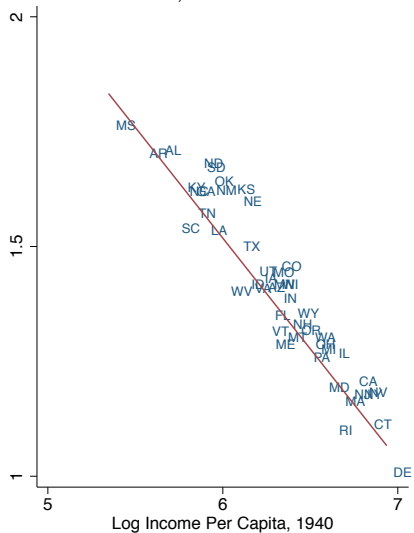# Why Has Regional Income Convergence in the U.S. Declined?

Peter Ganong (UChicago) and Daniel Shoag (Harvard)
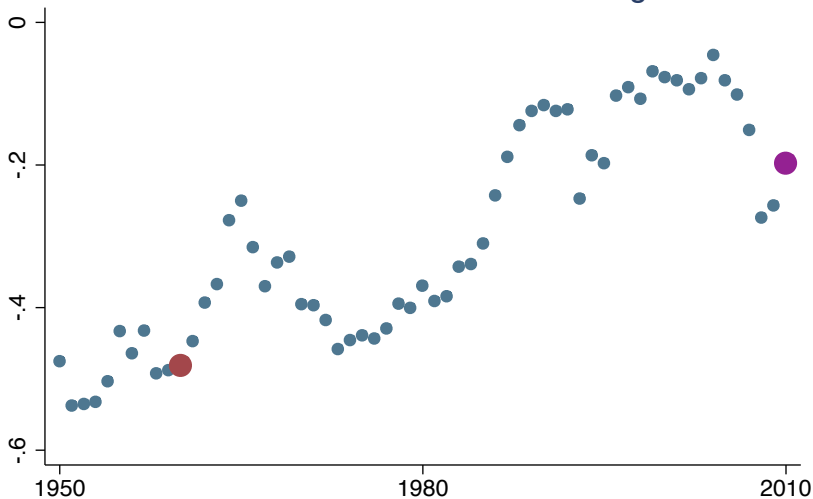
July 2016

Change in Log Income Per Capita

1940-1960, Coef: -.488 SE: .019

Change in Log Income Per Capita

1940-1960, Coef: -.488 SE: .019

1990-2010, Coef: -.198 SE: .057

Log Income Per Capita, 1940

Log Income Per Capita, 1990

Timeseries of Coefficients - Convergence

● Coef: dInc = b*inc_t-20

Change in Log Population

1940-1960, Coef: .33 SE: .07

Change in Log Population
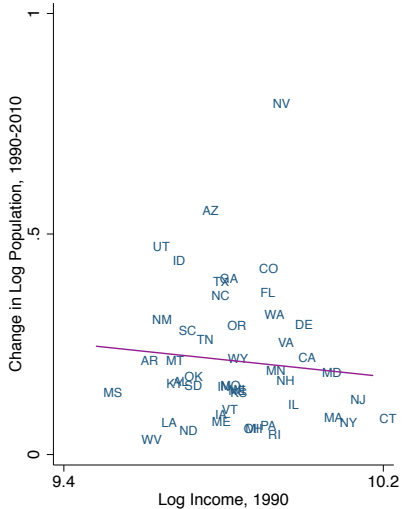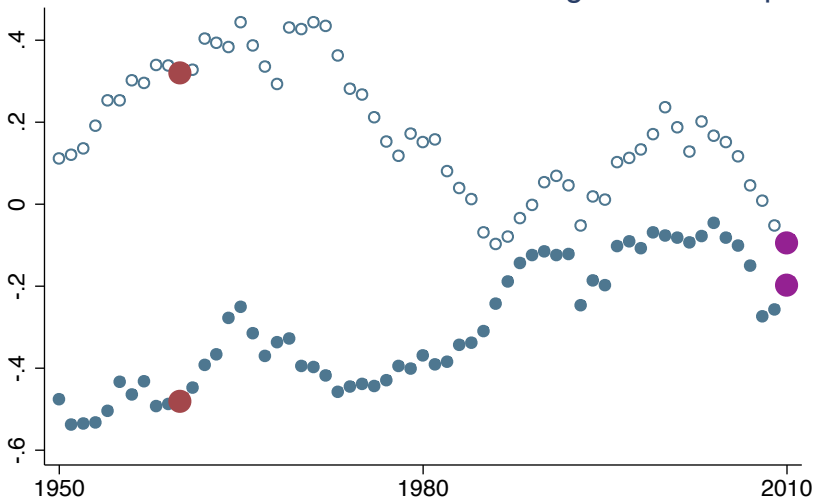
Timeseries of Coefficients - Convergence and Pop

