TRIUMPH OF THE CITY
How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier and Happier.

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(Harvard University)

Institutional Greetings
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Introduction and Chair
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Wednesday 25 March 2015, h. 15:00
Scuola di Economia e Studi Aziendali - Roma Tre University
Average Population Change, 2000-2010

Average Per Capita Income, 2000

Population Density

Per Capita Income, 2000

Population Change, 2000-2010

Source: U.S. Census
Change in Housing Prices, 2001-2006 vs. 2006-2011

- Detroit
- Houston
- Las Vegas
- New York
- Phoenix
- DC

-1
-.75
-.5
-.25
0
.25
“I regard the growth of cities as an evil thing, unfortunate for mankind and the world.”
USA data is from the 2005 ACS. China data is from the 2005 Census. India data is from the 2005 IHDS (India Human Development Survey).
Per Capita GDP Growth 1960-2010
(Poor Countries<$5000 PC GDP)

Urbanization in 1960 vs. GDP Growth 1960-2010

- Burundi
- Liberia
- Niger
- Malawi
- Sierra Leone
- Central African Republic
- Afghanistan
- Uganda
- Rwanda
- Nepal
- Zimbabwe
- Bangladesh
- Benin
- Kenya
- Cambodia
- Pakistan
- Senegal
- Cameroon
- Cote d'Ivoire
- Zambia
- Ghana
- Papua New Guinea
- India
- Nicaragua
- Sudan
- Bolivia
- Honduras
- Philippines
- Sri Lanka
- Iraq
- Egypt, Arab Rep.
- Morocco
- Guatemala
- Syrian Arab Republic
- Congo, Rep.
- El Salvador
- Ecuador
- China
- Algeria
- Thailand
- Jamaica
- Dominican Republic
- Peru
- Colombia
- South Africa
- Panama
- Costa Rica
- Malaysia
- Mexico
- Turkey
- Brazil
- Uruguay
- Chile
- Uruguay
- Korea, Rep.
- Portugal
- Brazil
- Greece
- Spain
- Hong Kong SAR, China
- Singapore
- Japan
Life Satisfaction by Percent Urbanization (Quintiles)
Cities are so monumental that we easily forget how fast they can fall—and rise. In the 1970s, New York verged on bankruptcy; President Ford refused to bail it out (left), and President Carter toured the grim ruins of the South Bronx (above). Three decades before these iconic images, Gotham had been an urban paragon, and three decades after them, it is again.

[Art 1:] New York Daily News Archive / Getty Images
[Art 2:] Teresa Zabala / The New York Times / Redux Pictures
The Chicago Home Insurance Building, built in 1885, is widely considered the world’s first metal-framed skyscraper. This technology would come to dictate the shape of most cities in the twentieth century and beyond.

*Chicago History Museum/Getty Images*

Until nearby commercial structures began to dwarf it in 1890, Trinity Church had been New York’s tallest building for forty years. The two buildings to the church’s left held that honor for thirty years until they were destroyed in a terrible attack that ultimately illustrated the resilience of a great city.

*Jeff Greenberg/ World of Stock*
Ford’s Big Idea (River Rouge)
The Decline of the Costs of Moving Goods

Dollars per Ton Mile (Real)

Railroad Revenue per Ton Mile

year

1890 2000

.02323

.185063
Population Growth over Quintiles of January Temperature
EUROPE, NUTS3
N=169

Source: Eurostat & European Climate Assessment
Figure I: The Projected System of Interstate Highways in 1947
Levittown, New York, provided thousands of mass-produced homes that helped America rebuild itself around the car.

_Hulton Archive/ Getty Images_

The Woodlands, outside Houston, shows how much more luxurious and sylvan large-scale suburban development has become since Levittown. Unfortunately, the expansion of the exurbs has lead to more carbon intensive lifestyles. All that greenery is really pretty brown.

