Stylised facts about cities
& some policy implications

Regional and Urban Economics

University of Geneva, 2012

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2006—A major Landmark

- **Over half** of the world population is urbanised
  - World urban population growths by 100 million annually

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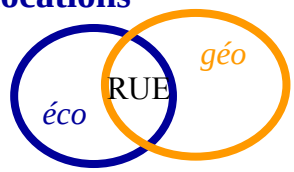
What is RUE?

- Urban and regional economics adds **geographical space** to economic analysis
  - People live and produce in certain **locations**
  - Moving costs or people is **costly**
- A main focus: **land**
  - **Immobile**, associated with a **unique** location
  - RUE study **land use** and **land price** as a function of this location



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Core-Periphery patterns

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(Core-Periphery patterns)

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(Core-Periphery patterns)

(Core-Periphery patterns)

- Cities are the centre of economic activity
- E.g. Japan's 3 Core Metro Areas
  - 5.2 % of area of Japan
  - 33% of its pop.
    - 31% of its manufacturing employment
  - 40% of its GDP
  - 0.18% of area of East Asia but 29% of its GDP!

(Core-Periphery patterns)

- Production is spatially concentrated
  - **US**: 100 most active counties
    - 1.5% of US land area
    - 41.2% of US manufacturing employment
  - **France**: Ile-de-France (Paris metro area)
    - 2.2% of area, 18.9% of its population, 30% of its GDP
    - Inside Ile-de-France, only 12% of available land used for housing, plants and roads
    - (88% forests, agriculture, natural activities)

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(Core-Periphery patterns)

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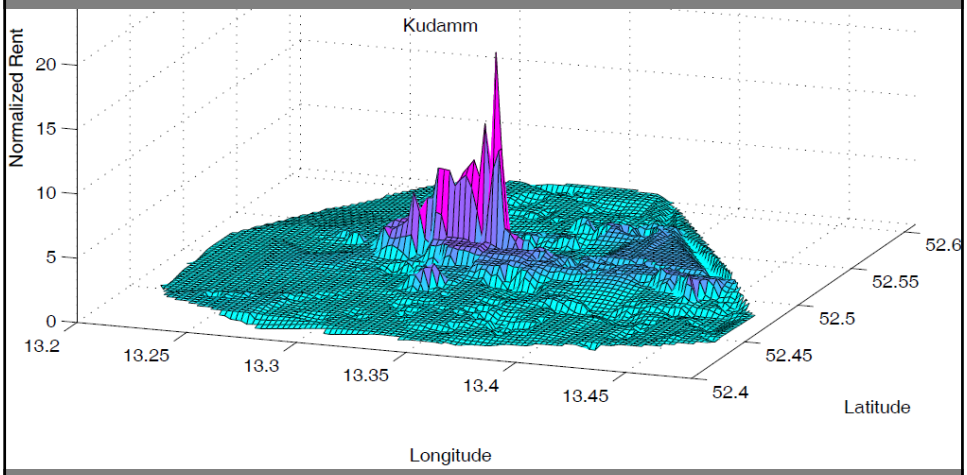
(Core-Periphery patterns)



West Berlin land rent in 1986. *Source*: Ahlfelt, Redding, Sturm and Wolf (2010)

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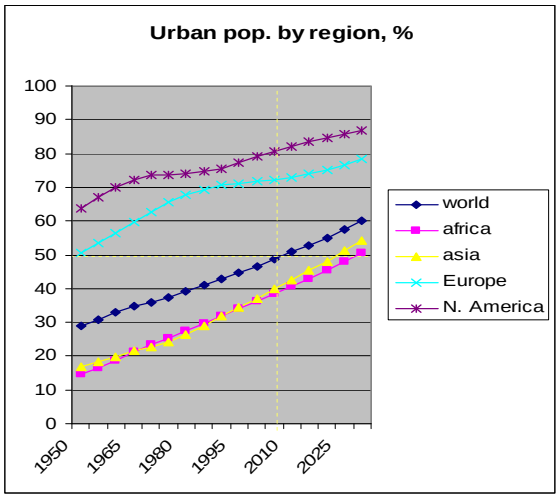
Stylised fact 1

