

Growth Under the Shadow of Expropriation? The Economic Impacts of Eminent Domain

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Outline

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- Motivation/Relevance
- Conceptual Framework
- Background
- Data

② Estimation

- Intuition
- Framework

③ Impact of Eminent Domain

- First Stage
- Growth
- Discussion
- Racial Inequality and Displacement
- Mechanisms
- Regulatory Takings

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Introduction

Broad literature Long-run consequences of institutions on

- Growth (Acemoglu, Johnson, Robinson 2001)
- Inequality (Dell 2010)
- Rule of law (Lopez de Silanes, La Porta, Shleifer, Vishny 1998)
 - Cross-country empirics attribute 30% greater stock-market-to-GDP ratio, stronger property rights to common law as opposed to civil law regimes
 - Suggests that aspects of common law can have important effects on economic outcomes
 - This paper examines the impact of one aspect of rule of law, namely property law, on growth and inequality

Property Law

Question: Is state seizure of a citizen's private property justified?

- Economists and philosophers have long speculated whether a society that fails to protect property rights against legislative restriction fails to support the rule of law (Locke, Waldron)
- India and China – deadly riots have followed government acquisitions of land on behalf of commercial developers



Figure 1: Indian government plans to confiscate farmland for a toll road to the Taj Mahal.

Property Law

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- Economists and philosophers have long speculated whether a society that fails to protect property rights against legislative restriction fails to support the rule of law (Locke, Waldron)
- Former Soviet bloc – Legislation allowing governments to take land for the establishment of private industrial parks is pending



Figure 2: Removing urban blight is one oft-stated goal of eminent domain

Role of Government Expropriation



Figure 3: Subjective valuation exceeds objective valuation

- Eminent domain (United States), compulsory purchase (United Kingdom, New Zealand, Ireland), resumption / compulsory acquisition (Australia), expropriation (South Africa and Canada)

Impact of Government Expropriation



Figure 4: Development induced-displacement is a subset of forced migration.

- Government has taken land from est. 40 million households, many of whom have been under-compensated and remain politically restless, landless, and unemployed (Cao et al. 2008)

Research Question

Research question

“What is the impact of government power to expropriate?”

- Eminent domain or to what extent government should have the right to expropriate and at what compensation is an open question in development economics, macroeconomics, urban economics, economic history, and constitutional law.
 - In the U.S., *Charles River Bridge* case of 1837 represents a watershed moment in economic history
 - Massachusetts government granted exclusive property rights to private investors to bridge traffic across Charles River
 - then revoked by building a free bridge nearby
 - touching off a dispute in which each side claimed to generate the socially optimal outcome

Motivation

- Eminent domain could spur economic growth through public goods provision, blight removal, and commercial development (*Kelo v. City of New London*, 545 U.S. 469 (2005))
 - Hold-up problem: coordination breakdowns between numerous property right owners frequently stymie socially optimal outcomes (Buchanan and Yoon 2000) (Roback 1982, Collins and Shester 2011)
- Revenue-seeking governments to collude with private developers (Byrne 2005) at the expense of disadvantaged groups (see Justices O'Connor's and Thomas's dissents in *Kelo* – “Reverse Robin Hood”)
 - City of New London took land for Pfizer
 - Allowed government transfer of land from a private owner to another

Motivation



Figure 5: Didden v. Village of Port Chester (2006)

- Landowners are undercompensated (Munch 1986, Chang 2010)
- Bart Didden: “the village’s use of eminent domain for development has left owners hesitant to improve their properties.”
- Power of eminent domain reduces investment incentives (Kaplow 1986, Epstein 2008)

What we do

- Data limitations have made it practically impossible to study the causal effects of eminent domain
 - Eminent domain is rarely randomly exercised
 - Few centralized data sources document condemnation
- We sidestep these issues by focusing on court-made laws that make it harder or easier for subsequent government actors to take
 - We study the U.S. because of its
 - common law system
 - random assignment of judges
 - appellate courts with regional jurisdiction

What we do

- We show how data collection from appellate and district courts, combined with the effective random assignment of U.S. federal judges, allows estimating two separate parameters of policy interest
 - Counterfactual is the opposite precedent
 - Counterfactual is no precedent
- We collect comprehensive data on U.S. judicial biographies to implement a sparse model for estimating treatment effects with high dimensional instruments (Belloni, Chen, Chernozhukov, and Hansen 2012)

What we do

- The signs of the effects of eminent domain laws on subsequent economic outcomes are ex ante theoretically ambiguous
 - We embed prominent set of theories in a model whose reduced form predictions isolate the channel through which government takings have their effects
 - “Competing models” with random assignment in the field (Card, DellaVigna, Malmendier 2011)
 - Law and Economics – “moral hazard”
 - Because of the just compensation clause, property owners are over-insured: do not pay the insurance premium on the insurance they receive in the event of a taking (Blume, Rubinfeld, and Shapiro 1984, Cooter 1985, Kaplow 1986)
 - Law and Development – “insecure property rights”
 - If the government compensates too little, then the landowner receives less return on his investment, leading to under-investment (Besley 1995, Banerjee, Gertler, and Ghatak 2002, Field 2005, Hornbeck 2010)
 - Economic Growth – “public use”
 - Expropriability of capital / Extractive capacity leads to growth (Aguar and Amador 2011, Mayshar, Moav, and Neeman 2012, Acemoglu, Garcia-Jimeno, and Robinson 2014)

What we do

- Check our model is consistent with predictions of models in the literature
- Explore how closely our research setting emulates a randomized control trial (Lee 2008) and dynamic treatment design
 - Omitted variables and reverse causality
 - Displacement (SUTVA violation)
 - Impulse response function
- Assess the concerns levied against RCTs (Deaton 2010), whether
 - Exclusion restriction is likely to hold
 - LATE interpretation of IV estimates are policy relevant
 - General equilibrium effects are incorporated

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Conceptual Framework

- Landowner
- I – investment by landowner
- $V(I)$ – book value from investment
- $C = C(I)$ – government compensation policy
- Factors include book value (appraisal price of the property).
- Factors include market demand; proximity to areas already developed in a compatible manner with the intended use; economic development in the area; *specific plans of businesses and individuals*; actions already taken to develop land for that use; scarcity of land for that use; negotiations with buyers; absence of offers to buy property; and the *use of the property* at the time of the taking. (60 Am. Jur. Trials 447).
- $C_I(I) > 0$ and $C_{II}(I) < 0$

Optimal Takings

First-Best world without takings

$$\max_I V(I) - I \quad \text{i.e.,} \quad V'(I) = 1$$

Second-Best world with takings

$$\max_I (1 - \pi_p) V(I) - I, \text{ i.e., } V'(I) = \frac{1}{(1 - \pi_p)} > 1$$

Landowner decision

$$\begin{aligned} \max_I ER &= \max_I \{ (1 - \pi_p) V(I) + \pi_p C(I) - I \} \\ \text{i.e., } V'(I) &= \frac{1 - \pi_p C_I(I)}{1 - \pi_p} < \frac{1}{1 - \pi_p} \end{aligned}$$

- Ignore any direct impact of public use on growth to isolate the channel through which eminent domain has its effects

Optimal Takings

First-Best world without takings

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Second-Best world with takings

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- Any positive compensation increasing with investment acts as insurance for takings risk, leading to over-investment

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- Second-Best takes probability of takings fixed. We have variation in takings risk so, we use first best as benchmark.