© Ted Washington  (per permission grant)
<table>
<thead>
<tr>
<th>City</th>
<th>1950 Pop.</th>
<th>2010 Pop.</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>7,891,957</td>
<td>8,175,133</td>
<td>+4 %</td>
</tr>
<tr>
<td>Chicago</td>
<td>3,620,962</td>
<td>2,695,598</td>
<td>-26%</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>2,071,605</td>
<td>1,526,006</td>
<td>-26%</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>1,970,358</td>
<td>3,792,621</td>
<td>+92%</td>
</tr>
<tr>
<td>Detroit</td>
<td>1,849,568</td>
<td>713,777</td>
<td>-61%</td>
</tr>
<tr>
<td>Baltimore</td>
<td>949,708</td>
<td>620,961</td>
<td>-34%</td>
</tr>
<tr>
<td>Cleveland</td>
<td>914,808</td>
<td>396,815</td>
<td>-56%</td>
</tr>
<tr>
<td>St. Louis</td>
<td>856,796</td>
<td>319,294</td>
<td>-63%</td>
</tr>
<tr>
<td>Washington</td>
<td>802,178</td>
<td>601,723</td>
<td>-25%</td>
</tr>
<tr>
<td>Boston</td>
<td>801,444</td>
<td>617,594</td>
<td>-23%</td>
</tr>
</tbody>
</table>
Subjective Well-Being Across Space
Subjective Well-Being and Population Growth

Happiness after exogenous demographic controls, 2005-2010

Change in Log Population, 1950-2000
Will the last person to leave Seattle please turn out the lights?

Alfred Peet

Photo by Postdil
Average Population Growth by Share with BA in 2000
(Quintiles)
Wage residuals and Population with BA degree

District-level observations for India

NOTE: Using data from the Indian Human Development Survey (2005) and the General Census (2001)
From his experience on Wall Street, New York’s Mayor Michael Bloomberg learned the value of face-to-face connection, and he turned City Hall into a wall-less bullpen that enables the speedy flow of information.

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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
The Strength of Favelas
### Poor (under $1200 p.c.), Populous Countries that are one-third urban,

<table>
<thead>
<tr>
<th>Country</th>
<th>Largest City (Population)</th>
<th>Percent Urbanized</th>
<th>Percent in Million+ Agglomeration&gt;</th>
<th>GDP P.C. 2010$ (PPP Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congo (Dem. Rep)</td>
<td>Kinshasa (9 Million)</td>
<td>.34</td>
<td>.17</td>
<td>210 (330)</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>Harare (1.6-2.8 Million)</td>
<td>.38</td>
<td>.12</td>
<td>625 (missing)</td>
</tr>
<tr>
<td>Mali</td>
<td>Bamako (1.8 million)</td>
<td>.34</td>
<td>.13</td>
<td>650 (1100)</td>
</tr>
<tr>
<td>Haiti</td>
<td>Port-au-Prince (1 – 2.4 Million)</td>
<td>.52</td>
<td>.21</td>
<td>700 (1000)</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Karachi (23.5 Million)</td>
<td>.36</td>
<td>.19</td>
<td>1100 (2400)</td>
</tr>
<tr>
<td>Senegal</td>
<td>Dakar (1-2.5 Million)</td>
<td>.42</td>
<td>.24</td>
<td>1100 (1700)</td>
</tr>
</tbody>
</table>
Urbanization and GDP in USA

Sources: European Urbanization 1500-1800 by Jan de Vries, United Nation World Urbanization Prospects, Maddison Project Database
Urbanization and GDP in UK