- Urbanised areas are growing over time



Source: UN World Urbanisation Prospects, 2005 revision

Click below to see the urbanisation rate of your favourite country:
http://www.nationmaster.com/red/graph/peo_urb-people-urbanization&b_printable=1

Urbanisation in Switzerland 1981 – 2009

Urban growth

- Very similar experiences in most countries
  - But for "physical" growth, there are large differences
- US: ‘sprawl’
  - Burchfield, Overman, Puga, and Turner (2006)
- Europe: ‘containment’
- Rest of the world: in-between

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Stylised fact 2a

- Cost of living increases with city size
  - E.g. Money expenditure in Lima is 39% higher than in Peru (1971)
  - It is only 14% higher in urban coast (Thomas, 1980)
- Non-market goods and bads
  - Average white urbanite in US: 10-year mortality penalty (early 20th century)

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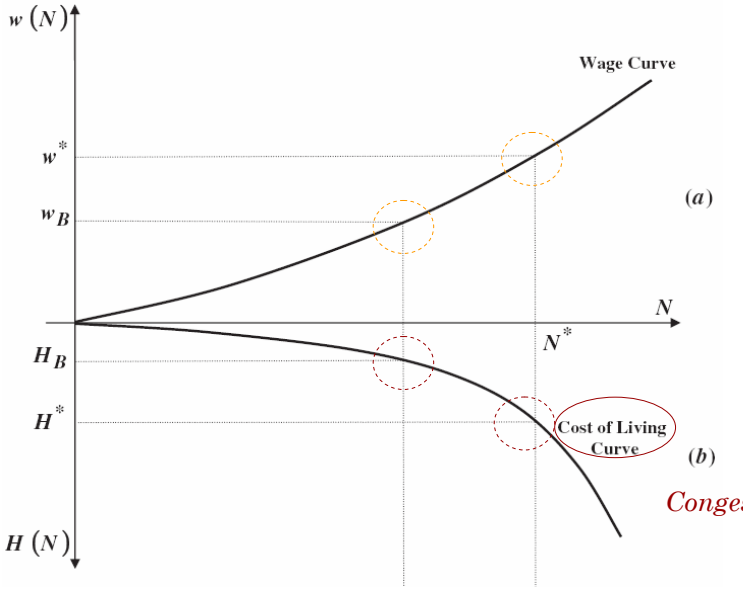
Cost of living & agglomeration size



Stylised fact 2b

- Cities produce more efficiently
  - → **It must be beneficial for firms and households to cluster**
  - – Holds across a number of efficiency measures: output per worker, TFP, wages, etc (Rosenthal and Strange, 2004)
  - – Standard elasticities in the 3 – 8 % range
    - Doubling city size increases manufacturing productivity by around 5% in US
    - NYC (10 M) ~ 50% more productive than Lakewood NJ (53,000)
  - – Distance and industry matter (Rosenthal and Strange 2003)
    - Employment within 1 mile most important. Strong decay.
    - Employment outside own industry less important

Cities produce more efficiently

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Cities are centres of innovation