● Coef: dInc = b*inc_t-20   ○ Coef: dPop = b*inc_t-20
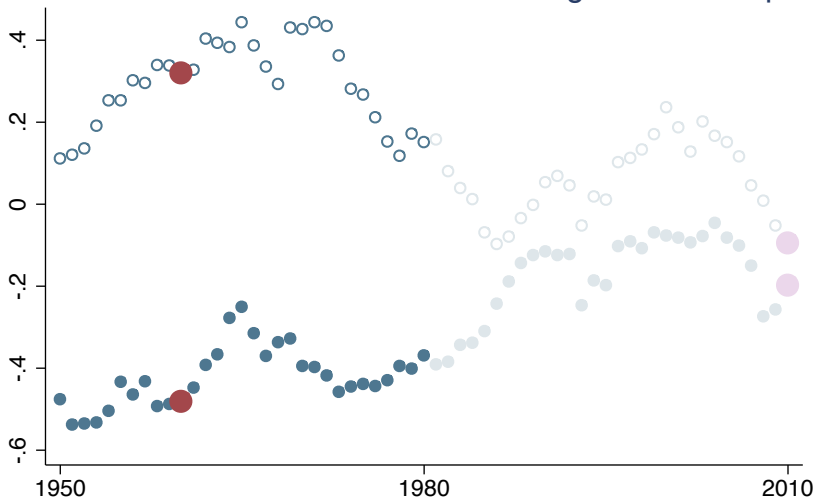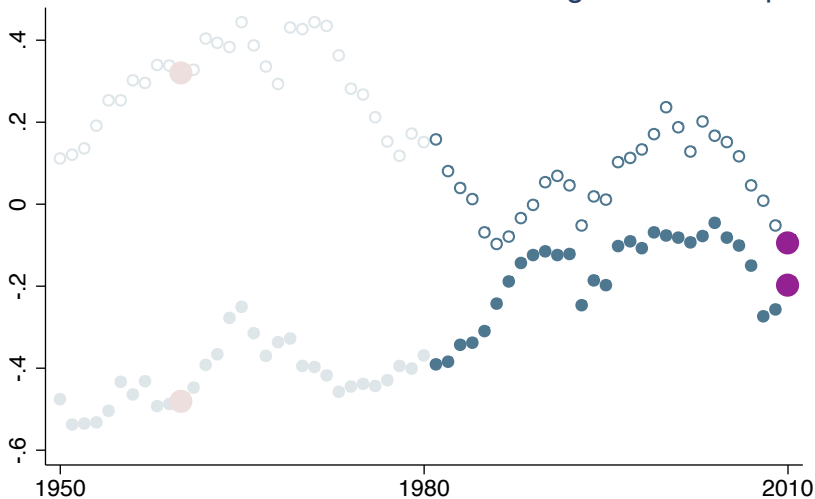
Timeseries of Coefficients - Convergence and Pop

● Coef: dInc = b*inc_t-20   ○ Coef: dPop = b*inc_t-20

Timeseries of Coefficients - Convergence and Pop

● Coef: dInc = b*inc_t-20   ○ Coef: dPop = b*inc_t-20

Outline

1. Facts About Housing Prices

2. How Does Housing Supply Affect Convergence? New Measure of Supply Restrictions

Outline

1. Facts About Housing Prices
   - Differences in Housing Prices Have Grown Relative to Differences in Incomes
   - Housing Prices Have Lowered the Returns to Living in Productive Places For Unskilled Workers
   - Migration Flows Respond to Skill-Specific Gains Net of Housing Prices

2. How Does Housing Supply Affect Convergence? New Measure of Supply Restrictions

Differences in Housing Prices

Left panel: 1960, Coef: .95 SE: .08 — scatter plot with Log Housing Value, 1960 (y-axis) vs Log Income Per Cap, 1960 (x-axis).