Sources: European Urbanization 1500-1800 by Jan de Vries, United Nation World Urbanization Prospects, Maddison Project Database
<table>
<thead>
<tr>
<th>World's Largest Cities through history (Chandler et alia)</th>
<th>Year reached one million (world maximum until 1800)</th>
<th>Approximate per capita income $2012 (generally Maddison)</th>
<th>Extenuating Circumstances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rome</td>
<td>1</td>
<td>$1400– Italy $1000– Empire</td>
<td>Strength abroad – weakness at home and political change</td>
</tr>
<tr>
<td>Chang’an, Kaifeng, Hangzhou</td>
<td>800 1000 1200</td>
<td>$820</td>
<td>Political centers of a vast empire– figures highly debatable</td>
</tr>
<tr>
<td>Baghdad</td>
<td>900</td>
<td>$1144</td>
<td>Highly centralized Abbasid Caliphate</td>
</tr>
<tr>
<td>Beijing</td>
<td>1800</td>
<td>$1050</td>
<td>Small share of overall country</td>
</tr>
<tr>
<td>Edo/Tokyo</td>
<td>1725</td>
<td>$1000</td>
<td>Metro Region</td>
</tr>
<tr>
<td>London</td>
<td>1810</td>
<td>$3000</td>
<td>Just predates mass industrialization</td>
</tr>
<tr>
<td>New York</td>
<td>1875</td>
<td>$4750</td>
<td>First non-political mega-city</td>
</tr>
</tbody>
</table>
Three Questions

• Why are very poor countries urbanizing so rapidly, when the west didn’t urbanize until they were much richer?

• Is this urbanization at such low income levels good or bad?

• How can economics help understand and hopefully mitigate the problems that accompany poor world mega cities?
  
   – A microeconomic and institutional approach
Understanding the Urbanization

• A model with tools that borrow from Krugman (1991) and an insight from Matsuyama (1992).

• The key idea is that global trade mitigates the need to develop agricultural productivity and national transportation infrastructure.
  – Food is substantially cheaper than it was (US wheat dropped 75 percent in real costs 1920-2006) in 1920.

• The model also helps to explain the different pattern of European cities (with far fewer mega-cities).
Simulation # 1: Open Economy, Highly Productive Manufacturing

Urbanization Rate

Rural Welfare

Urban Welfare

0.5

1

Urbanization Rate
Simulation # 2: Open Economy, Less Productive Manufacturing
Simulation # 3: Open Economy, More Productive Agriculture

Graph showing the relationship between Urbanization Rate and Rural Welfare, Urban Welfare.
Government Ineffectiveness and Urbanization
Simulation #4: Closed Economy, More Productive Agriculture

Urbanization Rate

Rural Welfare

Urban Welfare

Urbanization Rate
Simulation # 5: Closed Economy, Less Productive Agriculture

Urbanization Rate

Rural Welfare

Urban Welfare

0.5

1

-1

0

1

2

Urbanization Rate

Rural Welfare

Urban Welfare
Core Results

• In an closed economy, there will exist a unique equilibrium that is independent of urban productivity, but urbanization will be rising with rural productivity, and falling with transport costs, and overall population.

• In an open economy, there will typically exist multiple equilibria or only all agriculture and the middle one is not stable.

• In the stable equilibrium, urbanization rises with urban productivity, the manufactured good price and amenities and declining with rural productivity and rural transportation.

• In the past, agricultural development needed to precede urbanization, but that is no longer true in an open world.
Table 3:  
Urbanization and Agricultural Productivity, 1961 and 2010

<table>
<thead>
<tr>
<th>Year:</th>
<th>(1) 1961</th>
<th>(2) 1961</th>
<th>(3) 2010</th>
<th>(4) 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log of Agricultural Productivity</td>
<td>0.095***</td>
<td>0.051**</td>
<td>0.054***</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.021)</td>
<td>(0.018)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>Log of Agricultural Productivity * Demeaned Log of Population</td>
<td>0.038***</td>
<td>0.025**</td>
<td>0.025***</td>
<td>0.021**</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>(0.010)</td>
<td>(0.009)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>Log of Population</td>
<td>-0.205***</td>
<td>-0.134**</td>
<td>-0.157***</td>
<td>-0.122**</td>
</tr>
<tr>
<td></td>
<td>(0.070)</td>
<td>(0.056)</td>
<td>(0.056)</td>
<td>(0.051)</td>
</tr>
<tr>
<td>Observations</td>
<td>119</td>
<td>119</td>
<td>139</td>
<td>139</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.189</td>
<td>0.531</td>
<td>0.085</td>
<td>0.304</td>
</tr>
</tbody>
</table>

