Cities*

*Based on slides from Christina Romer and David Romer, “Urban Economic History”

Questions to Begin Class

- Why do cities exist?
- What determines the spatial distribution of economic activity?
- Why is the spatial distribution of economic activity so persistent?

Theories of Urban Location

- Locational Fundamentals
- Increasing Returns
- Random Growth test

First paper. . .

Bones, Bombs, and Break Points: The Geography of Economic Activity

By Donald R. Davis and David E. Weinstein*

We consider the distribution of economic activity within a country in light of three leading theories—increasing returns, random growth, and locational fundamentals. To do so, we examine the distribution of regional population in Japan from the Stone Age to the modern era. We also consider the Allied bombing of Japanese cities in WWII as a shock to relative city sizes. Our results support a hybrid theory in which locational fundamentals establish the spatial pattern *of relative regional densities, but increasing returns help to determine the* degree *of spatial differentiation. Long-run city size is robust even to large temporary shocks.* (*JEL* D5, J1, N9, R1)

FIRST SET OF QUESTIONS. . .

- 8,000 years of data on 39 Japanese regions
- Historically, how large has the variation in regional population density been and are there important changes over time?
- How persistent is the identity of the regions that have been most densely settled?
- What do the stylized facts tell us about the theories (I will focus on the first two for this lecture)?

Year	Population in thousands	Share of five largest regions	Relative var of log population density	Zipf coefficient	Raw correlation with 1998	Rank correlation with 1998	History
−6000 to −300	125	0.39	2.46	−0.809 (0.217)	0.53	0.31	Hunter-gatherer society, not ethnically Japanese, no metal tools or agriculture.
−300 to 300	595	0.23	0.93	−1.028 (0.134)	0.67	0.50	First appearance of primitive agriculture and ethnically Japanese people. Some metallurgical skills, some coins, no writing or cloth.
725	4,511	0.20	0.72	−1.207 (0.133)	0.60	0.71	Creation of feudal regime, population censuses begin, writing well developed, farming is widespread. Capital is Nara.
800	5,506	0.18	0.75	−1.184 (0.152)	0.57	0.68	Capital moves to Kyoto. Property rights for peasant farmers continue to improve, leading to greater cultivation.
900	7,442	0.29	0.68	−1.230 (0.166)	0.48	0.65	Use of metallic farm tools doubles over average for previous 300 years. Improved irrigation and dry-crop technology.
1150	6,836	0.20	0.66	−1.169 (0.141)	0.53	0.73	Multiple civil wars especially in (rice-rich) northern Japan. General political instability and rebellions.
1600	12,266	0.30	0.64	−1.192 (0.068)	0.76	0.83	Reunification achieved after bloody war, extensive contact with West. Japan is a major regional trading and military power.
1721	31,290	0.21	0.43	−1.582 (0.113)	0.85	0.84	Closure of Japan to trade with minor exceptions around Nagasaki. Capital moves to Tokyo. Political stability achieved.
1798	30,531	0.21	0.37	−1.697 (0.120)	0.83	0.81	Population is approximately 80 percent farmers, 6 percent nobility. Population stability attributed to infanticide, birth control, and famines.
1872	33,748	0.18	0.30	−1.877 (0.140)	0.76	0.78	Collapse of shogun's government, civil war, jump to free trade, end of feudal regime, start subsidized import of foreign technology.
1920	53,032	0.25	0.43	−1.476 (0.043)	0.94	0.93	Industrialization and militarization in full swing, but still 50 percent of labor force is farmers. Japan is a major exporter of silk and textiles.
1998	119,486	0.41	1.00	−0.963 (0.025)	1.00	1.00	Japan is a fully industrialized country. Tokyo, with a population of 12 million, is one of the largest cities in the world.

What are the results?

1. A lot of variance in regional density
   - Share of 5 largest regions
   - Relative variance of log pop density (very high in modern period and very oldest periods; still quite high in between)
   - Zipf coefficient close to -1 (except when Japan autarkic, it becomes more negative, reflecting more homogeneity, less urbanization)

   → Consistent with locational fundamentals

2. Rank of density very persistent
   - Raw correlation with 1998
   - Rank correlation with 1998

   → Consistent with both locational fundamentals and increasing returns

SECOND SECTION USES A DIFFERENT NATURAL EXPERIMENT TO ATTEMPT TO IDENTIFY THE IMPORTANCE OF LOCATIONAL FUNDAMENTALS VS. INCREASING RETURNS

- How does spatial concentration respond to a large temporary shock to population (and buildings)?

→ Take away the increasing returns (people and buildings) and see if there is still persistence.

- Population of 303 Japanese cities with more than 30K people in 1925
- Measures of wartime shock:
  - Bombing casualties/city population in 1940
  - Buildings destroyed/city population in 1940
- Also have data on government reconstruction spending (per person in city as of 1947) as a control

The Bombing of Japanese Cities by USAF during WWII as a Natural Experiment

- Video: Fog of War
- Large shocks
- Highly variable (USAF planners often took into account changing wind patterns etc...when planning which cities would be raided)
- Locational fundamentals unchanged (though infrastructure affected; compare with other types of shock, e.g. Black Death)

Appears to be support for locational fundamentals...

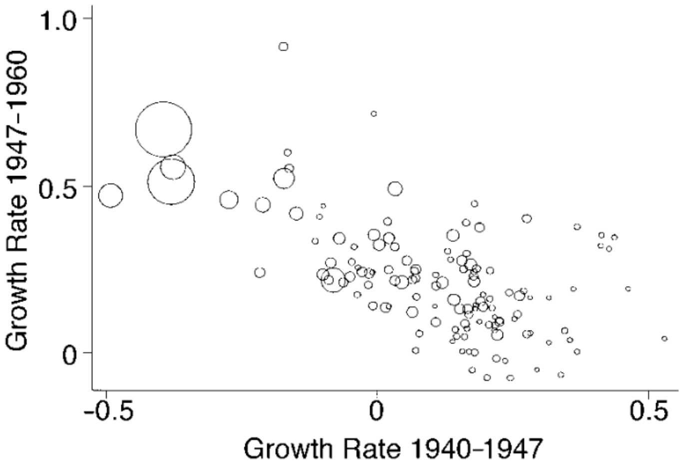


Figure 1. Effects of Bombing on Cities with More than 30,000 Inhabitants

Regression Analysis

$$Pop_{i,1960} - Pop_{i,1947} = \beta(Pop_{i,1947} - Pop_{i,1940}) + u_i$$

- *"An obvious method of looking at the innovation is to use the growth rate from 1940 to 1947. However, this measure of the innovation may contain not only information about the bombing but also past growth rates."*
- There is likely endogeneity here.
- They use instrumental variables:
  - Casualties/City Population in 1940
  - Number of buildings destroyed/City Population in 1940
- Does this account for all of the potential endogeneity?