Optimal Takings

First-Best world without takings

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Second-Best world with takings

$$\max_I (1 - \pi_p) V(I) - I, \quad \text{i.e.,} \quad V'(I) = \frac{1}{(1 - \pi_p)} > 1$$

Landowner decision

$$\max_I ER = \max_I \{ (1 - \pi_p) V(I) + \pi_p C(I) - I \}$$

$$\text{i.e.,} \quad V'(I) = \frac{1 - \pi_p C_I(I)}{1 - \pi_p} < 1$$

- Unless $C' = 1$, greater takings risk leads to lower growth unless public use benefits counteract.

Estimation

- Neither investment nor its marginal returns are observable,
- but investment affects property prices, which are observable.
- Aggregate investment affects local GDP and employment.
- Overinvestment decreases growth (Green 2003).

Estimation

Landowner decision

Landowner perceives the probability π of government action:

$$\max_I ER = \max_I \{ (1 - \pi)(V(I) - I) + \pi[(1 - \pi_p)V(I) + \pi_p C(I) - \pi_r L - I] \}$$

$$\text{i.e., } V'(I) = \frac{1 - \pi\pi_p C_I(I)}{1 - \pi\pi_p}$$

- Total Derivative: $dl = \frac{V'(I) - C_I(I)}{(1 - \pi\pi_p)V''(I) + \pi\pi_p C_{II}(I)} (\pi_p d\pi + \pi d\pi_p)$
 - When $C' = 1 = V'$, investment, property prices, GDP should be independent of probabilities, i.e., $\frac{dl}{d\pi} = \frac{dl}{d\pi_p} = 0$.
 - Any differences in outcomes would be due solely to public use projects.

Estimation

Landowner decision

Landowner perceives the probability π of government action:

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- Total Derivative: $dl = \frac{V'(I) - C_I(I)}{(1 - \pi\pi_p)V''(I) + \pi\pi_p C_{II}(I)} (\pi_p d\pi + \pi d\pi_p)$
 - If $C_I(I) < 1 < V'(I)$, then $\frac{dl}{d\pi}$ and $\frac{dl}{d\pi_p} < 0$ because $V''(I) < 0$ and $C_{II}(I) < 0$.
 - Any growth in economic outcomes would be due solely to public use projects.

Heterogeneity

- In the U.S. context, under-compensation is the presumption in the literature (Radin 1982; Fennell 2004) and minority landowners are especially affected.
- Minority landowners are disproportionately expropriated, displaced, and receive less compensation (Thomas's *Kelo* dissent; Carpenter and Ross 2009)
 - If under-compensation, predict (-) for: Minority landowners
 - If over-compensation, then a higher risk of taking leads to higher investment: Higher property values and higher employment but inefficient growth
 - Unless public use benefits counteract
- Judge Bio → Circuit Case Decision → **Precedential Effects** → Government Actions → Public Projects → **Growth, Inequality, Displacement**

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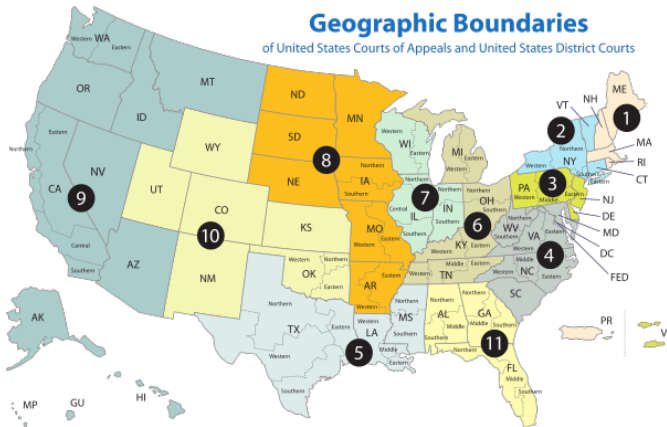
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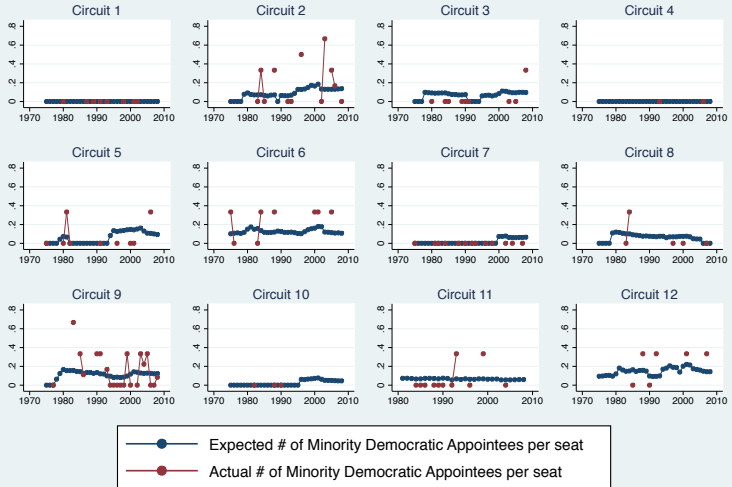
U.S. Federal Court System



- Binding precedent within circuit
- Random assignment of judges
- Deciding issues of new law

Graphical Intuition of Instrumental Variable

Random Variation by Circuit: Minority Democratic Appointees



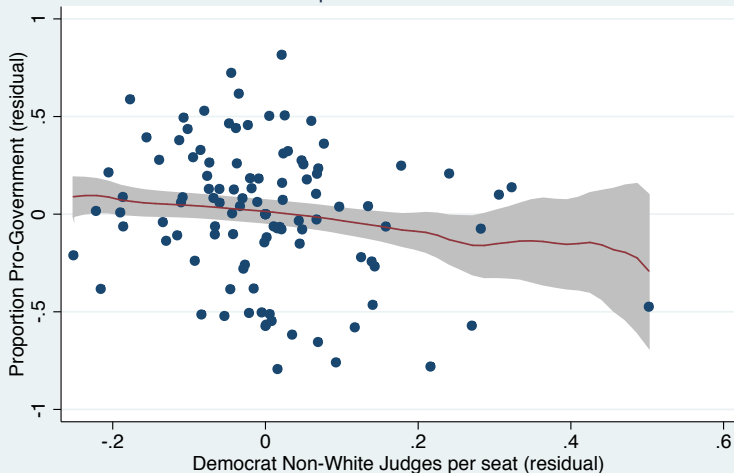
Basic Idea

We exploit idiosyncratic year-to-year variation in the demographic composition of judges sitting on eminent domain panels.

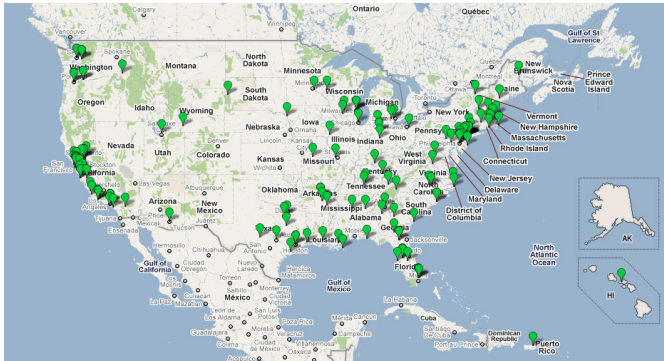
Graphical Intuition of First Stage

Local Polynomial Estimates of First Stage

Pro-Government Physical Takings Decisions
and Composition of Judicial Panels



Map of Original Takings



Examples Physical Takings Cases

- A government-built dam flooded land
- Beach protection constitutes taking
- Building sewer deprives well-water
- Government diverted river

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Judicial Data

Legal Cases

We code all 134 physical takings precedent from 1950-2008 (and 220 regulatory takings appellate precedents, 1979-2004, Sunstein, Schkade, Ellman, and Sawicki 2006)

- We select 3-judge cases citing major Supreme Court precedent
 - Regulatory: *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992); *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987); *Keystone Bituminous Coal Ass'n v. DeBenedictis*, 480 U.S. 470 (1987); and *Penn Central Transportation Co. v. New York City*, 438 U.S. 104 (1978)
 - Physical: *Berman v. Parker*, 348 U.S. 26 (1954); *Hawaii Housing Authority v. Midkiff*, 467 U.S. 229 (1984); *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419 (1982); *Kelo v. City of New London*, 545 U.S. 469 (2005); *Yee v. City of Escondido*, 503 U.S. 519 (1992)
 - Midkiff: Oligopoly in land ownership was “injuring the public tranquility and welfare” and court allowed Hawaii to enact condemnation scheme for title; prices doubled within six years.
- Substantive: Is it a taking?
- A vote is coded as pro-landowner if the judge voted to grant the party alleging a violation of the Takings Clause any relief.

