### Share of Countries over 1/3 Urbanized, by GDP per Capita (2012 \$) 1960 and 2010



Source: World Bank

## Per Capita GDP Growth 1960-2010 (Poor Countries<\$5000 PC GDP)





## Outline of Talk: Good and Bad of Cities

- Do the same factors that predict success in the wealthy world also hold for three large developing countries?
- Computer vision techniques for measuring income, infrastructure and assessing housing prices.
- Dealing with the downsides of density.
- A broad lesson: Cities are about interactions and hence institutions—like rule of law—that govern interactions are particularly critical in cities.
- CITIES AND RULE OF LAW ARE COMPLEMENTS.

#### Figure 6: Population and income residuals, 2010





#### China (urban population only)





#### Brazil (urban population only)



#### India (urban population only)



Description Law Income, C. 2 54/0 221/0 2/0 02414 as Ultras Description (D2, C. 451)

	USA	Brazil	China	India
	(MSAs)	(Microregions)	(Cities)	(Districts)
	Log wage	Log wage	Log wage	Log wage
OLS regressions				
Log of urban population	0.0538***	0.052***	0.0875	0.0770***
	(0.00720)	(0.013)	(0.0708)	(0.0264)
	R2=0.255	R2=0.321	R2 = 0.014	R2 = 0.251
Log of density	$0.0457^{***}$	0.026**	$0.192^{***}$	0.0760***
	(0.00865)	(0.010)	(0.0321)	(0.0195)
	R2=0.235	R2 = 0.318	R2=0.237	R2=0.257
Observations	28.5M	2,172 K	147K	9,778
IV1 regressions				
Log of urban population	$0.0559^{***}$	0.051***	0.0320	0.160
	(0.00753)	(0.014)	(0.102)	(0.0998)
	R2=0.256	R2 = 0.321	R2=0.173	R2=0.237
Log of density	0.0431***	0.026**	$0.169^{***}$	0.0828***
	(0.00888)	(0.011)	(0.0367)	(0.0218)
	R2=0.253	R2 = 0.318	R2=0.240	R2=0.253
Observations	28.5M	$2,172 { m K}$	143K	7,627



#### Figure 7: University graduates share and wage residuals 2010

USA

#### Brazil



#### China



Equation: Value=0-.22(0.017)+05.76(0.738)ShareBA2010 R2=0.15

India



Source: 2011-2 India Human Development Survey Equation: Value=0-.39(0.04)+05.78(0.521)ShareBA2011 R2=0.25

	U	SA	$\mathbf{Br}$	azil	$\mathbf{C}\mathbf{h}$	ina		India
	(MS)	SAs)	(Micror	$\cdot$ egions)	(Cit	ties)		$(\mathbf{Districts})$
	Log wage	Log wage	Log wage	Log wage	Log wage	Log wage	Log wage	Log wage
OLS regressions								
Share of Adult population with BA	$1.272^{***}$	1.001***	$3.616^{***}$	$4.719^{***}$	$6.743^{***}$	$5.262^{***}$	$3.215^{***}$	1.938**
	(0.155)	(0.200)	(0.269)	(0.440)	(1.088)	(0.862)	(0.851)	(0.841)
Log of density		$0.0241^{***}$		-0.029***		$0.112^{***}$		$0.0542^{***}$
		(0.00746)		(0.008)		(0.0199)		(0.0169)
R-squared	0.26	0.255	0.342	0.346	0.120	0.139	0.256	0.255
Observations (thousands)	34M	27M	$2{,}172~{\rm K}$	2,1712 K	147K	147K	12K	12K
IV1 regressions								
Share of Adult population with BA	$1.237^{***}$	$1.126^{***}$	$2.985^{***}$	$3.784^{***}$	$6.572^{***}$		$2.911^{***}$	$2.124^{**}$
	(0.202)	(0.231)	(0.332)	(0.486)	(0.925)		(0.988)	(1.074)
Log of density		$0.0216^{***}$		-0.018**				$0.0425^{**}$
		(0.00769)		(0.009)				(0.0178)
R-squared	0.254	0.255	0.341	0.344	0.120		0.240	0.243
Observations	27M	27M	$2,\!172K$	2,172 K	147K		11 K	11K