First stage of IV

Table 2—Instrumental Variables Equation (dependent variable = rate of growth in city population between 1940 and 1947)

Independent variable	Coefficient
Constant	0.213
	(0.006)
Deaths per capita	−0.665
	(0.506)
Buildings destroyed per capita	−2.335
	(0.184)
R^2:	0.409
Number of observations:	303

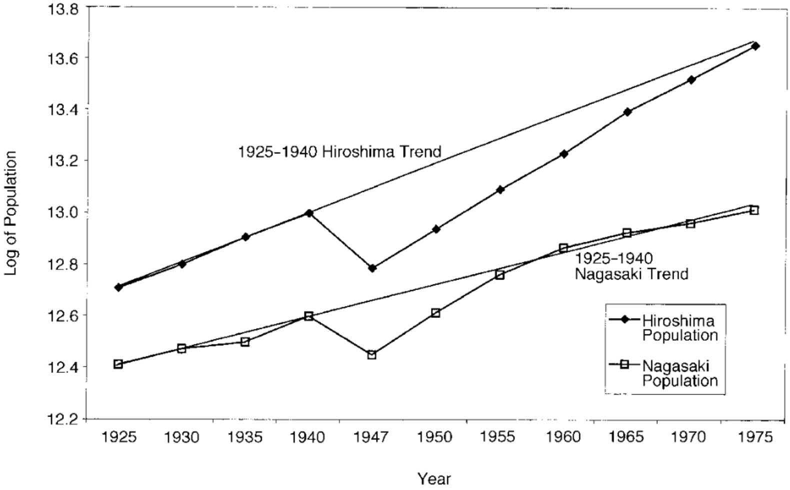
Second stage of IV

Table 3—Two-Stage Least-Squares Estimates of Impact of Bombing on Cities (Instruments: Deaths per Capita and Buildings Destroyed per Capita)

	Dependent variable = growth rate of population between 1947 and 1960		Dependent variable = growth rate of population between 1947 and 1965
Independent variable	(i)	(ii)	(iii)
Growth rate of population between 1940 and 1947	−1.048 (0.097)	−0.759 (0.094)	−1.027 (0.163)
Government reconstruction expenses	1.024 (0.387)	0.628 (0.298)	0.392 (0.514)
Growth rate of population between 1925 and 1940		0.444 (0.054)	0.617 (0.092)
R^2:	0.279	0.566	0.386
Number of observations:	303	303	303

Concerns?

- Population decline may be due to refugees, not deaths
- Return to previous population is just refugees coming back because of social networks, not because of locational fundamentals
- Can look at what happened in Hiroshima and Nagasaki where refugees may not have wanted to return (and where there were fewer refugees)



13.8
13.6
13.4
13.2
13.0
12.8
12.6
12.4
12.2
Log of Population
1925-1940 Hiroshima Trend
1925-1940
Nagasaki Trend
Hiroshima
Population
Nagasaki
Population
1925
1930
1935
1940
1947
1950
1955
1960
1965
1970
1975
Year

CONCLUSION?

- No effects of temporary shocks
- Not consistent with increasing returns.
- May be consistent with locational fundamentals

PORTAGE AND PATH DEPENDENCE*

HOYT BLEAKLEY AND JEFFREY LIN

Many cities in North America formed at obstacles to water navigation, where continued transport required overland hauling or *portage*. Portage sites attracted commerce and supporting services, and places where the falls provided water power attracted manufacturing during early industrialization. We examine portage sites in the U.S. South, Mid-Atlantic, and Midwest, including those on the *fall line*, a geomorphological feature in the southeastern United States marking the final rapids on rivers before the ocean. Although their original advantages have long since become obsolete, we document the continuing importance of historical portage sites. We interpret these results as path dependence and contrast explanations based on sunk costs interacting with decreasing versus increasing returns to scale. *JEL* Codes: R12, N91, N92, O18, F12.

Comparing Bleakley and Lin (BL) with Davis and Weinstein (DW)

- DW ask if population density is persistent in face of temporary shock to population (holding locational fundamentals the same).

→ Find that it is. Suggests locational fundamentals are important.

- BL ask if population density is persistent in the face of a permanent shock to locational fundametals.

→ Find that it is. Suggests that increasing returns are important.

What shock do BL consider?

- Rapids where rivers cross Fall Line—portage point.
- This is the locational fundamental that gives rise to a city.
- Portage point become less important over time as non-river transportation becomes dominant.
- Locational fundamentals change permanently.

→ Do the cities disappear (or at least lose their relative position in the ranking of size)?