Judicial Data

- Citation data verifies that our physical takings precedent are followed within the circuit but not outside and they impact on state courts and state statutes within the circuit.
 - State attorneys general are instructed to establish and annually update a set of guidelines, based on federal and state law, to assist state agencies in identifying and analyzing actions that may result in a taking (Drees 1997)

BiographiesAttribute Data, Federal Judiciary Center, own data collection

party, race, religion, gender, college, law school, graduate law degree, decade of birth, ABA rating, wealth, appointed when President and Congress majority were from the same party, appointed by president from an opposing party, prior federal judiciary experience, prior law professor, prior government experience, previous U.S. attorney, previous assistant U.S. attorney

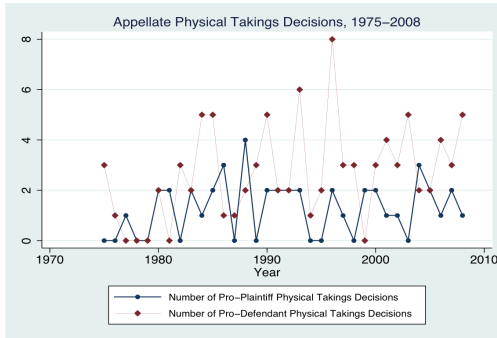
LASSO: two-way interactions at the judge and panel-level, per capita and 1, 1+, 2+

Summary Statistics

Panel A: Physical Takings Cases (1975-2008)

Number of Judges	17.66 [7.72]
Number of Physical Takings Panels	0.33 [0.63]
Proportion of Circuit-Years with No Physical Takings Panels	73%
Proportion of Pro-Government Physical Takings Decisions when Circuit-Year has Panels	66%
Expected # of Minority Democratic Appointees per Seat when Circuit-Year has Panels	0.06 [0.06]
Expected # Republican Prior U.S. Attorneys per Seat when Circuit-Year has Panels	0.04 [0.06]

Summary Statistics



Examples of **Regulatory Takings** Cases

- Zoning restrictions on hotels
- Zoning restrictions on gambling
- Requiring car racing enclosure
- Shortening the fishing year

Economic Data

Property Prices and GDP
Fiserv Case-Shiller Weiss zip-code price indices

- 40,000 zip codes followed quarterly from 1975-2008
- Bureau of Economic Analysis (GDP and Sectoral GDP)

Displacement and Housing
March CPS

Labor and Employment
MORG CPS

Condemnations, Acquisitions, and Interstate Mileage
Federal Highway Administration

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Methodology

- Causally evaluate legal and economic theories
 - Omitted Variables and Reverse Causality
 - If property prices are expected to increase, then courts may be less likely to rule that a condemnation or regulation meets the criteria for public use such as blight removal or that the compensation is just.
- Random Variation in Takings Precedent
 - Race (Chew and Kelley 2008, Scherer 2004, Kastellec 2011)
 - Physical Takings: people whose properties are physically condemned tend to be poor and non-white (Frieden and Sagalyn 1989; Mihaly 2006, Chang 2010, Bryne 2005, Carpenter and Ross 2009)
 - Regulatory Takings: regulatory takings challenges tend to be brought forward by relatively wealthy, non-minorities, especially business entities (Stein 1995)
 - Party Affiliation & Government Advocacy - U.S. Attorneys (Perry 1998, Lochner 2002, Gordon 2009)

Evolution of Common Law

- Pro-landowner appellate decisions on the margin increase the likelihood that property owners can challenge a taking and win suit
 - Judges follow precedent
 - Property buyers, sellers, and governments respond to appellate decisions
 - Newspaper publicity: Kritzer and Dreschel 2011, Pastor 2007, Eager 2007, Sandefur 2004
 - Due diligence: Pollak 2001, Berliner 2003, Nader and Hirsch 2004
- Development of distinctions expands or contracts the space over which subsequent actions may be found liable (Gennaioli and Shleifer 2007)
 - pro-landowner: *Martino v. Santa Clara Valley Water Dist.*: an ordinance requiring a landowner to obtain permits and establish dedications for a flood control project before the landowner could develop his land can constitute a taking
 - pro-takings: *Moore v. Costa Mesa*: but if the conditional variance affects only a small portion of the landowner's property, then the regulation is not a taking

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Specification

Our structural model is a distributed lag specification:

$$Y_{ict} = \beta_0 + \sum_n \beta_{1n} Law_{c(t-n)} + \sum_n \beta_{2n} \mathbf{1}[M_{c(t-n)} > 0] + \beta_3 C_c + \beta_4 T_t + \\ \beta_5 C_c * Time + \sum_n \beta_{6n} W_{c(t-n)} + \beta_7 X_{ict} + \varepsilon_{ict}$$

- Y_{ict} : $\Delta \log$ house prices, $\Delta \log$ GSP, government acquisitions, highway construction, home ownership, employment status, hours worked last week, $\log$ real weekly earnings.
- Law_{ct} : percent of eminent domain cases that were pro-government
 - 0 when there are no cases (otherwise lag reduces sample size)
 - Laws might not be immediately capitalized (Della Vigna and Pollet 2007)
 - Helps us distinguish level vs. growth effects if $\beta_{1(t-1)}$ and $\beta_{1(t-5)}$ have opposite signs (Dell et al 2012)
- β_1 measures average impact (should be invariant to controls)
- Up to 408 (1,632) experiments (34 yrs x 12 circuits (x 4 qrts))

Dynamic Effects

- Moment Conditions

- Original: $\mathbf{E}[(N_{ct}/M_{ct} - \mathbf{E}(N_{ct}/M_{ct}))\varepsilon_{ict}] = 0$.
- Construct an instrument, $p_{ct} - \mathbf{E}(p_{ct})$, whose moment conditions are implied by the original moment conditions.

$$p_{ct} = \begin{cases} N_{ct}/M_{ct} & \text{if } \mathbf{1}[M_{ct} > 0] = 1 \\ 0 & \text{if } \mathbf{1}[M_{ct} > 0] = 0 \end{cases}$$

- $\mathbf{E}[(p_{ct} - \mathbf{E}(p_{ct}))\varepsilon_{ict}] = 0$ conditional on $\mathbf{1}[M_{ct} > 0]$
 - Allows distributed lag, no dividing by 0
 - as long as you include $\mathbf{1}[M_{ct} > 0]$
 - We have now constructed our instrument $p_{ct} - \mathbf{E}(p_{ct})$

Dynamic Effects

- However, the presence of cases $\mathbf{1}[M_{ct} > 0]$ may respond to $p_{c(t-n)}$, introducing downward bias for lag coefficients.
 - Solution: Random assignment of district judges as instrumental variable for the presence of cases
 - Some district judges may be prone to error, write strong opinions, and be more likely to be reversed on appeal
 -

$$w_{ct} = M_1 * \left(\frac{N_1}{M_1} - E \left(\frac{N_1}{M_1} \right) \right) + \dots + M_6 * \left(\frac{N_6}{M_6} - E \left(\frac{N_6}{M_6} \right) \right) \quad (1)$$

- 6 possible district courthouses: 1,...,6. M_i denotes the number of cases filed in district courthouse i and the N_i denote the number of judges with a particular characteristic
- The Law of Iterated Expectations (LIE) implies

$$E \left(M_i * \left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \right) = 0 \quad (2)$$

- Identifying both $\mathbf{1}[M_{ct} > 0]$ and Law_{ct} permit leads to serve as falsification check.