## Average Population Growth by Share with BA in 2000 (Quintiles)



#### Table 11: Human capital and growth, 1980-2010

	USA		Brazil		
	(M)	SAs)	(Microregions)		
		ulation, 1980-2010	2010		
University graduates (%)	1.621***	2.136***	4.384***	7.343***	
in 1980	(0.340)	(0.283)	(0.734)	(0.987)	
	N = 249	N=249	N = 442	N = 442	
	R2=0.084	R2=0.496	R2 = 0.055	R2 = 0.311	
Initial income levels control	No	Yes	No	Yes	
Initial population control	No	Yes	No	Yes	
Climate amenities controls	No	Yes	No	Yes	
	Log change in income per capita, 1980-2010				
University	0.224	0.637***	23.015***	17.191***	
graduates (%)	(0.140)	(0.129)	(2.206)	(1.026)	
in 1980	N = 249	N = 249	N = 442	N = 442	
	R2=0.010	R2=0.336	R2 = 0.278	R2 = 0.845	
Initial income levels control	No	Yes	No	Yes	
Initial population control	No	Yes	No	Yes	
Climate amenities controls	No	Yes	No	Yes	

T	China (Cities)		India (Districts)			
University graduates (%) in 1980	26.95***	18.93***	0.196	0.466*		
	(3.971)	(4.496)	(0.249)	(0.260)		
	N=252	N=249	N=445	N=375		
	R2=0.156	R2=0.382	R2=0.001	R2=0.120		
Initial income levels control	No	Yes	No	Yes		
Initial population control	No	Yes	No	Yes		
Climate amenities controls	No	Yes	No	Yes		
		Log change in income per capita, 1980-2010				
University graduates (%)	-12.75*	9.403	•	•		
in 1980	(7.493)	(9.615)				
	N=274	N=249				
	R2=0.011	R2=0.085				
Initial income levels control	No	Yes	No	Yes		
Initial population control	No	Yes	No	Yes		
Climate amenities controls	No	Yes	No	Yes		





Regression: RentRes = -0.08 ( 0.01) + 1.20 ( 0.02) WageRes.

#### India



Regression: Log Rent Residual=0-.12(0.05)+0.11(0.116)Log Wage Residual (R2=00)

China



Regression: Rent=.14Constant(.0424)+.72IncomeResid(.1549) (R2=.07)

USA





### Measuring Streetscapes (with Nikhil Naik)



# Proof-of-concept experiment for the U.S.



Median Income of the Census Block group: \$60,000

#### Training Examples







#### Machine Learning



Image Features Derived from Pixels

#### Predicted Income



\$54,000



### Testing Sample – New York Income





# Chinitz: Contrasts in Agglomeration: New York and Pittsburgh



#### Economic Growth and Firm Size

MSA Employment Growth (1977-2010) by Average Firm Size (1977) Quintiles



Smallest firms are in Quintile 1



A man transports children through the bustle—and fetid streets—of Mumbai's Dharavi slum. Conditions like this are similar to those that faced many residents of Paris, London, New York, and other large cities in the nineteenth century. *Prashanth Vishwanathan / Bloomberg / Getty Images* 

# A Trio of Failures: Politics, Public Management, Law

- Public Management Failures means that the projects are poorly performed and corruption and waste are rife.
  - Economics of Corruption, Public Private Partnerships
- Legal failures mean that private property is unsafe and that it is impossible to deal with the negative externalities with effective incentives.
  - Economics of Crime, Law and Economics
- Political failures means the wrong projects (or no projects) get built the direction of policy is wrong.
  - Political Economy

## Public Management Failure: Tweed's Infamous Courthouse



# Political Failures: Detroit's Infamous People Mover

Detroit tried to reverse its decline with foolish investments like its People Mover, which here glides over essentially empty streets.