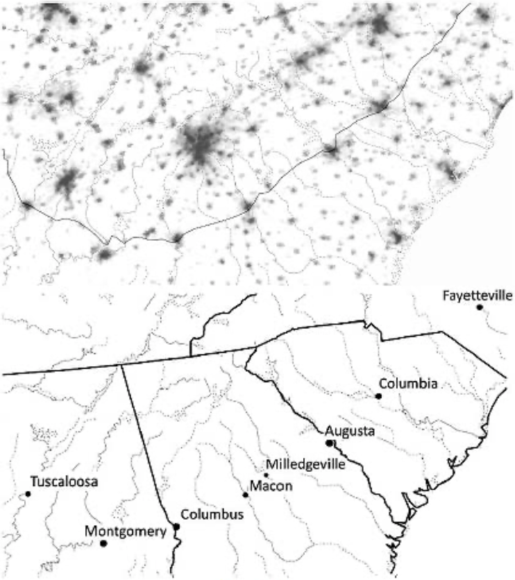


FIGURE II
Fall-Line Cities from Alabama to North Carolina

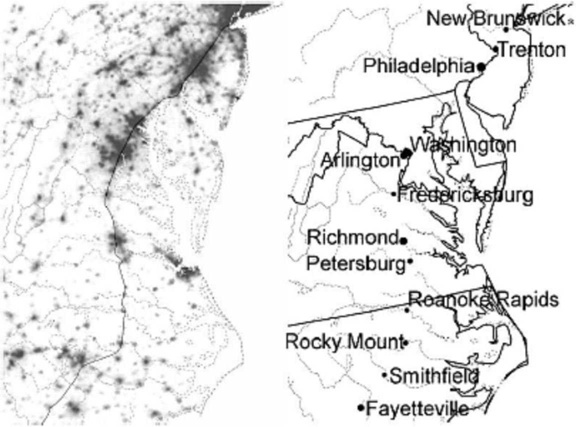


Figure IV
Fall-Line Cities from North Carolina to New Jersey

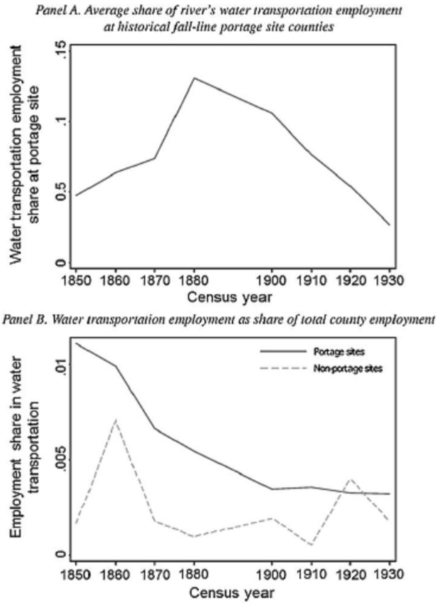


FIGURE I
Water-Transportation Employment across Fall-Line-Area Counties, 1850–1930

Data

- Measures of population density
    - Pop/Area by county back to 1790
    - Satellite light intensity in 2003
    - Pop/Area by census tract in 2000
- Potential portage points—every place a river crosses the Fall Line
- Sort densities by watershed
- Measures of watershed area above portage point

(1) $$\ln density_{gr} = \beta \cdot portage_g + \alpha_1 D_g^{FL} + \alpha_2 D_g^R + \mathbf{Z_g}\xi + \delta_r + \epsilon_{gr},$$

where $density_{gr}$ is the population density of geographic area g (either a county, tract, or night-light observation) lying in river watershed r. The variable $portage_g$ indicates if the area is close to a portage site. The main measure of proximity used is a dummy equal to 1 if the centroid of the area is within 15 miles of the portage site.[15] The variables D_g^{FL} and D_g^R are binary variables equal to one if the area's centroid is within 15 miles of the fall river or river, respectively.

- β measures the impact of potential portage site on population density today

Specifications:	(1) Basic	(2) Other spatial controls: State fixed effects	(3) Other spatial controls: Distance from various features	(4) Additional fixed factors: Climate variables	(5) Additional fixed factors: Aquifer Share	(6) Additional fixed factors: Mean elevation	(7) Other samples: Atlantic Rivers only	(8) Other samples: Within 100mi of the fall line
Explanatory variables:								
Panel A: Census Tracts, 2000, $N = 21452$								
Dummy for proximity	1.113	1.009	1.118	1.041	0.979	1.077	0.838	1.039
to portage site	(0.340)***	(0.321)***	(0.243)***	(0.316)***	(0.330)***	(0.316)***	(0.401)**	(0.319)***
Distance to portage	−0.617	−0.653	−0.721	−0.460	−0.562	−0.577	−0.572	−0.764
site, natural logs	(0.134)***	(0.128)***	(0.118)***	(0.121)***	(0.123)***	(0.118)***	(0.177)***	(0.142)***
Panel B: Nighttime Lights, 1996–97, $N = 65000$								
Dummy for proximity	0.504	0.445	0.490	0.500	0.506	0.522	0.495	0.391
to portage site	(0.144)***	(0.127)***	(0.161)***	(0.144)***	(0.147)***	(0.155)***	(0.151)***	(0.100)***
Distance to portage	−0.188	−0.159	−0.151	−0.186	−0.196	−0.138	−0.130	−0.212
site, natural logs	(0.065)***	(0.065)**	(0.090)	(0.061)***	(0.065)***	(0.059)**	(0.101)	(0.060)***
Panel C: Counties, 2000, $N = 3480$								
Dummy for proximity to	0.912	0.850	0.770	0.939	0.912	0.884	1.074	0.915
portage site	(0.236)***	(0.206)***	(0.253)***	(0.225)***	(0.236)***	(0.216)***	(0.288)***	(0.227)***
Distance to portage site,	−0.217	−0.215	−0.202	−0.195	−0.222	−0.192	−0.487	−0.201
natural logs	(0.081)***	(0.083)**	(0.090)**	(0.067)***	(0.082)***	(0.076)**	(0.194)**	(0.120)*

shown in column (1). Being 10% farther away from a portage site predicts 6% lower population density in the tract data and 2% lower density in the lights and county data. The dummy variable for proximity predicts 50% to 110% increases in density, depending on the outcome variable used.

$$\ln density_{gr} = \zeta \cdot portage_g + \gamma \cdot portage_g \cdot (\ln watershed_r - \mu) + \tilde{\alpha}_1 D_g^{FL} + \tilde{\alpha}_2 D_g^{R} + \mathbf{Z_g}\nu + \delta_r + \varepsilon_{gr}, \tag{2}$$

where $portage_g$ is the binary indicator for the portage site described above, $\ln watershed_r$ is the natural logarithm of the watershed area upstream of fall line drained by each river r, μ is the mean of $\ln watershed$ areas across portages, and the other variables are as in equation (1).