LASSO

Basic Idea: We have a large number of valid instruments.

- Weak instruments problem with too many instruments

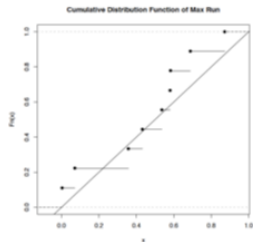
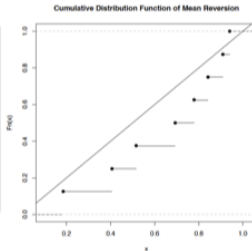
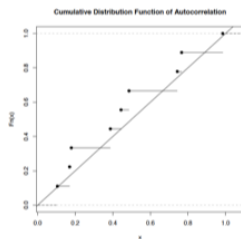
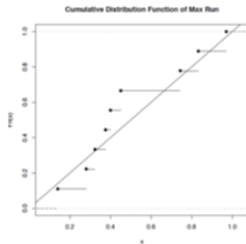
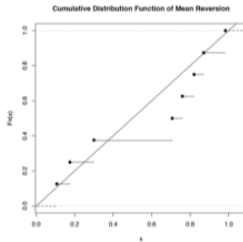
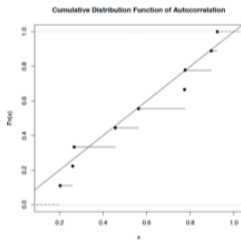
LASSO (Belloni, Chen, Chernozhukov, Hansen 2012)

- LASSO minimizes sum of squares subject to sum of absolute value of coefficients being less than a constant
- Sparse: Add penalty for too many coefficients; force less important coefficients = 0
- Continuity: stability of predictors
- OLS: low bias, large variance – but lacks the above
- Joint F goes up 100%

Appellate Randomization Check $E[p_{ct}\varepsilon_{ict}] = 0$

- Interviews of circuit courts and orthogonality checks of observables (Chen and Sethi 2011) may be insufficient because of
 - **Settlement, but**
 - Judges are revealed very late
 - Parties are unlikely to settle in response to judge identity
 - Settlement is unaffected by earlier announcement of judges (Jordan 2007)
 - **Publication decision, but**
 - Publication decision is uncorrelated with judicial ideology (Merritt and Brudney 2001)
 - Unpublished cases are not supposed to have precedential value
 - Decisions in unpublished cases are uncorrelated with judicial ideology (Keele et al. 2009)
 - **Strategic use of keywords or citation of Supreme Court precedent, but**
- (Weak) Omnibus test: examine how similar the string of actual panel assignments is to a random string.
 - Propose a statistic summarizing the yearly sequence within a circuit.
 - Test for autocorrelation (judges seeking out cases), mean-reversion (judges 'due' for certain cases), and longest-run (specialization)
 - p-values should look uniformly distributed (1001th random string should have a statistic anywhere between 1-1000)
 - Kolmogorov-Smirnov Test for whether the empirical distribution of p-values approaches the CDF of a uniform distribution
 - Does not address the possibility that observables are randomly ordered, so it complements standard randomization checks

Appellate Randomization Check $E[p_{ct}\varepsilon_{ict}] = 0$



District Randomization Check $E[w_{ct}\varepsilon_{ict}] = 0$

$$\text{and } E[w_{ct}p_{c(t-n)}] = 0$$

- Rules for randomization are less systematic
 - in one district (SDNY), civil cases are allocated to one of 3 wheels according to nature of suit (Waldfoegel 1995)
 - exception that federal government party can choose the wheel
 - from these wheels, cases are randomly assigned to judges in a courthouse
 - senior judges can choose which wheels
- District judges are revealed much earlier, but
 - they are much more constrained: judicial ideology does not predict district court
 - settlement rates (Ashenfelter et al. 1995, Nielsen et al. 2010)
 - settlement fees (Fitzpatrick 2010),
 - publication choice (Taha 2004), or
 - decisions in published or unpublished cases (Keele et al. 2009),
 - Supports the assumption that the district judge identity affects outcomes through the presence of an appeal but not through the district court decision.
- (Weak) Omnibus test: whether district court judicial biographical characteristics in *filed* property cases jointly predict publication in our database of district opinions
 - PACER (Swartz (~36% sample with judges)) district court case filings linked to AOC (3-digit case category) and our data collection (of published opinions)

District Randomization Check $E[w_{ct}\varepsilon_{ict}] = 0$ and $E[w_{ct}p_{c(t-n)}] = 0$

- District IV needs to be uncorrelated with unobservables *and* *appellate IV*.
- Random assignment at courthouse level (interviews, literature); our construction of $w_{ct} = \sum_i M_{it} E[(N_{it}/M_{it} - E(N_{it}/M_{it}))]$
 - permits $p_{c(t-n)}$ to affect M_{it} ,
 - through litigant forum selection of district court(house), only sometimes determined by physical proximity
 - due to endogenous economic/government activity at district court(house) level
 - due to special interests funding cases in certain locations
 - permits $p_{c(t-n)}$ to affect $E\left(\frac{N_i}{M_i}\right)$, district judges movement between court(house)s or relative caseload of senior judges
- $E\left(\frac{N_i}{M_i}\right)$ is practically not computable and potentially endogenous for visiting, senior, and magistrate judges (collectively <10%)
 - Preferred Solution: Drop these judges in constructing w_{ct} and p_{ct}
 - Alternative Solution: $\frac{N_{1s}}{M_{1s}}, \dots, \frac{N_{js}}{M_{js}}$ as instruments – but endogeneity of $1[M_{ist} > 0]$ problem
 - Alternative Solution: Separate pseudo-first stage for each courthouse-judgetype, compute predicted $1[M_{ct} > 0]$, take union across district courthouse-judgetypes in circuit-year as w_{ct} – but identification comes partly from functional form (Wooldridge, Angrist and Pischke)

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Table 2 - First Stage: Relationship Between Pro-Government Physical Takings Appellate Precedent and Composition of Physical Takings Panels, 1975-2008

Panel A	Outcome: Pro-Takings						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Minority Democratic Appointee Variable	-0.203 (0.0686)		-0.570 (0.186)	-0.615 (0.193)	-0.666 (0.177)	-0.518 (0.184)	-0.534 (0.174)
Republican Prior U.S. Attorney Variable		0.176 (0.0741)	0.677 (0.235)	0.929 (0.272)	0.963 (0.231)	0.553 (0.215)	0.540 (0.216)
N	394	307	134	107	402	357691	4054704
R-sq	0.017	0.008	0.076	0.108	0.693	0.062	0.686
F-statistic	8.800	5.638	12.540	9.010	15.220	34.975	42.747
Pro-Takings measure	Judge Vote	Judge Vote	Panel Vote	Percentage	Percentage	Percentage	Percentage
Controls	No	No	No	No	Yes	No	Yes
Analysis level	Judge	Judge	Panel	Circuit-year	Circuit-year	Circuit-quarter zip	Circuit-quarter zip

- Minority Democratic appointees are 20% more likely to strike down a physical taking.
 - more likely to have background in civil rights litigation including housing, may be more likely to favor takings plaintiffs, who tend to be poor and minority.
- Republican prior U.S. Attorneys are 18% more likely to uphold a physical taking.
 - may be used to viewing things from a government perspective and be pro-business/growth.
- Robust across aggregation
 - point estimates change as cases are not evenly distributed across circuit years
- Falsification checks correlation between judicial composition and takings decisions in leads and lags
- 2SLS estimates robust to visual Hausman test