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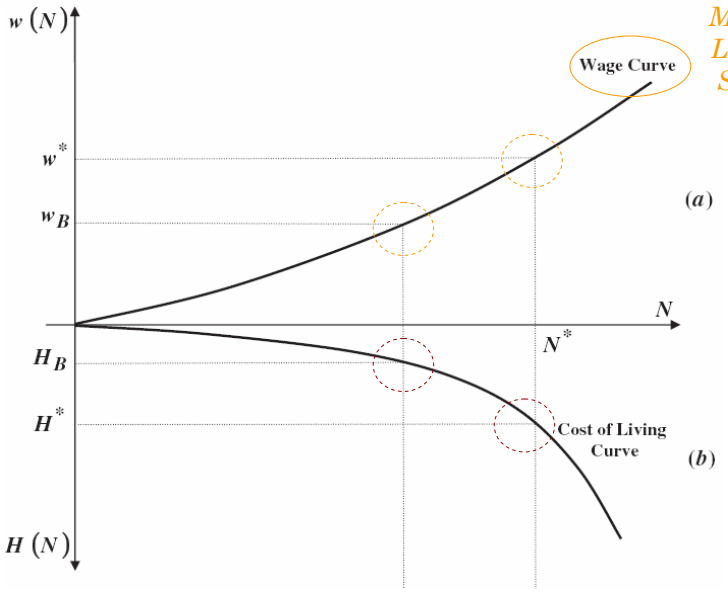
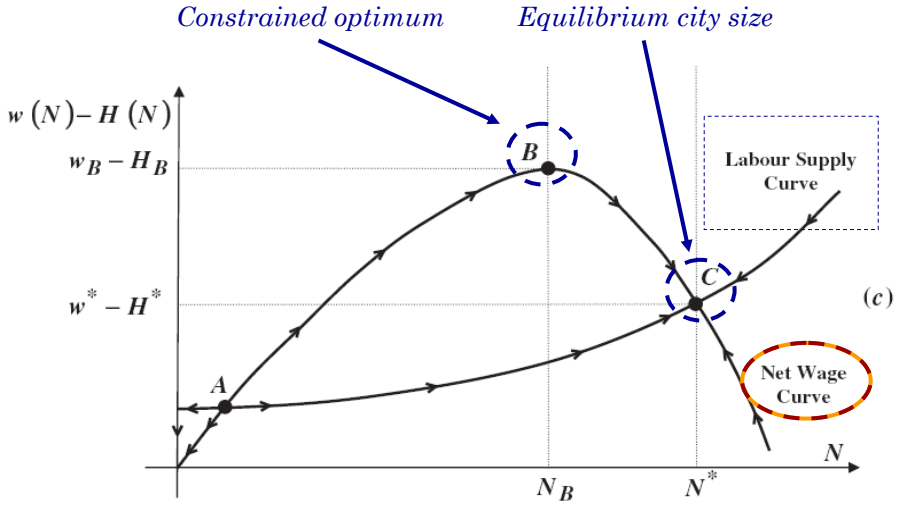
Productivity & agglomeration size



Second best optimum and Equilibrium



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(Second best optimum and Equilibrium)

- City's stock of roads and buses causes larger population and employment (U.S.)
  - Elasticities = 20% (roads) and 8% (buses)
    - Duranton and Turner (2010)
  - But increased provision of roads and public transit does not relieve congestion
    - Duranton and Turner (2011)

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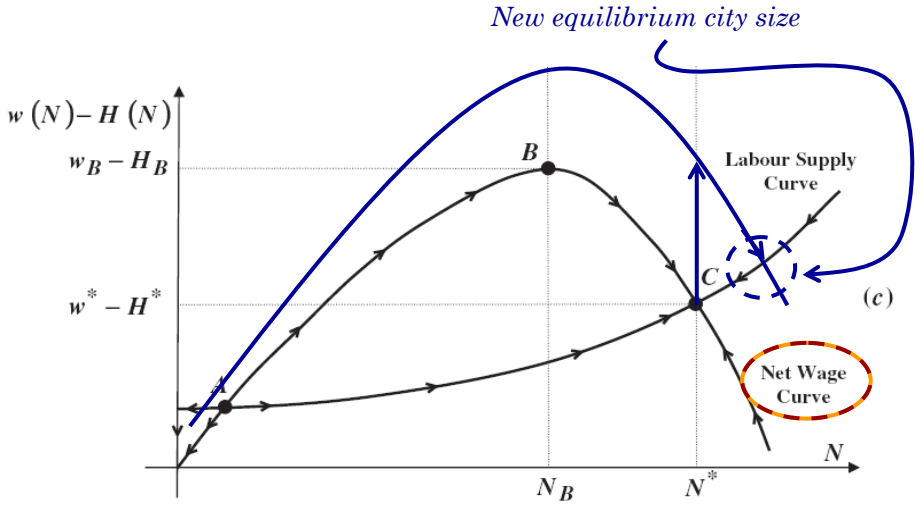
Second best optimum and Equilibrium



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(Second best optimum and Equilibrium)

- Migration restrictions (China)
  - Chinese cities are undersized
    - Au and Henderson (2006*a*,*b*)

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Stylised fact 2c

- Income inequalities are correlated with city size
  - Human capital composition
  - Industrial structure
  - *Returns to skills* (Behrens and Robert-Nicoud 2008)

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Cities are polarized

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Cities are polarized

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Returns to skill and city size

		Years of schooling			
	all	16+	13-15	9-12	0-8
Education	**5 %**	2.5 %	4 %	7 %	3 %
Experience	**4 %**	5 %	4.5 %	4 %	4 %
Log resident pop.	**2.7 %**	4 %	3 %	2 %	0

Endogenous variable: Log hourly wages.
Source: Wheeler, 2001, J. Labour Econ.