- For a watershed of size μ, whole effect is captured by coefficient on portage dummy.
- Expect γ to be positive (portage more important when there is a large watershed above it).

UPSTREAM WATERSHED AND CONTEMPORARY POPULATION DENSITY

	(1) Basic	(2) Other spatial controls	(3)	(4) Water power	(5)
Specifications:		State fixed effects	Distance from various features		
Explanatory variables:					
Panel A: Census Tracts, 2000, N = 21452					
Portage site times	0.467	0.467	0.500	0.496	0.452
upstream watershed	(0.175)**	(0.164)***	(0.114)***	(0.173)***	(0.177)**
Binary indicator	1.096	1.000	1.111	1.099	1.056
for portage site	(0.348)***	(0.326)***	(0.219)***	(0.350)***	(0.364)***
Portage site times				−1.812	
horsepower/100k				(1.235)	
Portage site times					0.110
I(horsepower > 2000)					(0.311)
Panel B: Nighttime Lights, 1996–97, N = 65000					
Portage site times	0.418	0.352	0.456	0.415	0.393
upstream watershed	(0.115)***	(0.102)***	(0.113)***	(0.116)***	(0.111)***
Binary indicator	0.463	0.424	0.421	0.462	0.368
for portage site	(0.116)***	(0.111)***	(0.121)***	(0.116)***	(0.132)***
Portage site times				0.098	
horsepower/100k				(0.433)	
Portage site times					0.318
I(horsepower > 2000)					(0.232)
Panel C: Counties, 2000, N = 3480					
Portage site times	0.443	0.372	0.423	0.462	0.328
upstream watershed	(0.209)**	(0.185)**	(0.207)**	(0.215)**	(0.154)**
Binary indicator for	0.890	0.834	0.742	0.889	0.587
portage site	(0.211)***	(0.194)***	(0.232)***	(0.211)***	(0.210)***
Portage site times				−0.460	
horsepower/100k				(0.771)	
Portage site times					0.991
I(horsepower > 2000)					(0.442)**

(3) $\ln density_{grt} = \delta_g + \delta_{rt} + \delta_t + \zeta_t \cdot proximity_g + \mathbf{Z_g} \cdot \omega_t + \epsilon_{grt},$

where δ_g, δ_{rt}, and δ_t are fixed effects for county, watershed-year, and year. (By including county fixed effects, we control for characteristics whose value is time-invariant.) We also allow for a time-varying spatial trend in $\mathbf{Z_g}$. The variable $proximity_g$ is a binary indicator for portage site, as before, and we allow for a time-varying effect on population density. Thus, for each decade τ we can obtain estimates of the effect of portage proximity *relative to 1850*—that is, $\hat{\zeta}_\tau - \hat{\zeta}_{1850}$. (To identify the model, we normalize ζ_{1850} to zero.)

- If ζ_t is larger for later decades, this suggests that the effect of portage has risen, rather than fallen

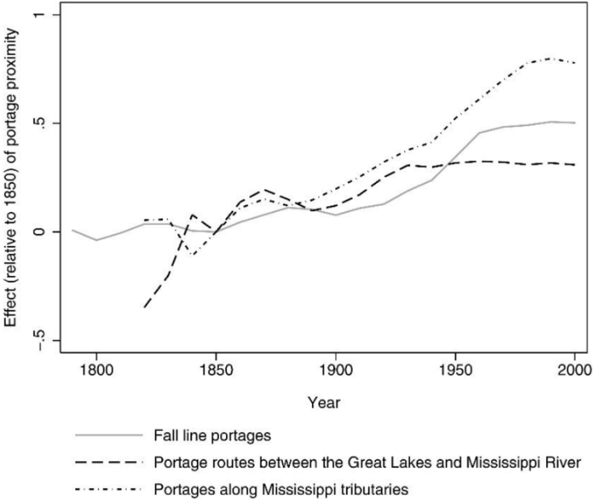


FIGURE V
Portage and Population Density, 1790–2000

INTERPRETATION

- Authors clearly believe this is path dependence/increasing returns
- However, consider that maybe it's just slow adjustment.
- Theory says that port cities today should more of certain types of capital than comparable cities (controlling for density).
- They don't fund that…

Proximity to Historical Portage Site and Contemporary Factors

	(1) Housing units, 1990	(2) Median rents, 1990	(3) Median values, 1990	(4) Interstates, 2000	(5) Major roads, 2000	(6) Rail, 2000	(7) Travel time to work, 1990	(8) Crime, 1995	(9) Born in state, 1990	(10) Water use, 1995	(11) Federal expend., 1997	(12) Gov't. empl., 1997
Explanatory variables:												
Panel A. Portage and contemporary factors												
Dummy for proximity	0.910	0.110	0.108	0.602	0.187	0.858	−0.554	1.224	0.832	0.549	1.063	1.001
to portage site	(0.243)***	(0.040)***	(0.053)**	(0.228)**	(0.071)**	(0.177)***	(0.492)	(0.318)***	(0.186)***	(0.197)***	(0.343)***	(0.283)***
Panel B. Portage and contemporary factors, conditioned on contemporary density												
Dummy for proximity	0.005	0.014	−0.001	0.159	−0.064	0.182	−0.447	−0.007	−0.025	−0.153	0.032	0.114
to portage site	(0.015)	(0.020)	(0.038)	(0.108)	(0.054)	(0.110)	(0.513)	(0.058)	(0.046)	(0.145)	(0.091)	(0.077)

Reconciling DW and BL?

- Perhaps locational fundamentals matter a lot when they are very heterogenous (e.g. in Japan).
- Perhaps, where locational fundamentals don't vary much, path dependence/increasing returns is more important.

IV. Richard Hornbeck and Daniel Keniston

"Creative Destruction: Barriers to Urban Growth and the Great Boston Fire of 1872"

Overview of Hornbeck and Keniston

- Micro evidence concerning local spillovers and agglomeration economies.
- Spillovers they focus on are very local: extend over a small part of a city.
- Focus on the Great Boston Fire of 1872.
- Test a range of predictions of a model of local spillovers.