First Stage

$$\mathbf{1}[M_{ct} > 0]$$

<i>Panel B</i>		District-level LASSO Instruments	
	Outcome: Presence of Appellate Case		F-statistic
Fiserv (Zip-Year)	Born in 1920s and attended public institution for baccalaureate (BA), Evangelical * Born in 1940s		27.56
GDP (State-Year)	Born in 1920s and attended public institution for BA, Born in 1920s and above median wealth		9.15
CPS (Individual-Year)	Born in 1920s and attended public institution for BA, Black Prior Law Professor		29.00
FHWA (State-Year)	BA from state of appointment, Attended public institution from state of appointment for BA		6.66

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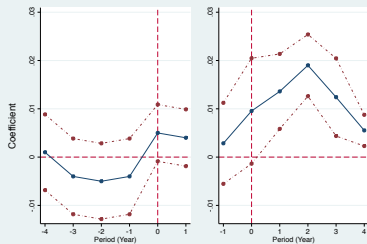
Property Prices and GDP

	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dependent Variable
<i>Panel A</i>	(1)	(2)	(3)	(4)	(5)
<i>Average Lag Effect</i>					
ΔLog Quarterly Price Index	0.002	0.012	0.007	3989626	0.012
Joint P-value	0.032	0.000	0.001		
ΔLog Annual GDP	0.001	0.011	0.011	1671	0.066
Joint P-value	0.254	0.000	0.009		
<i>Panel B</i>					
<i>Average Lead Effect</i>					
ΔLog Quarterly Price Index	0.004	0.003	0.002	3989626	0.012
Joint P-value	0.108	0.505	0.684		
ΔLog Annual GDP	0.001	0.002	0.005	1671	0.066
Joint P-value	0.890	0.810	0.453		

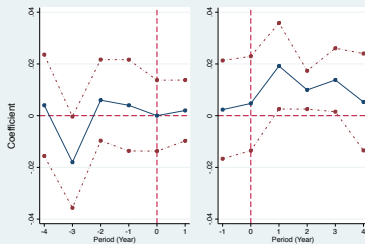
- Increase in house price growth of 0.7% points per quarter
- RCT found paving paths led to 16% higher property values
- 5 yrs. legislation enabling government acquisitions: 4% higher
- \$100 p/c Housing Act of 1949 grant funding: 7.7% higher

Dynamic Effects

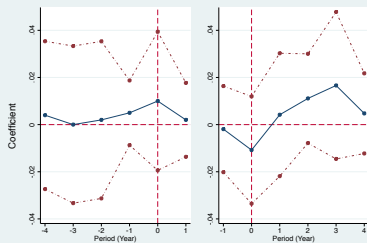
House Price Impacts of Physical Takings Precedent



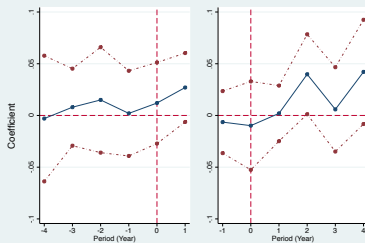
GDP Impacts of Physical Takings Precedent



House Price Impacts of Regulatory Takings Precedent



GDP Impacts of Regulatory Takings Precedent



Wild Bootstrap

<i>Yearly Lags</i> Coefficient	$\Delta \text{Log Annual GDP}$					
	(f1)	(t0)	(t1)	(t2)	(t3)	(t4)
Coefficient	0.005	0.011	0.018	0.008	0.011	0.007
Standard Error	(0.007)	(0.006)	(0.009)	(0.007)	(0.008)	(0.009)
Main percentile	0.452	0.077	0.046	0.205	0.148	0.472
Wild Bootstrap percentile	0.358	0.040	0.109	0.318	0.358	0.378

- Cluster at level of randomization (Barrios, Diamond, Imbens, and Kolesar 2012)

Robustness to Controls

2SLS

Appendix Table A7 -- Impact of Physical Takings Precedent on House Prices -- Robustness of 2SLS Estimates

The Effect of Appellate Physical Takings Precedent on Δ Log Price Index			
	Average of yearly lags	P-value of lags	P-value of leads
	(1)	(2)	(3)
A. Add Circuit-Specific Trends	0.012	0.000	0.643
B. No Fixed Effects	0.006	0.002	0.209
C. State Cluster	0.012	0.000	0.408
D. Control for Expectation	0.017	0.000	0.350
E. Use Population Weights	0.015	0.000	0.521
F. Add 2-year Lead	0.012	0.000	0.557
G. Drop 1 Circuit			
Circuit 1	0.012	0.000	0.693
Circuit 2	0.010	0.000	0.456
Circuit 3	0.013	0.000	0.491
Circuit 4	0.012	0.000	0.578
Circuit 5	0.013	0.000	0.300
Circuit 6	0.011	0.000	0.571
Circuit 7	0.014	0.000	0.568
Circuit 8	0.012	0.000	0.342
Circuit 9	0.010	0.000	0.217
Circuit 10	0.012	0.000	0.347
Circuit 11	0.013	0.000	0.326
Circuit 12	0.012	0.000	0.510
H. Circuit-quarter laws	0.010	0.000	0.004

Very stable

Growth not Level Effect

Physical Takings and ΔLog Price Index

	(t0)	(t1)	(t2)	(t3)	(t4)
A. Add Circuit-Specific Trends	0.010+ (0.006)	0.013** (0.004)	0.019** (0.004)	0.014** (0.005)	0.006** (0.002)
B. No Fixed Effects	-0.000 (0.007)	-0.003 (0.004)	0.015+ (0.009)	0.018+ (0.010)	0.001 (0.006)
C. State Cluster	0.010+ (0.005)	0.014** (0.005)	0.019** (0.005)	0.012** (0.004)	0.006* (0.003)
D. Control for Expectation	0.016+ (0.009)	0.021** (0.006)	0.023** (0.003)	0.015** (0.004)	0.010** (0.003)
E. Use Population Weights	0.014+ (0.007)	0.019** (0.006)	0.023** (0.005)	0.014** (0.004)	0.005** (0.002)
F. Drop 1 Circuit					
Drop Circuit 1	0.008 (0.006)	0.013** (0.004)	0.019** (0.003)	0.012** (0.004)	0.005** (0.002)
Drop Circuit 2	0.006 (0.006)	0.011* (0.005)	0.017** (0.005)	0.009* (0.004)	0.006** (0.001)
Drop Circuit 3	0.012* (0.006)	0.016** (0.003)	0.019** (0.003)	0.012** (0.004)	0.006** (0.002)
Drop Circuit 4	0.010+ (0.006)	0.014** (0.004)	0.019** (0.003)	0.012** (0.004)	0.006** (0.001)
Drop Circuit 5	0.012+ (0.006)	0.013** (0.004)	0.019** (0.004)	0.015** (0.004)	0.004** (0.002)
Drop Circuit 6	0.008 (0.006)	0.011** (0.004)	0.018** (0.002)	0.013** (0.003)	0.007** (0.002)
Drop Circuit 7	0.010+ (0.006)	0.014** (0.004)	0.023** (0.003)	0.015** (0.004)	0.007** (0.002)
Drop Circuit 8	0.010+ (0.006)	0.013** (0.005)	0.018** (0.004)	0.013** (0.004)	0.005** (0.002)
Drop Circuit 9	0.007 (0.006)	0.011 (0.010)	0.018+ (0.009)	0.011 (0.009)	0.005 (0.009)
Drop Circuit 10	0.011* (0.005)	0.015** (0.004)	0.019** (0.003)	0.012** (0.004)	0.006** (0.002)
Drop Circuit 11	0.012+ (0.007)	0.016** (0.004)	0.020** (0.004)	0.013* (0.005)	0.005+ (0.003)
Drop Circuit 12	0.010+ (0.006)	0.014** (0.004)	0.019** (0.003)	0.012** (0.004)	0.006** (0.002)