Notes:  
Standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Agricultural productivity is defined as cereal yield in kilograms per hectare times hectares per capita. The interaction between agricultural and population has demeaned the population in the given year so that the raw coefficient on agricultural productivity can be interpreted as the impact of agricultural productivity at the mean level of population. Data comes from the World Bank. Standard errors are in parentheses. A constant is included in the regression but not reported.
Welfare Analysis

• In the open economy, the social benefits of adding more urban population depend on
  – (1) urban-rural welfare (should be zero),
  – (2) urban agglomeration economies,
  – (3) congestion in rural sector,
  – (4) urban amenity diseconomies

• In a closed economy, you add on a price effect because even though prices are transfers the marginal utility of consumption is not necessarily equal (Stone-Geary).
The Search for Optimal City Size

• It is awfully hard to say anything sensible about these combined terms.
• Agglomeration economies mean market failures but that’s not enough to justify government action.
• I often think that the macro-approach to regional development/optimal city size is doomed.
  – As opposed to focusing on particular urban problems.
• Does agglomerating the Mezzogiorno mean de-agglomerating Milan and which yields greater externalities?
Many vs. One City

• In the closed economy model, there is a real advantage to urbanites and rural people together for cities to be spread out—especially when transport costs are high.

• In an open economy, there is only an advantage to rural dwellers, and typically the urbanites would benefit by co-location.

• Holding urbanization rates constant, Europeans are 15 percent less likely to live in agglomerations of over 1 million.
Is the rise of poor cities bad?

• Theory is ambiguous. Requires certainty about externalities when we have none.
• Externalities may be more severe in these areas, but the available Chinese and Indian data suggest that agglomeration economies may be as well.
• Growth data shows interesting correlations.
• I am left facing the challenges of urban disamenities, not wanting to ban cities.
The Demons of Density

• Urban density spreads the flow of contagious disease and the congestion of roads.
• It facilitates crime, by providing targets, facilitating escape and breaking down old social structures.
• Urban density also means higher land prices.
• All of this can be handled with technology, money or good governance.
• The problems of today are probably harder than in the past (cars, global diseases).
The Need for Institutional Analysis

• The great urban problems are microeconomic – they hinge on externalities that multiply at density.
• The ability to address these problems relies on both technology and political competence.
• Engineers understand the technology– economists have dealt with the behavioral response– but we haven’t really addressed the urban policy– institution nexus.
Core Ideas of Cities and Externalities

• Faced by difficult circumstances—places face a stark tradeoff between dictatorship and disorder.

• City Size increases the costs of disorder larger—crime, riots, fires, plagues.

• But can also make order more difficult.

• Creates potential non-monotonicities, depending on which effect dominates.
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
Infrastructure and Institutions

• The behavioral response problem – driving on highways to the point that they become useless—abuse of parks, sidewalks.

• The ability to regulate these uses is institutional—economists have often devised optimal pricing schemes that are not well suited for poorer places. (architects too)

• Infrastructure is hard to evaluate using randomized trials.

• Political institutional analysis is appropriate.
Tweed Courthouse
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*
Congestion in Singapore
<table>
<thead>
<tr>
<th>Low Protection of Land Rights</th>
<th>High Level of Building Regulation</th>
<th>High Protection of Land Rights</th>
</tr>
</thead>
</table>
The great urbanist Jane Jacobs looks none too happy with the tall buildings surrounding her. She argued vigorously against such high-rises and in favor of a low-slung cityscape like that of New York’s Greenwich Village. Her arguments have not all proven correct.