Stylised fact 3

- Population density increases with proximity to the city centre
  - Lausanne, Switzerland

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Density gradient

– NY city : Manhattan

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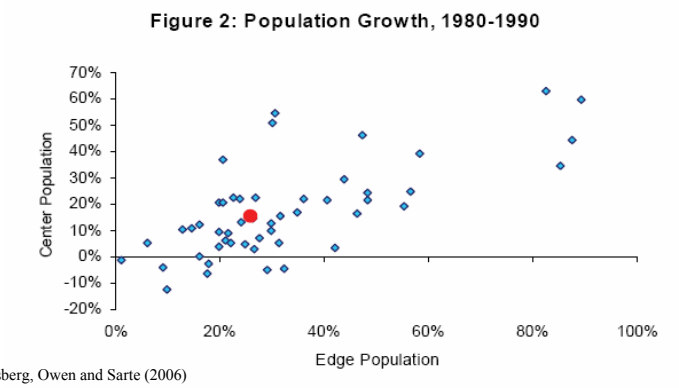
US Sprawl ?

- 1980 – 1990 : 50 largest US Metro Areas
  - Population increased in all but Pittsburgh (-.4 %)
  - Average: 21.3%; Maximum: Orlando (+70%)

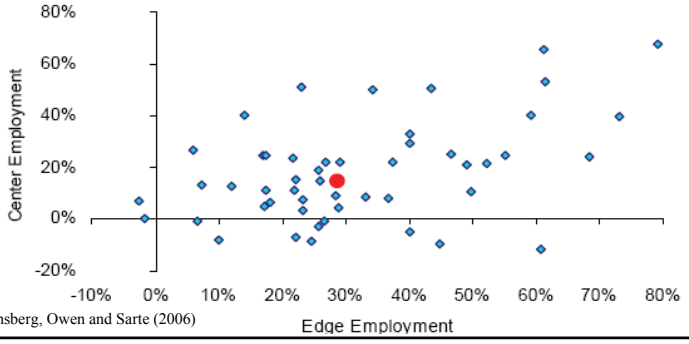


Source: Rossi-Hansberg, Owen and Sarte (2006)

(US Sprawl?)

- Population grew both at centres and edges
  - Las Vegas: +50% in the centre and **+80%** at edges
  - Employment grew both at centre & in edge counties

Figure 3: Employment Growth, 1980-1990



Source: Rossi-Hansberg, Owen and Sarte (2006)

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Stylised fact 4

- Cities vary considerably in terms of population size
  - In the US:
    - NY: 18 million
    - Kansas City: 1.8 million
    - Lafayette (IN): 180,000
    - Los Alamos (NM): 18,000

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Urban population in Switzerland

- Population in Switzerland in 2009: 7.786 millions
- Population in main metropolitan areas

– Zürich	1.170 mio	15%	(15.0%)
– Genève	0.521 mio	6.7%	(21.7%)
– Basel	0.488 mio	6.4%	(28.1%)
– Bern	0.351 mio	4.5%	(32.6%)
– Lausanne	0.331 mio	4.3%	(36.9%)
– Luzern	0.208 mio	1.5%	(39.5%)
– …			
– Stans	0.03 mio	0.4%	(69%)