Very stable

T1, T2,
~Decay

Not level
effect

Robustness to Lag Structure

		2SLS					
		(t0)	(t1)	(t2)	(t3)	(t4)	(t5)
G. Lag Structure							
1 Lag	Robust to # Lags	0.004 (0.003)	0.004 (0.003)				
2 Lags		0.004 (0.003)	0.010** (0.004)	0.016** (0.003)			
2 Leads, 4 Lags		0.010+ (0.006)	0.016** (0.005)	0.018** (0.003)	0.010* (0.004)	0.004* (0.002)	
1 Lead, 5 Lags	Leads are precisely small in magnitude	0.011* (0.005)	0.012** (0.004)	0.017** (0.003)	0.014** (0.004)	0.003 (0.002)	-0.005* (0.003)
4 Leads, 1 Lag		0.004 (0.003)	0.005+ (0.003)	0.001 (0.004)	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.004)
(t0, t1, t4, t3, t2, t1)							

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Counterfactuals

- What if Kelo v. City of New London had been decided the opposite way?
 - Law_{ct}
 - Captures effect of decision on a case already in front of judge
 - Typically 1 (100% pro-government) or 0 (100% pro-property owner)
- What if Kelo v. City of New London did not exist?
 - Pro-takings: Add the effect of $\mathbf{1}[M_{ct} > 0]$ and Law_{ct}
 - Pro-landowner: The effect of $\mathbf{1}[M_{ct} > 0]$
 - Presence of a case is separately identified from pro-landowner during the time window before case resolution
 - Presence of a case is separately identified from pro-landowner for district originating the circuit case

Displacement

- Estimates potential displacement if $\beta_{1(t-n)}$ and $\beta_{2(t-n)}$ have opposite signs
 - Local governments may defer public use projects until a favorable legal regime
 - The absence of a case serves as “supercontrol” (Crepon, Duflo, Gurgand, Rathelot, and Zamora 2012)
 - Randomize both $\mathbf{1}[M_{ct} > 0]$ and Law_{ct}

Growth under the shadow of (rather than actual) expropriation

- Distinguish local effect from precedential effect of making it easier for subsequent takings
- Appellate eminent domain decisions affirm or overturn a local taking that have direct effects separate from precedential effects:

$$Y_{ict} = \beta_0 + \beta_1 Law_{ct} + \beta_2 LocalLaw_{ict} + \varepsilon_{ict}$$

- We separately instrument for Law_{ct} and $LocalLaw_{ict}$ using the random of judges in cases that occur in the zip code locally and in cases that occur in the circuit.

What Magnitudes Should We Expect?

- 2SLS isolates LATE, effect on compliers (the hard cases whose decisions may be affected by judicial biography)
- but hard cases precede easy cases, so LATE may capture TOT (LATE & effect on always takers)
- $TOT_{circuit} = [TOT_{direct} + TOT_{indirect}] * P(\text{individual exposure to law}_{circuit})$
 - $TOT_{indirect}$ (unknown size of expressive externalities)
 - TOT_{direct} : Broad scope of eminent domain power
 - Large causal effects of railroads (Donaldson / India), electricity (Dinkelman / S. Africa), place-based policies (Busso et al / US), cell-phone towers (Jensen / India), military procurement (Nakamura and Steinsson / US), dams (Duflo and Pande / India)
 - Taking intellectual property rights currently debated: expenditures in one IP lawsuit estimated to be \$2M; \$1B/year in aggregate
- U.S. may be uniquely strong in
 - Individual property rights
 - e.g. Oil discovered underground is owned by the landowner, not the state
 - Good governance (checks and balances between 3 branches of government)

What Magnitudes Should We Expect?

- Assessing magnitudes and explaining proportion of social change ΔY is challenging
 - We might expect $\Delta \log GSP_t - \Delta \log GSP_{t-1} = 0$ in steady state, so any effects would be transitions between steady states
 - Clinical trials isolate effect of X , but population X could vary with factors that can have opposing effects on Y

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_2 X_3 + \varepsilon$$

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Displacement

33

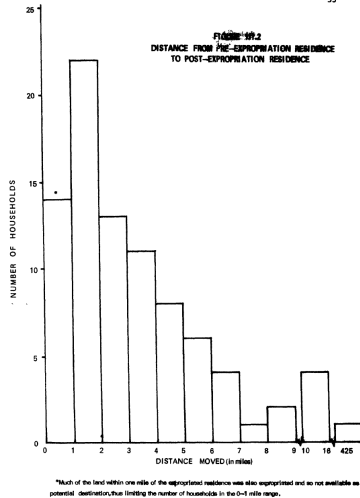


Figure 6: Most displaced residents will relocate within a few miles

Displacement and Housing

<i>Panel A</i>	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dep. Variable Non-White	White
<i>Average Interaction Lag Effect</i>	(1)	(2)	(3)	(4)	(5)	(6)
Within-County Move in Last Year	0.001	0.001	0.001	3451505	0.115	0.090
Joint P-value	0.378	0.000	0.000			
Out-County Move in Last Year	-0.001	-0.001	-0.002	3451505	0.062	0.061
Joint P-value	0.818	0.161	0.476			
<i>Average Level Lag Effect</i>						
Within-County Move in Last Year	0.001	0.003	0.002	3451505	0.115	0.090
Joint P-value	0.011	0.298	0.000			
Out-County Move in Last Year	-0.0003	-0.001	0.00007	3451505	0.062	0.061
Joint P-value	0.198	0.188	0.023			

- Increase within-county moves of non-whites by 0.1% more than they do of whites.
- Consistent with 16 (qualitative) studies showing that displaced persons moved within the same city.

Displacement and Housing

<i>Panel A</i>	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dep. Variable Non-White	White
<i>Average Interaction Lag Effect</i>	(1)	(2)	(3)	(4)	(5)	(6)
Live in Public Housing	0.009	0.005	0.003	4098609	0.079	0.017
Joint P-value	0.016	0.000	0.000			
Living Below Poverty Line	0.013	0.006	0.006	4098609	0.266	0.117
Joint P-value	0.000	0.003	0.328			
<i>Average Level Lag Effect</i>						
Live in Public Housing	-0.001	0.000	0.000	4098609	0.079	0.017
Joint P-value	0.002	0.647	0.534			
Living Below Poverty Line	-0.001	0.005	0.001	4098609	0.266	0.117
Joint P-value	0.076	0.020	0.001			

- Non-whites are also 0.3% more likely to live in public housing than whites after pro-takings decisions.
- Non-whites are an additional 0.6% more likely to live below the poverty line than whites

Employment

<i>Panel A</i>	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dep. Variable Non-White	White
<i>Average Interaction Lag Effect</i>	(1)	(2)	(3)	(4)	(5)	(6)
Employment Status	-0.015	-0.021	-0.017	6720948	0.655	0.742
Joint P-value	0.016	0.011	0.001			
Log Real Weekly Earnings	-0.091	-0.130	-0.116	6154598	3.792	4.348
Joint P-value	0.019	0.013	0.000			
<i>Average Level Lag Effect</i>						
Employment Status	0.005	0.012	0.010	6720948	0.655	0.742
Joint P-value	0.158	0.000	0.000			
Log Real Weekly Earnings	0.032	0.071	0.065	6154598	3.792	4.348
Joint P-value	0.342	0.681	0.000			

- Non-whites are 1.7% less likely to be employed than whites after pro-takings decisions.
- Whites are 1.0% more likely to be employed; overall population is also more likely to be employed.