Bob Gomel/ Time & Life Pictures/Getty Images
Figure: Manhattan permits, units vs. Real housing prices (Four-year moving averages)

- Manhatten permits, units
- Real housing prices


Permits and prices show fluctuations over time.
Median Housing Value by Population Growth

- Marin County, California
- San Mateo County, California
- Santa Clara County, California
- Pitkin County, Colorado
- Nantucket County, Massachusetts
- New York County, New York
Why the combination of heavy regulations and light rule of law?

• Hypothesis # 1: Inappropriate institutional borrowing (blame the UK land use planners)
• Hypothesis # 2: Corrupt officials like all those rules (economists’ favorite— but better for explaining maintenance not origination)
• Hypothesis # 3: Cost of enforcement— ex ante prevention of construction is easy— ex post removal of extra-legal settlers is hard.
The High Cost of Overregulating Height

Mumbai has recently begun building up, but the city is still short, expensive, and congested because of decades of overrestricting height.  Scott Eels / Bloomberg / Getty Images
Climate Change and the City?
Electricity Use per Capita, 2010
by Urbanization Quintiles, 2010

Least Urbanized in Quintile 1
Source: World Bank
# Marginal Effect: City-Suburb Differences in CO$_2$ Output Emissions

## Top 10 MSAs

<table>
<thead>
<tr>
<th>MSA</th>
<th>City-Suburb Difference in Emissions from Driving (Lbs of CO2)</th>
<th>City-Suburb Difference in Emissions from Public Transportation (Lbs of CO2)</th>
<th>City-Suburb Difference in Emissions from Home Heating (Lbs of CO2)</th>
<th>City-Suburb Difference in Electricity (Lbs of CO2)</th>
<th>City-Suburb Difference in Carbon Dioxide Emissions Cost ($ per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York, NY</td>
<td>7,105</td>
<td>-2,367</td>
<td>5,953</td>
<td>5,637</td>
<td>351</td>
</tr>
<tr>
<td>Nashville, TN</td>
<td>8,002</td>
<td>-649</td>
<td>1,700</td>
<td>4,416</td>
<td>290</td>
</tr>
<tr>
<td>Boston, MA</td>
<td>7,197</td>
<td>-1,091</td>
<td>5,863</td>
<td>158</td>
<td>261</td>
</tr>
<tr>
<td>Minneapolis-St. Paul, MN</td>
<td>5,934</td>
<td>-105</td>
<td>2,661</td>
<td>2,539</td>
<td>237</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>6,128</td>
<td>-2,280</td>
<td>2,176</td>
<td>4,518</td>
<td>227</td>
</tr>
<tr>
<td>Cincinnati, OH</td>
<td>4,255</td>
<td>-383</td>
<td>-204</td>
<td>6,427</td>
<td>217</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td>6,587</td>
<td>-1,242</td>
<td>1,324</td>
<td>3,136</td>
<td>211</td>
</tr>
<tr>
<td>Philadelphia, PA</td>
<td>7,030</td>
<td>-2,286</td>
<td>1,221</td>
<td>3,519</td>
<td>204</td>
</tr>
<tr>
<td>Houston, TX</td>
<td>2,846</td>
<td>-561</td>
<td>1,597</td>
<td>5,379</td>
<td>199</td>
</tr>
<tr>
<td>Hartford, CT</td>
<td>6,814</td>
<td>-2,905</td>
<td>2,762</td>
<td>2,314</td>
<td>193</td>
</tr>
</tbody>
</table>
The Boston Hypothesis

• Cities are part of changing institutions.
• At the simplest level, density enables the formation of crowds—riots and revolutions start in city.
• Also, the spread of ideas among malcontents (Adams and Hancock).
• But even more importantly if cities are forges of human capital, this human capital is then the stuff of forging better institutions.