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The rank size rule debate

- City size distribution is well approximated by the rank size rule [controversial]
  - Pareto distribution :

$$Rank(i) = \left(\frac{\max Size(i)}{Size(i)} \right)^{a}$$

- Zip's law:

$$a \simeq 1$$

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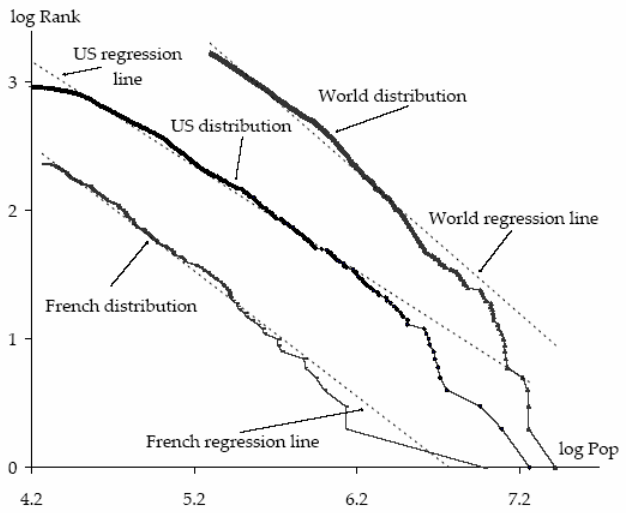
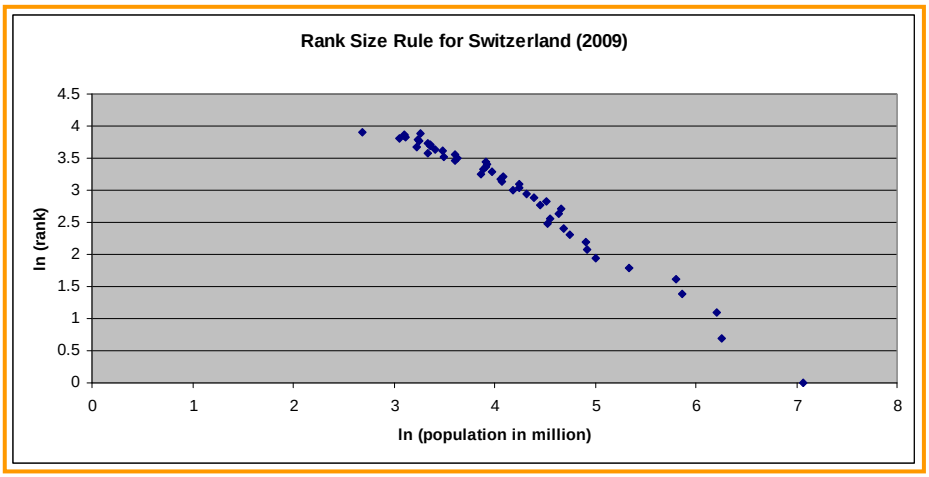
(The rank size rule debate)



(The rank size rule debate)



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(The rank size rule debate)

- Mixed evidence
  - Switzerland: *a* = .98
  - France: *a* = .97 (Duranton) *a* = 1.02 (Soo)
  - USA: *a* = .85
  - World: *a* = 1.11
  - 73 countries: See Soo (2005)
- Deviations from 'rule'
  - Urban primacy
  - Thick and thin lower tails
  - Rotations over time
    - Telephone & ICT revolutions

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Stylised fact 5

- City rankings and relative city sizes change slowly over time

  Exceptions :

  – Pittsburgh (demise of steel industry), Detroit
    - Lost half of their population over 1950 – 1990
  – San Jose (rise of internet-related industries)
  – Phoenix's population increased almost by a factor 10

- Changes in US metropolitan areas are mostly caused by local shocks at the industry level

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Stylised fact 7

- Specialised and diversified cities co-exist

Specialised and diversified cities

	Specialisation		Diversity	
Rank	City (sector)	RZI	City	RDI
1	Richmond, VA (tobacco)	64.4	Cincinnati, OH	166.6
2	Macon, GA (tobacco)	55.0	Oakland, CA	161.2
3	Lewiston, ME (leather)	49.6	Atlanta, GA	159.4
4	Galveston, TX (petroleum)	49.1	Philadelphia, PA	151.4
5	Bangor, ME (leather)	45.6	Salt Lake City, UT	120.8
6	Owensboro, KY (tobacco)	44.4	Buffalo, NY	110.1
7	Corpus Christi, TX (petroleum)	37.6	Columbus, OH	108.3
8	Cheyenne, WY (petroleum)	33.4	Portland, OR	94.1
315	Buffalo, NY (rubber and plastics)	1.6	Lawton, OK	2.4
316	Cincinnati, OH (chemicals)	1.5	Richland, WA	2.4
317	Chicago, IL (metal products)	1.5	Steubenville, OH	2.4