Baseline Model (No Local Externalities)

- Flow return (for example, the rent) to a building depends on the quality of the building, q, and an economy-wide variable, ω.
- There is a fixed cost to changing q.
- The optimal (no-adjustment-cost) q is increasing in ω.
- ω is rising over time.

Predictions from the Baseline Model

- "The Fire does not increase plot land values."
- "The Fire increases average building values in the burned area, following reconstruction."
- "The Fire's impact on building values is decreasing in the quantile of building value, and is zero at the highest quantiles."
- "The Fire has the same impact on building values as individual building fires."
- "Building values and land values are unaffected in unburned areas."

Extended Model (Adds Local Externalities)

- Flow return to a building <u>also</u> depends on the average quality of surrounding buildings, Q.

- Specifically:

  - Flow return is increasing in Q.

  - The optimal (no-adjustment-cost) q is increasing in Q.

Predictions from the Extended Model: The Fire …

- "increases plot land values in the burned area."
- "increases land values in nearby unburned areas."
- "increases average building values in the burned area, following reconstruction."
- "[has an impact] on building values [that] is decreasing in the quantile of building value, … but there are … impacts at the highest quantiles."
- "increases building values in nearby unburned areas."
- "has a greater impact on building values than individual building fires."

The Sources of the Different Predictions of the Extended Model

- The extended model adds two assumptions to the baseline: The flow return is increasing in Q, and the optimal (no-adjustment-cost) q is increasing in Q.

- Are there possible reasons that one assumption might hold without the other?

- Which of the different predictions of the extended model come from which new assumption?

Why Is (or Isn't) a Large Fire Urban Fire in the Nineteenth Century a Good Way to Test for Local Spillovers?

- A big, largely random shock.
- Hypothesis that there are local externalities makes testable predictions.
- Limited role for government (for example, minimal building codes and zoning).
- But: More limited data. Applicability to other settings ("external validity")?

Figure 1. Historical Downtown Boston, the Burned Area, and Sample Plot Locations

Notes: The shaded red area was burned during the 1872 Great Fire of Boston. Small black points denote each geo-located plot in our main sample for 1867, overlaid on downtown Boston in 1867 (Sanborn Map Company).

From: Hornbeck and Keniston, “Creative Destruction”

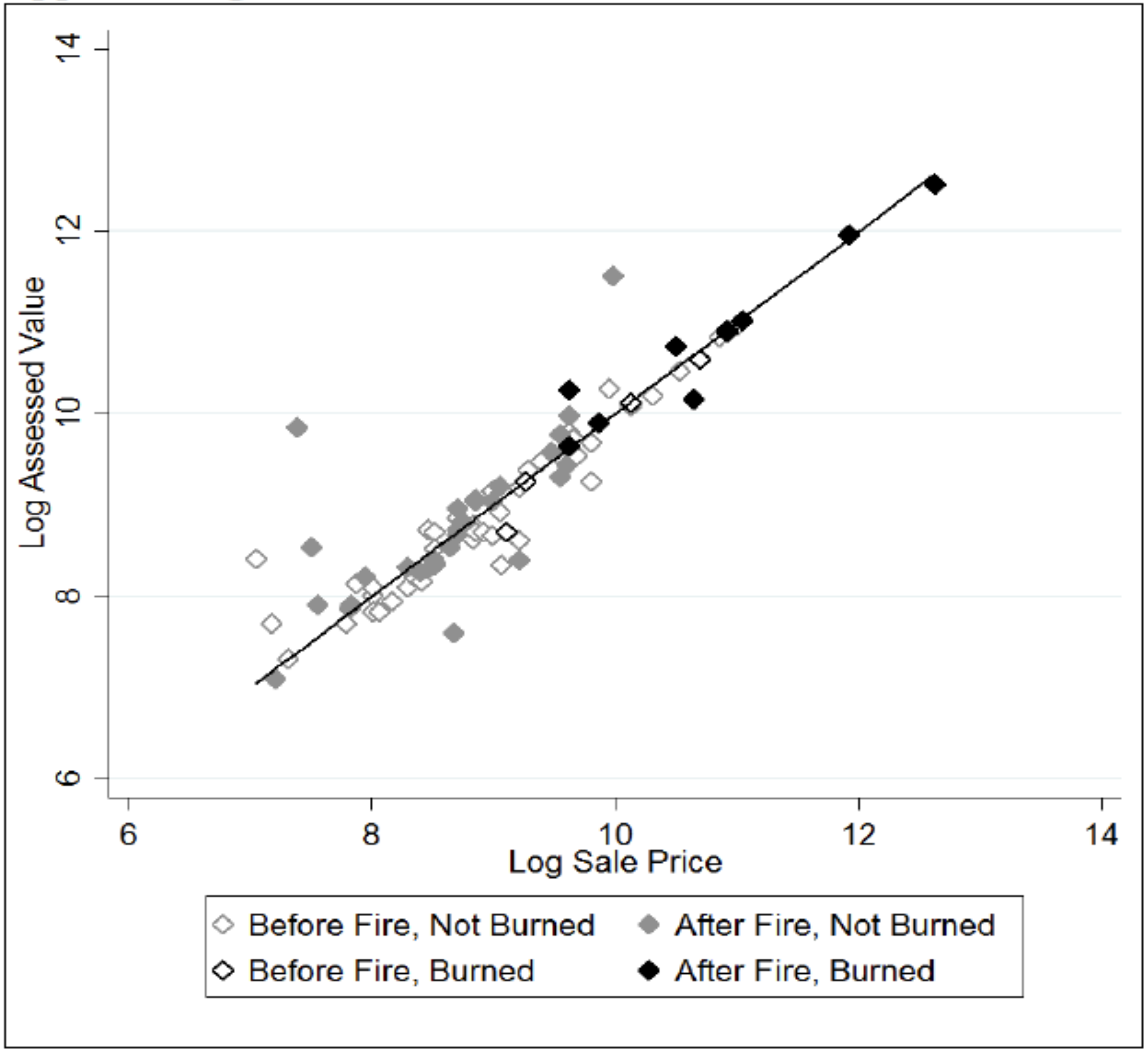
Data

- Assessed values, for each plot, of land and buildings (separately), for 1867, 1872, 1873, 1882, and 1894.
- Location of each plot (for example, relative to the fire boundary).
- Sales of plots, 1867–1894.
- Individual building fires, 1866–1891.