Dennis MacDonald/ World of Stock



## A Tale of Two Technologies

- Many urban services can be provided by a cheap individual technology and a (socially if not privately) costly shared technology:
  - Sewage system vs. Pit Latrine
  - Shallow Well vs. Aqueducts and Piped Water
  - Jitneys vs. Public BRT/Rail System
  - Also cheap private schools, private secturity, etc.
- We focus on cases where the individual option generates negative externalities, which means that there is a case for inducing adoption of the collective technology.

### A Tale of Two Technologies







### The Last Mile Problem in Zambia

- 1975-1983, the World Bank had provided Zambia with \$20 million for Lusaka Squatters
- Plan for upgrading 26,000 households (with access to communal taps– like NYC hydrants).
- Households applied for water, but not sewers.
  - Externalities are a larger share of benefit for sewers
- Cost of connection is about \$960 high relative to incomes.
- Massive infrastructure program has had far too little impact because of nonadoption.
- Unclear ownership reduces incentive to invest.
- Public sector has a strong anti-subsidy bent.
- But they don't really want to impose penalties either.
  - Current fees are typically not collected (10% in one study).



New York City's Department of Health shows the timeline of the city's mortality rate, which sharply dropped with the provision of clean water in the nineteenth century.

New York City Department of Health and Mental Hygiene

### Executive vs. Judicial Incapacity



### Property Rights and Urban Governance

- Ownership entails responsibilities. With ownership comes the ability to fine for not taking actions that create social costs.
- Ownership also creates the possibility for property taxes.
  - Use computer vision techniques for mass appraisal.
- But demand for titling in a world where property rights remain uncertain often seems week.
- How to predict prices with computer vision techniques.

### Figure 2. Experts' Assessment of Undue Influence over Judges



### World Justice Project Survey Data

Figure 1. Popular Perception of Undue Influence over Judges



Table 1: Perceived Fairness of Government Takings					
	Government compensates homeowners fairly for taking	Homeowners sue government for unfair compensation	Court awards homeowners fair compensation	Judges stop illegal government decision	
	(1)	(2)	(3)	(4)	
		Linear Probe	ability <mark>Mode</mark> l		
Post-Graduate Degree	0.065***	0.027**	0.042**	0.059***	
	(0.014)	(0.012)	(0.016)	(0.013)	
College Degree	0.028**	0.025***	0.014	0.054***	
	(0.011)	(0.009)	(0.012)	(0.011)	
High School or	0.012	-0.010	-0.003	0.028***	
Middle School Diploma	(0.009)	(0.006)	(0.009)	(0.008)	
Homeowner	0.015**	0.012**	0.020***	0.027***	
	(0.006)	(0.005)	(0.006)	(0.006)	
Adjusted R-Squared	0.103	0.145	0.094	0.123	
Country Fixed Effects	Yes	Yes	Yes	Yes	
Number of Observations	94,582	95.080	93,461	93,781	

#### Table 2: Resolution of Contract Disputes

	Had contract dispute during past 3 years	Resorted to courts for dispute resolution	Court process was objective and unbiased	Courts guarantee everyone a fair trial
	(1)	(2)	(3)	(4)
	i.	Linear Prob	ability Model	
Post-Graduate Degree	0.054***	0.032	0.084*	0.051***
	(0.008)	(0.025)	(0.049)	(0.013)
College Degree	0.034***	0.058***	0.056	0.031***
	(0.007)	(0.018)	(0.044)	(0.011)
High School or	0.013***	0.011	0.060	0.005
Middle School Diploma	(0.004)	(0.016)	(0.043)	(0.009)
Homeowner	- 0.002	0.022*	- 0.002	0.017**
	(0.005)	(0.013)	(0.021)	(0.007)
Adjusted R-Squared	0.072	0.106	0.102	0.158
Country Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	96,125	10,857	3,362	93,082