Right panel: 2010, Coef: 2.04 SE: .25 — scatter plot with Log Housing Value, 2010 (y-axis) vs Log Income Per Cap, 2010 (x-axis).

Changes in Returns to Migration
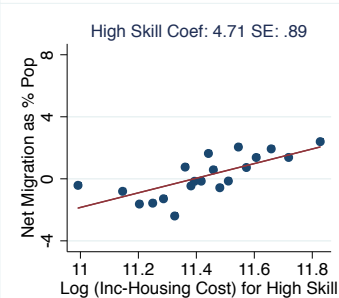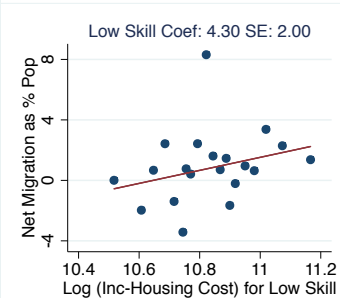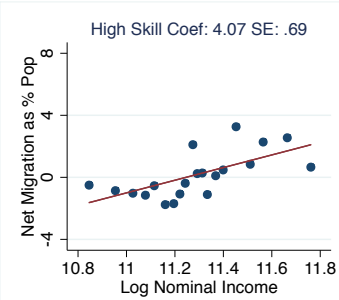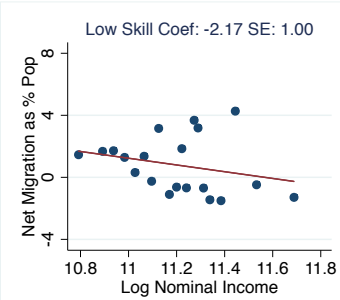
Effect of $1 of Statewide Inc on Skill-Specific Inc Net of Housing

- Unskilled HH
- Skilled HH

Migration Flows – 2000

Outline

1. Facts About Housing Prices

2. How Does Housing Supply Affect Convergence? New Measure of Supply Restrictions

A New Regulation Measure
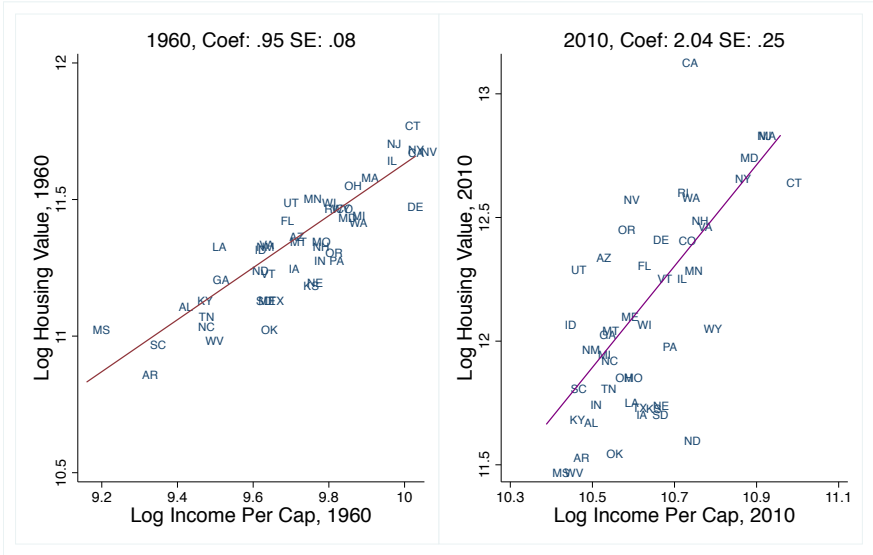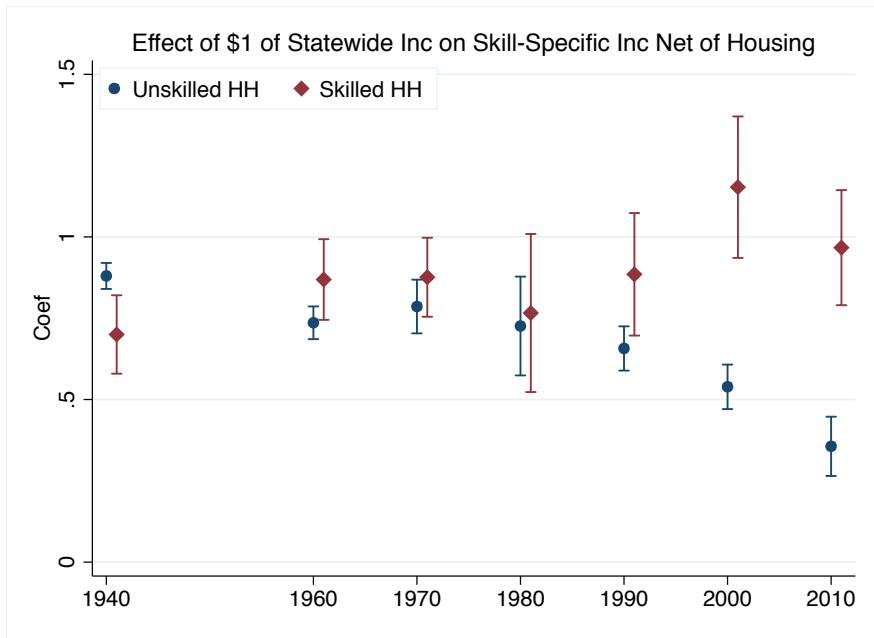
- Construction
  - Number of hits per capita from state appeals courts for "land use"
  - Omnibus measure. Captures many different anti-development tactics.
- Properties
  - correlated with cross-sectional measures
    - American Institute of Planners, 1975
    - Wharton Residential Land Use Regulatory Index, 2005
  - correlated with prices, conditional on state and year fixed effects
- Look at patterns separately for low elasticity and high elasticity states