Possible Issues with the Data

- Assessed values vs. market values?
- Why 1867, 1872, 1873, 1882, and 1894?
- "we cannot match each plot in later years to its own characteristics prior to the fire …. As a first approx-imation, we assign each plot the average pre-Fire values over all plots within its same fixed city block in 1867 and 1872. As a closer approximation, we assign each plot the characteristics of the nearest plot in 1867 and 1872. In practice, this 'nearest neighbor' is very often that same plot in the earlier years."

Appendix Figure 5. Plot Assessed Value vs. Plot Sale Price



From: Hornbeck and Keniston, “Creative Destruction”

Other Possible Mechanisms through Which a Fire Could Affect Land and Building Values

- Government response – for example, wider streets, better water and sewage pipes.

- Rationalization – with a blank slate, locations of various types of businesses and residences are likely to be more sensible.

Tests: Recall the Predictions: The Fire …

- “increases plot land values in the burned area.”
- “increases land values in nearby unburned areas.”
- “increases average building values in the burned area, following reconstruction.”
- “[has an impact] on building values [that] is decreasing in the quantile of building value, … but there are … impacts at the highest quantiles.”
- “increases building values in nearby unburned areas.”
- “has a greater impact on building values than individual building fires.”

Essence of Test #1: Difference-in-Differences

Two years, one pre-fire, one post-fire:

$$\ln V_{it} = \alpha + \beta_1 FIREAREADUMMY_{it} + \beta_2 POSTFIREDUMMY_{it} + \beta_3 FIREAREADUMMY_{it} POSTFIREDUMMY_{it} + \beta_4' X_{it} + e_{it}.$$

Land Value

	Pre-Fire	Post-Fire
Non-Fire Area	α	$\alpha + \beta_2$
Fire Area	$\alpha + \beta_1$	$\alpha + \beta_1 + \beta_2 + \beta_3$

How much does land value rise in the non-fire area? β_2
How much does land value rise in the fire area? $\beta_2 + \beta_3$

So β_3 shows the effect on land value of fire area versus non-fire area.

Table 2. Estimated Impact on Land Values in Burned Area, Relative to 1872

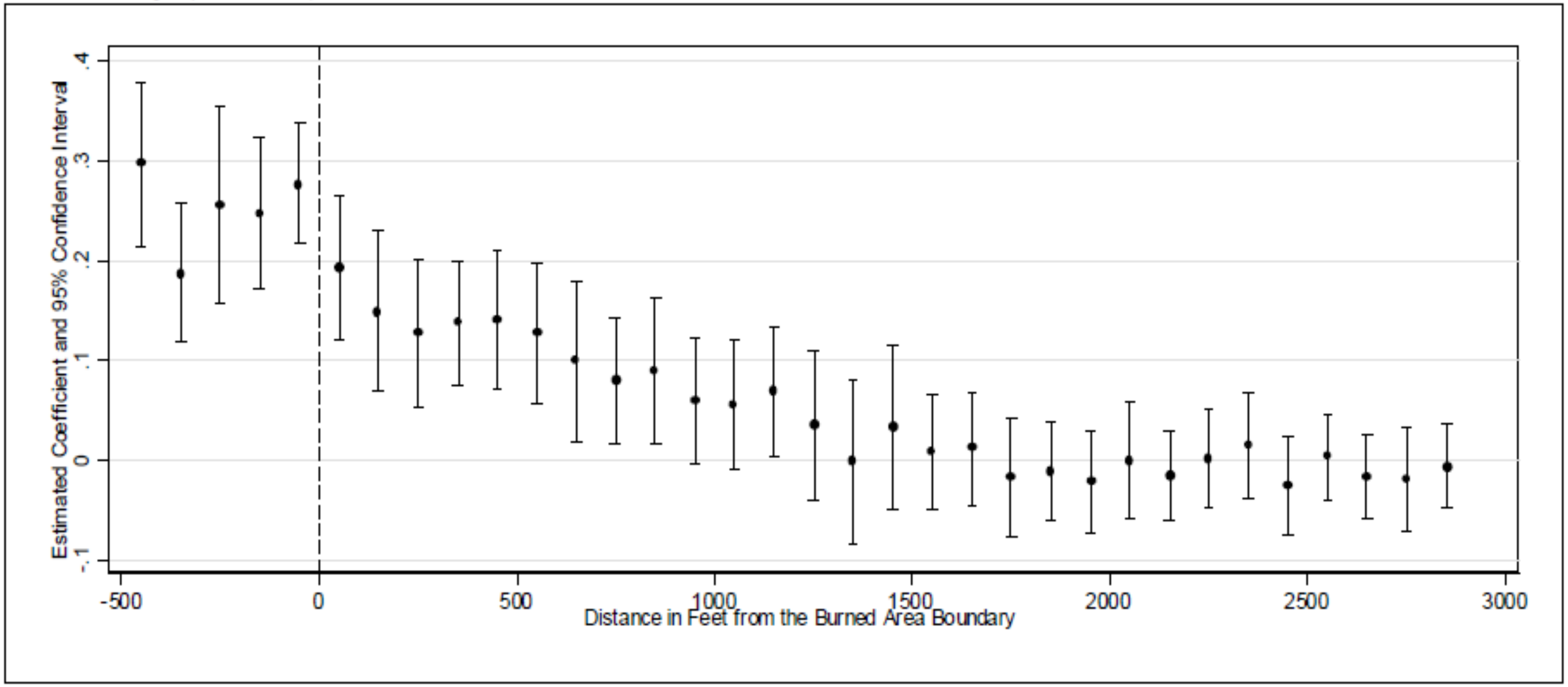
	Log Value of Land per Square Foot			
	Full Sample			
	(1)	(2)	(3)	(4)
1867 x Burned	0.174***	0.019	-	-
	(0.041)	(0.013)	( )	( )
1872 x Burned	0	0	0	0
	( )	( )	( )	( )
1873 x Burned	0.149***	0.169***	0.168***	0.172***
	(0.020)	(0.020)	(0.017)	(0.018)
1882 x Burned	0.157***	0.137***	0.139***	0.144***
	(0.043)	(0.044)	(0.040)	(0.042)
1894 x Burned	-0.102*	-0.147**	-0.172***	-0.145**
	(0.056)	(0.061)	(0.056)	(0.060)
Controls:				
Year Fixed Effects	X	X	X	X
Year FE x Pre-Fire Block Average		X		X
Year FE x Pre-Fire Neighbor Value			X	X
R-squared	0.153	0.797	0.934	0.938
Number of Plots	31302	31302	31302	31302