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Federal Transportation Projects

Table 7 - Parcels Acquired for Federal Transportation Projects Impacts

	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dependent Variable
<i>Average Lag Effect</i>	(1)	(2)	(3)	(4)	(5)
Log Compensation	0.187	0.023	0.125	572	16.746
Joint P-value of lags	0.076	0.004	0.002		
Joint P-value of leads	0.764	0.317	0.153		
Log Parcels Acquired	-0.003	-0.056	-0.103	663	6.456
Joint P-value of lags	0.043	0.000	0.000		
Joint P-value of leads	0.223	0.462	0.660		
Log Residential Displacements	-0.134	-0.199	-0.065	663	3.508
Joint P-value of lags	0.195	0.129	0.044		
Joint P-value of leads	0.451	0.758	0.608		
Log Residential Relocation Costs	-0.156	-0.302	-0.091	663	12.587
Joint P-value of lags	0.282	0.087	0.000		
Joint P-value of leads	0.053	0.164	0.191		
Log Replacement Housing Costs	-0.251	-0.372	-0.126	663	12.357
Joint P-value of lags	0.316	0.011	0.120		
Joint P-value of leads	0.229	0.103	0.583		
Log Commercial Displacements	0.031	0.025	0.122	663	3.139
Joint P-value of lags	0.027	0.000	0.000		
Joint P-value of leads	0.053	0.909	0.979		
Log Commercial Relocation Costs	0.099	0.138	0.163	663	12.117
Joint P-value of lags	0.088	0.012	0.009		
Joint P-value of leads	0.800	0.581	0.638		

Federal Transportation Projects

Table 9 - Highway Construction Impacts

	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dependent Variable
<i>Average Lag Effect</i>	(1)	(2)	(3)	(4)	(5)
ΔLog Miles of 2-digit Highways	0.000	0.029	0.040	7805	0.079
Joint P-value of lags	0.168	0.001	0.071		
Joint P-value of leads	0.593	0.855	0.936		
ΔLog Miles of 3-digit Highways	-0.003	0.012	0.007	7805	0.041
Joint P-value of lags	0.081	0.272	0.000		
Joint P-value of leads	0.948	0.943	0.733		
ΔLog Miles of 2-dig Fed Hghwys	-0.002	0.024	0.029	7805	0.085
Joint P-value of lags	0.017	0.040	0.704		
Joint P-value of leads	0.838	0.666	0.962		
ΔLog Miles of Planned Highways	-0.001	0.016	0.033	7805	0.072
Joint P-value of lags	0.034	0.398	0.034		
Joint P-value of leads	0.831	0.194	0.151		

Local Public Goods

<i>Panel A: Quarterly Lags</i>	$\Delta \text{Log Quarterly Price Index}$					Mean
	(q0)	(q4)	(q8)	(q12)	(q16)	
1. Circuit-quarter laws	0.009 (0.003)	0.003 (0.007)	0.017 (0.008)	0.008 (0.007)	0.003 (0.006)	0.010
2. Circuit-quarter laws (Law_{ct}) controlling for	0.009 (0.004)	-0.000 (0.008)	0.011 (0.005)	0.004 (0.006)	-0.000 (0.005)	0.007
Local takings decision (LocalLaw_{ict})	-0.018 (0.025)	0.014 (0.022)	-0.000 (0.029)	-0.013 (0.040)	0.010 (0.023)	0.005

- Local effects are a sizeable 0.5 percentage point increase
- Precedential effects fall from 1.0 to 0.7% points increase

Public Use

ΔLog Sectoral Annual GDP

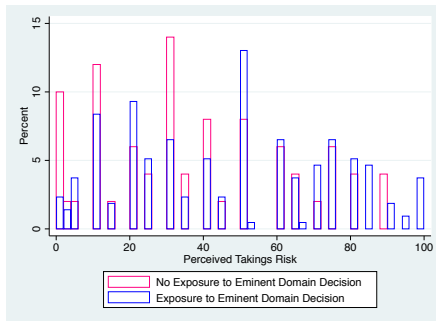
	Physical Takings Appellate and District IV	Joint P-value	
		Lags	Leads
Construction	0.039	0.001	0.227
Manufacturing	0.007	0.784	0.169
Retail	0.017	0.001	0.768
Services	-0.092	0.001	0.456
Wholesale	0.013	0.213	0.300
Mining	0.018	0.690	0.236
Agriculture	0.057	0.000	0.674
Transportation and Utilities	0.014	0.005	0.311
Finance, insurance, rental, estate	0.022	0.014	0.919
Government	0.003	0.002	0.470

- Spur annual growth in government, transportation and utilities, and construction.
- Spur annual growth in agriculture, retail, and finance, insurance, rental, and estate.
 - Distinguish between direct contribution of infrastructure *building* to GDP with contribution of infrastructure to GDP
- Growth in the service sector is adversely affected.

Subjective Risk

- Validate assumptions about expectations (Manski 2004)

Figure 7: Artefactual field experiment assigning data entry workers to transcribe news reports on eminent domain decisions



- "What do you think is the probability that the government will deny you the right to use your property (land or house or any other physical property) in a way that you want?"
 - Exposure to any eminent domain decision increased their self-reported takings risk by 10% relative to the control group.

Presence of an Appeal

Table 9 - Impacts of Presence of Appeals

	OLS	Appellate IV	Appellate and District IV	Obs	Mean Dependent Variable
<i>Panel A</i>					
<i>Average Lag Effect</i>	(1)	(2)	(3)	(4)	(5)
$\Delta \text{Log Quarterly Price Index}$	-0.003	-0.010	-0.006	3989626	0.012
Joint P-value of lags	0.094	0.000	0.153		
Joint P-value of leads	0.732	0.706	0.861		
$\Delta \text{Log Annual GDP}$	-0.002	-0.009	-0.010	1671	0.066
Joint P-value of lags	0.040	0.000	0.000		
Joint P-value of leads	0.886	0.620	0.414		

- The presence of an appeal reduces house prices and economic growth.
 - Thus, a large part of the effect of an appellate decision may be through the effect of the precedent (i.e., the subsequent takings that are not litigated in appellate courts).
- The presence of an appeal appear to drive perceived takings risks and negative growth effects.

Outline

1 Introduction

- Motivation/Relevance
- Conceptual Framework
- Background
- Data

2 Estimation

- Intuition
- Framework

3 Impact of Eminent Domain

- First Stage
- Growth
- Discussion
- Racial Inequality and Displacement
- Mechanisms
- Regulatory Takings

4 Conclusion

Regulatory Takings Precedent

- Expropriation need not be total, but could be partial such as zoning ordinances, environmental regulation, or flooding.
- In the U.S., this is called a regulatory taking and also influenced by physical takings precedent.
 - Serves as falsification check
 - no effect of regulatory takings precedent on racial inequality in displacement or employment nor on acquisitions for federal transportation projects nor on construction/transportation sectors
 - Strong effects on growth and in white-collar sectors