Land Use Cases Per Million People
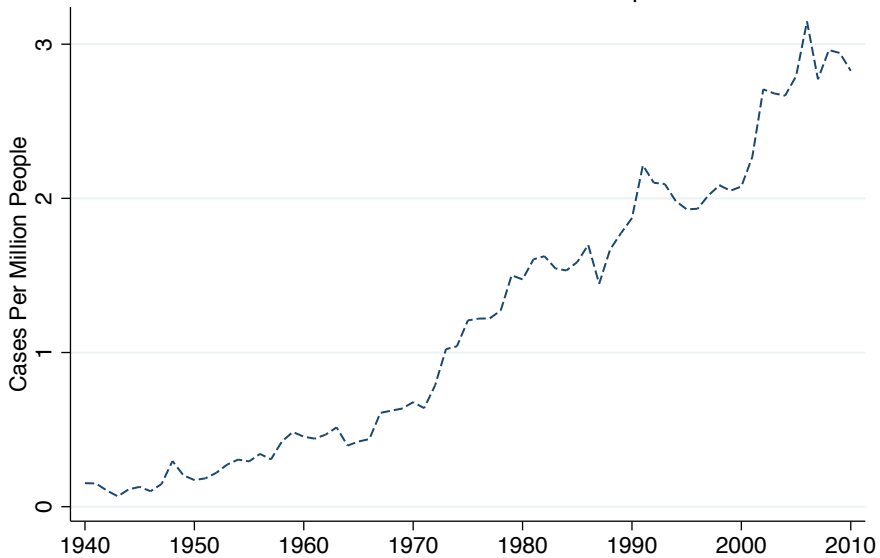
How Regulations Affect Convergence

- The previous graphs split states at the median within each year.
- We can instead exploit the regulation measure to fix a cutoff level of regulation.

$$Reg_{s,t} = Percentile\{\frac{LandUseCases_{st}}{Pop_{st}}\}$$

$$Y_{s,t} = \alpha_t + \alpha_t Reg_{s,t} + \beta Inc_{s,t} + \beta^{\text{high reg}} Inc_{i,t-1} \times Reg_{s,t} + \varepsilon_{s,t}$$

- Dependent variables: log housing prices, population, human capital (growth accounting measure from a Mincerian regression), and income.