From: Hornbeck and Keniston, "Creative Destruction"

Essence of Test #2: Difference-in-Differences

Like Test #1, but focus on unburned area, and replace “FIREAREADUMMY” with dummies for different distances from the fire area.

Figure 5. Estimated Changes in Land Value from 1872 to 1873, by Distance to the Fire Boundary (in Feet)

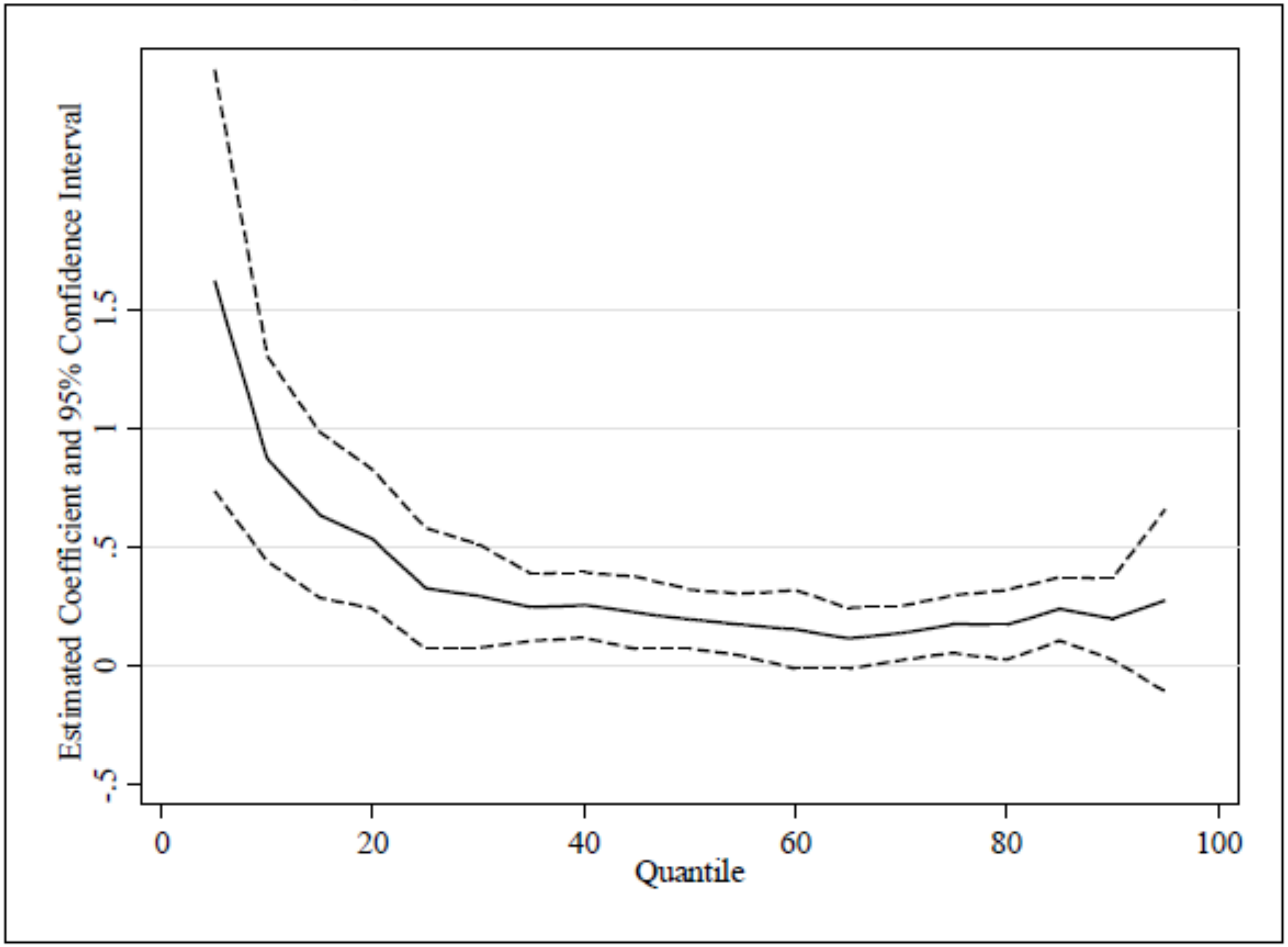


Notes: For the indicated distance from the boundary of the burned area, each circle reports the estimated change in land value from 1872 to 1873 (and the vertical lines reflect 95% confidence intervals). The omitted category is plots more than 2900 feet from the burned area. Negative distances reflect areas within the burned area, and burned plots more than 400 feet from the Fire boundary are grouped together. The empirical specification includes controls for plots' predicted land value in 1867 and 1872 based on block average and nearest neighbor.