Source: Duranton and Puga (2000), using Black and Henderson's dataset

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Stylised fact 8

- Industries are mobile
- Evidence of 'churning' for France and US (Duranton 2005)
  - Changes in employment at the level of cities and industries are about 10% per year
  - whereas the growth rate of urban population is only about 3% per year

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Stylised fact 9

- Larger cities tend to be more diversified
- Cities of similar diversification are of similar size
  - The relationship between size and diversity is not very strong (partly because all cities have a large component of employment in non-tradeable activities)

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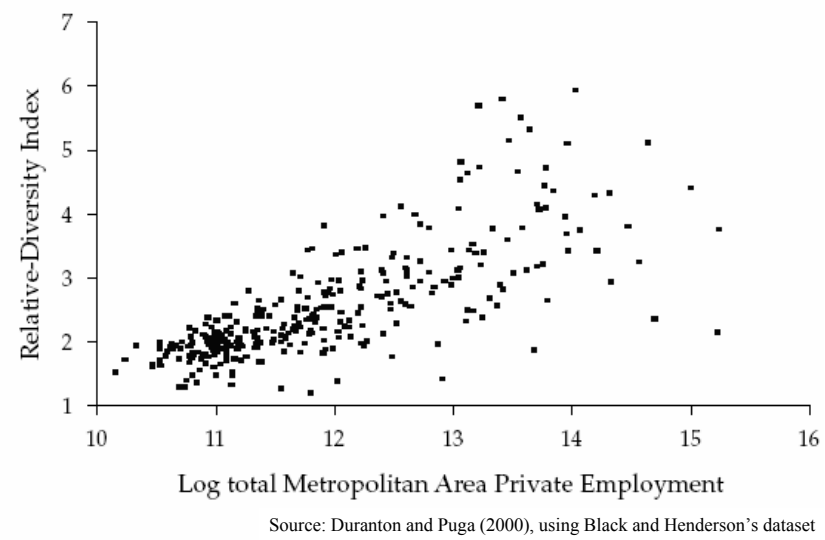
City size and diversification



Source: Duranton and Puga (2000), using Black and Henderson's dataset

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From sectoral to urban specialisation

- From sectoral to urban specialisation
  - Duranton and Puga (2005)
  - Cities have gone from specialising mainly by sector to specialising mainly by function
    - headquarters and business services disproportionately clustered in larger cities
    - production plants clustered in smaller cities

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Stylised fact 11

- Most innovations take place in particularly diversified cities and most new plants are created there
- Most relocations are from diversified to specialised cities

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Nursery cities

- Jacobs (1969)
- Feldman and Audretsch (1999)
  - data set of 3969 U.S. product innovations in 1982
  - 96% of the innovations in metropolitan areas (30% of population)
  - Regress the number of innovations in sector-cities with diversity within underlying scientific base (++), specialisation (-) and size (+)
- Fujita and Ishii (1998)
  - Japanese electronics MNEs
- Duranton and Puga (2000, 2001)
  - on firm creation in France and firm relocation in France, respectively

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Stylised fact 12

- More developed cities are more regulated
  - Hilber and Robert-Nicoud (2010) for the US
    - Cities with nice amenities are more developed and more regulated
    - Looks familiar?
  - Regulation policies seem to be neither efficient nor democratic

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Summary

- Cities are growing
- Cities are diverse
- Macro stability
  - E.g. distribution of city sizes is stable
- Micro dynamism
  - Individual cities grow at different rates and may decline
  - Creation and destruction in individual cities

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Policy implications

- Localised agglomeration economies
  - → Improve urban efficiency
  - → Free internal migration
    - Let people and ideas move around
- Dynamic externalities and product cycle
  - → Free internal migration
  - → Improve market access
  - → Allow secondary cities to develop
    - Especially in developing countries

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