Regulatory Takings Precedent

Living Below Poverty Line	0.018	0.028	3227637	0.266	0.119
Joint P-value of lags	0.035	0.607			
Joint P-value of leads	0.953	0.097			
Employment Status	-0.011	0.004	5341620	0.660	0.750
Joint P-value of lags	0.169	0.958			
Joint P-value of leads	0.115	0.476			
Log Real Weekly Earnings	-0.064	0.013	4892691	3.817	4.405
Joint P-value of lags	0.002	0.951			
Joint P-value of leads	0.158	0.539			
	Average Lag Effect				
Log Residential Displacements	0.202	1.127	663		3.508
Joint P-value of lags	0.383	0.496			
Joint P-value of leads	0.594	0.719			
Log Commercial Displacements	0.203	-0.209	663		3.139
Joint P-value of lags	0.182	0.777			
Joint P-value of leads	0.683	0.687			
<i>Panel C</i>	Fiserv	GDP	CPS		FHWA
<i>First stage F-statistic</i>					
Appellate LASSO IV	48.36	37.48	50.39		30.01
District LASSO IV	6.53	6.43	11.51		9.24

Regulatory Takings Precedent

Table 10 - Impacts of Regulatory Takings Precedent

<i>Panel A</i> <i>House Prices and GDP</i>	Average Lag Effect		Obs (3)	Mean Dep. Variable (4)
	OLS (1)	IV (2)		
$\Delta \text{Log Quarterly Price Index}$	0.002	0.003	2486744	0.11
Joint P-value of lags	0.086	0.000		
Joint P-value of leads	0.005	0.333		
$\Delta \text{Log Annual GDP}$	0.005	0.002	1065	0.56
Joint P-value of lags	0.024	0.017		
Joint P-value of leads	0.897	0.918		

- Sectoral gains: services, government, and financial services
- Sectoral losses: manufacturing and wholesale
 - Consistent with large U.S. place-based rezoning policies leading to 12-21% increase in total employment and 8-13% increase in weekly wages, amounting to \$269 million per year (Busso, Gregory, and Kline 2013)

Regulatory Takings as Uncompensated Takings

Regulatory Takings and Log Price Index

	(t0)	(t1)	(t2)	(t3)	(t4)
A. Add Circuit-Specific Trends	-0.147** (0.056)	-0.174+ (0.104)	-0.075 (0.111)	-0.034 (0.104)	0.076 (0.089)
B. No Fixed Effects	-0.285 (0.371)	-0.705 (0.809)	-0.356 (0.521)	-0.516 (0.881)	0.227 (0.455)
C. State Cluster	-0.148* (0.068)	-0.152* (0.065)	-0.075 (0.073)	0.021 (0.080)	0.040 (0.101)
D. Control for Expectation	-0.183* (0.076)	-0.168 (0.107)	-0.078 (0.125)	-0.000 (0.103)	0.047 (0.153)
E. Use Population Weights	-0.086 (0.121)	-0.111 (0.071)	-0.084 (0.087)	-0.026 (0.112)	-0.050 (0.186)
F. Drop 1 Circuit					
Drop Circuit 1	-0.139 (0.092)	-0.153 (0.098)	-0.079 (0.082)	0.013 (0.082)	0.039 (0.111)
Drop Circuit 2	-0.099 (0.11)	-0.093 (0.1)	-0.09 (0.098)	-0.009 (0.06)	-0.035 (0.153)
Drop Circuit 3	-0.119 (0.143)	-0.097 (0.145)	-0.036 (0.105)	0.045 (0.109)	0.041 (0.167)
Drop Circuit 4	-0.146* (0.058)	-0.162 (0.162)	-0.057 (0.121)	0.025 (0.1)	0.064 (0.163)
Drop Circuit 5	-0.166+ (0.085)	-0.162+ (0.085)	-0.067 (0.089)	0.03 (0.086)	0.057 (0.087)
Drop Circuit 6	-0.124 (0.097)	-0.141+ (0.084)	-0.089 (0.087)	-0.027 (0.04)	0.031 (0.106)
Drop Circuit 7	-0.15+ (0.089)	-0.139 (0.094)	-0.055 (0.072)	0.03 (0.069)	0.043 (0.087)
Drop Circuit 8	-0.106 (0.112)	-0.125 (0.107)	-0.031 (0.083)	0.067 (0.135)	0.01 (0.138)
Drop Circuit 9	-0.289** (0.081)	-0.291 (0.194)	-0.018 (0.232)	0.128 (0.201)	0.183+ (0.108)
Drop Circuit 10	-0.155+ (0.091)	-0.14 (0.108)	-0.082 (0.102)	0.025 (0.073)	0.03 (0.134)
Drop Circuit 11	-0.105 (0.114)	-0.121 (0.142)	-0.153* (0.071)	-0.005 (0.072)	-0.058 (0.161)
Drop Circuit 12	-0.15 (0.098)	-0.154 (0.105)	-0.076 (0.088)	0.021 (0.081)	0.04 (0.115)

Negative
initial
effects
followed
by positive
effect

Summary

Main Findings

- Rulings making it easier to take physical property rights spur economic growth and property values
- but increase racial inequality as minorities become more likely to be unemployed, live below the poverty line, and live in public housing.

Mechanisms – Consistent with public use, underinvestment, and insecure property rights

- ① States displace more expensive commercial tenants for federal projects.
- ② Property values in the local zip code(s) of the original takings increases.
- ③ Growth in construction, transportation and utilities, and government – but also in agriculture, retail, and financial services.
- ④ Presence of a decision increases perceived takings risk and reduces growth in house prices and GDP.

Interpretation

- *Exclusion Restriction*: Identity of judges on eminent domain panels only affects economic outcomes through legal precedent (ongoing: Badawi and Chen 2014)
 - pro-landowner vs. pro-government is the materially relevant legal doctrine (ongoing: multinomial inverse, LASSO triple selection; residuals test)
- *External Validity*: If monotonicity assumptions hold, we have a LATE interpretation that is policy relevant, else we must assume homogeneous treatment effects. (ongoing: different sub-samples)
- *General Equilibrium*: Captures all possible responses at aggregate level, factor mobility leading to smaller effects.
- *Influence outside circuits*: Could lead to underestimates of the true effect. (ongoing: Chen, Frankenreiter, and Yeh)
- *Sparsity*: Only a few judge characteristics matter (ongoing: RJIVE)
- *Dynamic Treatment Effects*: Allow treatment effects to differ depending on treatment history (ongoing: Chen, Levonyan, Yeh)

Further Research

- Capture the effects of eminent domain projects that stimulate trade and growth in multiple circuits.
- Structural estimation of judges' dynamic optimization problem vis-à-vis state actors balancing strategic public choice considerations around an optimal policy control function.
- Evaluating whether bargaining procedure for minority-owned land ameliorates eminent domain's disparate impact.

THANK YOU !

Latest draft available at:

<http://users.nber.org/~dlchen/papers/EminentDomain.pdf>

Comments welcome

District IV

We need to show that:

$$E \left(M_i * \left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \right) = 0 \quad (3)$$

To show this, use the Law of Iterated Expectations (LIE):

$$E \left(M_i * \left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \right) = E \left(E \left[M_i * \left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \mid M_i \right] \right) \quad (4)$$

And,

$$E \left(E \left[M_i * \left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \mid M_i \right] \right) = E \left(M_i E \left[\left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \mid M_i \right] \right)$$

Moreover, again by LIE:

$$\begin{aligned} E \left[\left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \mid M_i \right] &= \\ E \left[E \left(\left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) * \epsilon_{ct} \mid \epsilon_{ct}, M_i \right) \mid M_1, \dots, M_6 \right] &= \\ E \left[\epsilon_{ct} E \left(\left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) \mid \epsilon_{ct}, M_i \right) \mid M_1, \dots, M_6 \right] \end{aligned}$$

Now, note that the expression $\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right)$ is the deviation of the ratio of judge assignment characteristics from the mean. It should therefore be independent of both ϵ_{ct} , and $M_1, \dots, M_6$. Therefore,

$$E \left(\left(\frac{N_i}{M_i} - E \left(\frac{N_i}{M_i} \right) \right) \mid \epsilon_{ct}, M_i \right) = 0 \quad (5)$$