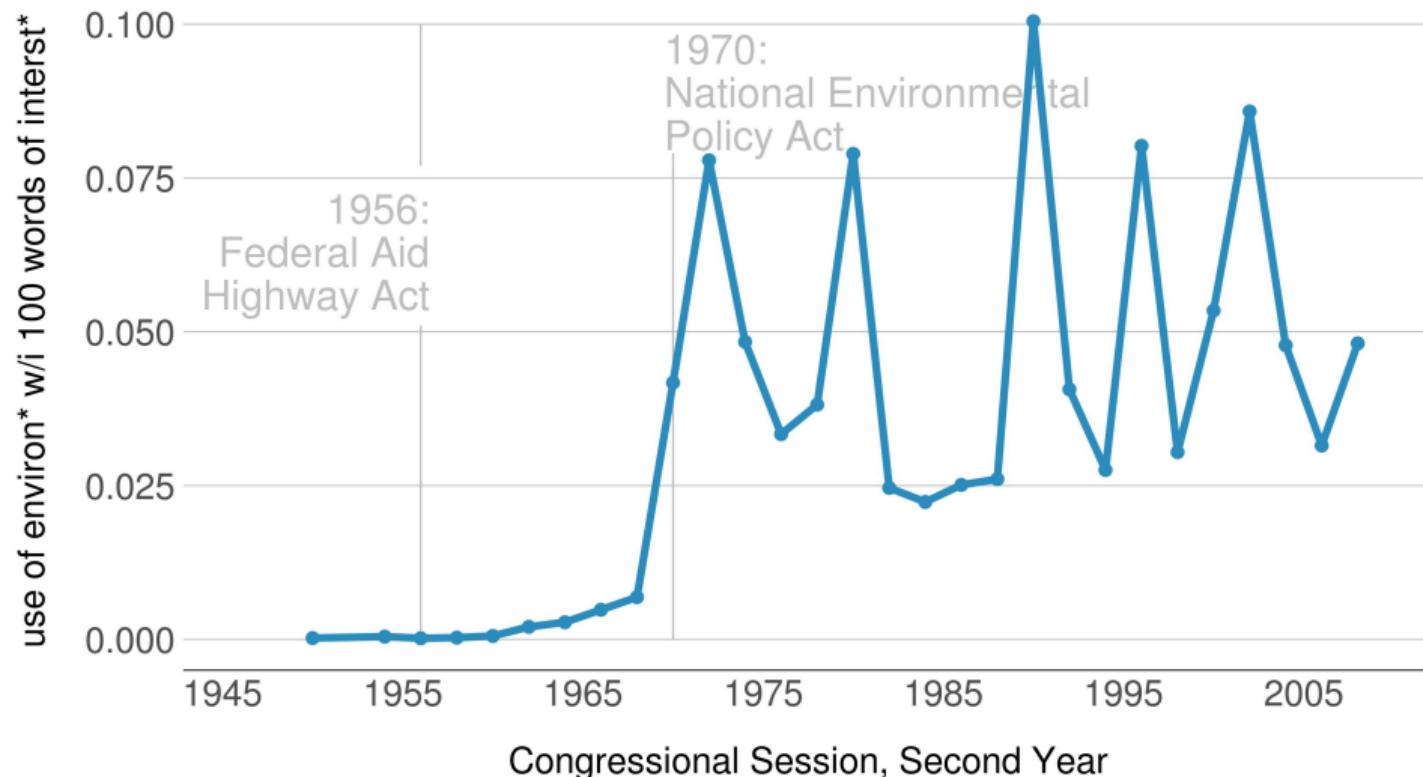
With Passage of Nat'l Envir. Policy Act, Usage is Heightened

Times Stem "Environ" Appears within 100 Words of "Interst" Divided by Number of "Interst"



Discussion Remains Permanently Elevated

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- due in part to the increasing ability of citizens to moderate government behavior
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Cost drivers are critical:

More infrastructure hinges on the ability to produce it affordably