From: Hornbeck and Keniston, "Creative Destruction"

Appendix Figure 9. Estimated Impacts on Building Value in the Burned Area, by Quantile

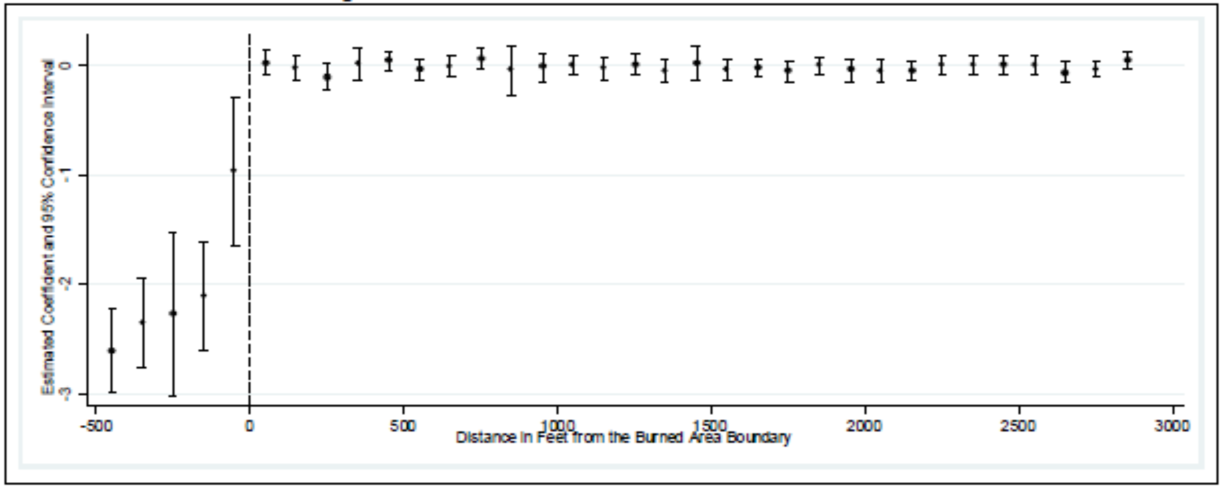
Panel A. Estimated Quantile Effects in 1882



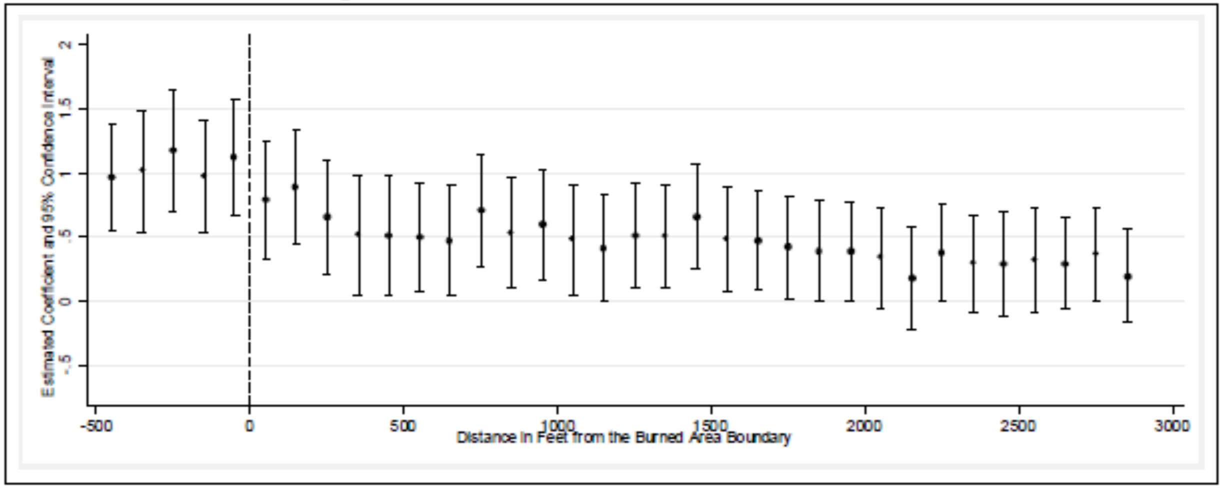
From: Hornbeck and Keniston, "Creative Destruction"

Appendix Figure 8. Estimated Impacts on Building Value, by Distance to the Fire Boundary (in Feet)

Panel A. Estimated Impacts in 1873



Panel B. Estimated Impacts in 1882



From: Hornbeck and Keniston, "Creative Destruction"

Table 5. Estimated Impact of Fire: Great Fire vs. Individual Fires

	Log Value of Building per Sqr. Ft.		Log Value of Land per Sqr. Ft.	
	Full Sample	Restricted Sample	Full Sample	Restricted Sample
	(1)	(2)	(3)	(4)
1873 x Burned	-1.950***	-1.944***	0.170***	0.129***
	(0.173)	(0.178)	(0.018)	(0.022)
1882 x Burned	0.514***	0.445***	0.142***	0.080*
	(0.059)	(0.053)	(0.042)	(0.046)
1894 x Burned	0.413***	0.247***	-0.156***	-0.200***
	(0.083)	(0.072)	(0.060)	(0.072)
~1 Year After Individual Fire	-0.127	-0.005	-0.054	-0.019
	(0.131)	(0.028)	(0.062)	(0.042)
~10 Years After Individual Fire	0.346**	0.128*	0.084	-0.008
	(0.152)	(0.068)	(0.102)	(0.156)
~22 Years After Individual Fire	0.012	-0.013	-0.210	-0.205
	(0.085)	(0.083)	(0.269)	(0.298)
Test of Equality of Individual Fire and Great Fire Effects (p-value):				
~7 Month Interval	0.000	0.000	0.001	0.002
~ 10 Year Interval	0.299	0.000	0.606	0.600
~ 22 Year Interval	0.000	0.003	0.848	0.988
Controls:				
Year Fixed Effects	X	X	X	X
Year FE x Pre-Fire Block Average	X	X	X	X
Year FE x Pre-Fire Neighbor Value	X	X	X	X
R-squared	0.788	0.744	0.938	0.889
Number of Plots	30128	10525	31219	11284

From: Hornbeck and Keniston, “Creative Destruction”

Discussion and Conclusions

- As Hornbeck and Keniston stress, their approach is silent about any effects at the level of the city as a whole.
- Might the fire have been big enough to have had substantial effects at the city level?
- Hornbeck and Keniston provide strong evidence of local spillovers, which are essential for agglomeration economies.
- But: Don't we know from the fact that cities exist that there are local spillovers?
- One strength of the analysis: It shows how a model fits with a <u>range</u> of observed phenomena.
- A role for structural modeling?