How Regulations Affect Convergence

Dep Var	$\ln p^{house}$	$d \ln pop$	$d \ln HumanCapital$	$d \ln Inc$
Log Income	0.77***			
	(0.11)			
Log Income *Reg	0.83***			
	(0.26)			
N	384			

Indicators for Year and Year*Reg in all specifications.

How Regulations Affect Convergence

Dep Var	$\ln p^{house}$	$d \ln pop$	$d \ln HumanCapital$	$d \ln Inc$
Log Income	0.77***	1.69**		
	(0.11)	(0.64)		
Log Income	0.83***	-1.88***		
*Reg	(0.26)	(0.61)		
N	384	2,448		

Indicators for Year and Year*Reg in all specifications.

How Regulations Affect Convergence

Dep Var	$\ln p^{house}$	$d \ln pop$	$d \ln HumanCapital$	$d \ln Inc$
Log Income	0.77***	1.69**	-0.043***	
	(0.11)	(0.64)	(0.007)	
Log Income	0.83***	-1.88***	0.040**	
*Reg	(0.26)	(0.61)	(0.016)	
N	384	2,448	288	

Indicators for Year and Year*Reg in all specifications.

How Regulations Affect Convergence

Dep Var	$\ln p^{house}$	$d \ln pop$	$d \ln HumanCapital$	$d \ln Inc$
Log Income	0.77***	1.69**	-0.043***	-2.03***
	(0.11)	(0.64)	(0.007)	(0.10)
Log Income	0.83***	-1.88***	0.040**	1.30***
*Reg	(0.26)	(0.61)	(0.016)	(0.39)
N	384	2,448	288	2,448

Indicators for Year and Year*Reg in all specifications.

Regime One

Dep Var	ln p^{house}	$d \ln pop$	$d \ln HumanCapital$	$d \ln Inc$
Log Income	0.77***	1.69**	-0.043***	-2.03***
	(0.11)	(0.64)	(0.007)	(0.10)
Log Income	0.83***	-1.88***	0.040**	1.30***
*Reg	(0.26)	(0.61)	(0.016)	(0.39)
N	384	2,448	288	2,448

Indicators for Year and Year*Reg in all specifications.

Regime Two

Dep Var	ln p^{house}	d ln pop	d ln $HumanCapital$	d ln Inc
Log Income	0.77***	1.69**	-0.043***	-2.03***
	(0.11)	(0.64)	(0.007)	(0.10)
Log Income *Reg	0.83***	-1.88***	0.040**	1.30***
	(0.26)	(0.61)	(0.016)	(0.39)
N	384	2,448	288	2,448

Indicators for Year and Year*Reg in all specifications.

Omitted Variable Bias

- More generally, could there be a post-1980 shock that raised regulation levels and lowered convergence?
- Use pre-1980 measures of housing supply elasticity

Omitted Variable Bias

Dep Var:	Log Income Per Cap t - Log Income Per Cap t-20					
Constraint:	Regs in 2005		Regs in 1965		Buildable Land	
	Pre	Post	Pre	Post	Pre	Post
Log Income	-1.93***	-1.80***	-2.05***	-1.97***	-2.49***	-1.20***
	(0.11)	(0.33)	(0.15)	(0.47)	(0.06)	(0.08)
Log Income	0.22	2.01***	0.20	1.91***	-0.09	0.71***
*Constraint	(0.27)	(0.66)	(0.27)	(0.69)	(0.10)	(0.17)
N	1,248	1,200	1,248	1,200	8,413	9,194
Geo	State	State	State	State	County	County

Indicators for Year and Year*Constraint in all specifications.

Conclusion

- Weakening of directed migration and convergence in last 30 years
- Directed migration drove convergence:
  - Regional labor markets clear through skill-sorting rather than net migration. Can be explained by supply shifts.
  - Continued convergence in places with unconstrained supply
- State-level panel measure for housing regulations.
  - We are happy to share this with other researchers.

Model Overview

- Model with multiple skill types, endogenous migration, and potentially restricted housing supply.
- Proposition 1: Directed migration drives convergence
- Proposition 2: Housing prices affect migration differently by skill level

Substantive	Expositional
Regional labor demand is downward sloping	$Y = AL^{1-\alpha}$
Land is an Inferior Good within a City	$U = c^\beta (h - H)^{1-\beta}$
Migration is Costly	

Simulation