Cities in Bad Shape: Urban Geometry in India

Mariflavia Harari
Discussant: Melanie Morten (Stanford)

May 21, 2015
Commuting around the world

Chart 1 shows the average commute times (one-way trip) in Brazilian metropolitan areas plus the Federal District (FD) and compares them to other selected metropolitan areas around the world with over 2 million inhabitants. In general, commute times tend to be relatively long in Brazilian MAs, especially when their population size is taken into account.

**CHART 1**

Average time spent commuting to work in selected metropolitan areas in Brazil and other countries¹,²

(In minutes)

<table>
<thead>
<tr>
<th>City</th>
<th>Time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shanghai</td>
<td>50</td>
</tr>
<tr>
<td>São Paulo</td>
<td>45</td>
</tr>
<tr>
<td>Rio de Janeiro</td>
<td>40</td>
</tr>
<tr>
<td>London</td>
<td>35</td>
</tr>
<tr>
<td>Stockholm</td>
<td>30</td>
</tr>
<tr>
<td>Recife</td>
<td>25</td>
</tr>
<tr>
<td>Federal District</td>
<td>20</td>
</tr>
<tr>
<td>New York</td>
<td>20</td>
</tr>
<tr>
<td>Tokyo</td>
<td>20</td>
</tr>
<tr>
<td>Belo Horizonte</td>
<td>20</td>
</tr>
<tr>
<td>Sydney</td>
<td>15</td>
</tr>
<tr>
<td>Salvador</td>
<td>15</td>
</tr>
<tr>
<td>Paris</td>
<td>15</td>
</tr>
<tr>
<td>Madrid</td>
<td>15</td>
</tr>
<tr>
<td>Toronto</td>
<td>15</td>
</tr>
<tr>
<td>Curitiba</td>
<td>15</td>
</tr>
<tr>
<td>Fortaleza</td>
<td>15</td>
</tr>
<tr>
<td>Belém</td>
<td>15</td>
</tr>
<tr>
<td>Montreal</td>
<td>15</td>
</tr>
<tr>
<td>Chicago</td>
<td>15</td>
</tr>
<tr>
<td>Vancouver</td>
<td>15</td>
</tr>
<tr>
<td>Boston</td>
<td>15</td>
</tr>
<tr>
<td>São Paulo</td>
<td>15</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>15</td>
</tr>
<tr>
<td>Portland</td>
<td>15</td>
</tr>
<tr>
<td>Seattle</td>
<td>15</td>
</tr>
<tr>
<td>Milan</td>
<td>15</td>
</tr>
<tr>
<td>Barcelona</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Brazil - National Household Sample Survey (PNAD/IBGE); Santiago (Chile) – data available at: <http://www.sectra.gob.cl>; data from all other metropolitan areas from Toronto Board of Trade (2012).

Notes:
¹ Tokyo: 2005; Santiago and Europe: 2006; Brazil: 2009; Australia, Canada, Shanghai and USA: 2010.
² Commute time data from Eurostat is available only at the regional level. However, the delimitation of these boundaries is not strictly defined and may vary greatly across European MAs. Data from the USA is based on Metropolitan Statistical Area.
This paper

- Thinks about spatial equilibrium across cities

- Each city is a bundle of (homogenous):
  - Wages
  - Amenities
  - Rents

- Capture city size as an urban amenity
  - Commuting time

- Instrument for city size with Saiz (2010) -style instruments
Results consistent with city size being a negative amenity

- Predictions of model to a worsening in city shape, $S$ (no agglomeration/congestion effects):
  - Population decreases ($\frac{dN}{dS} < 0$) negative
  - Wage indeterminate (depend on consumption/production amenities) ($\frac{dw}{dS} \geq / \leq 0$) positive
  - Housing prices fall ($\frac{dp_H}{dS} < 0$) negative, insig

- Suggestive evidence commuting matters
  - Mitigated by road density
  - Worsened by height restrictions

- Magnitude large
  - 1 std dev. is 360 metres each way / 225km extra per year
  - Implied cost is 5% of income
  - At walking speed, can get half way there
  - Driving (including car costs): one quarter way there
What happens *inside* a city?

http://www.urbanobservatory.org/
Population density

Yellow high (30,000-150,000 people/sq. km)
http://www.urbanobservatory.org/
Commercial land

http://www.urbanobservatory.org/
http://www.urbanobservatory.org/
Commute times within a city differ

CHART 5
Commute time length among the 1st and 10th income deciles\(^1\) – Brazilian metropolitan areas (2008-2009)\(^2\)

5A – Average time length (In minutes)

5B – Share of commutes who travel to work for longer than one hour (one-way trip) (In %)

Source: National Household Sample Survey (PNAD/IBGE).
Notes:\(^1\) Per-capita household income deciles.
\(^2\) 2-year average.

Chart 5 also shows that this commute time gap between rich and poor is much larger in some metropolitan areas and almost non-existent in others. In Salvador, Recife and Fortaleza, for instance, the commute time gap between rich and poor people is rather small despite the often markedly different capacities in terms of residential relocation and public transport dependence among the richest and poorest commuters. On the other hand, in the metropolitan areas of Belo Horizonte, Curitiba and in the Federal District journey-to-work trips are respectively 40%, 61% and 75% longer amongst the poorest decile compared to the richest one. From a research perspective, these observations reveal the need for future studies into the extent to which these commute time gaps between rich and poor can be explained as a result of spatial segregation and neighborhood accessibility in Brazilian MAs. Curitiba, for example, is a remarkable case that should be the object of further investigation. Despite Curitiba's...
Is the most interesting variation across cities?

- Monocentric models capture the within-city rent gradient
  - e.g. Saiz (2010), allow for cost $t$ for distance $d$
  - More general: Ahlfeldt et al. (2014)

- Yields housing supply equation
  - Derive average rent for the city based on the within-city rent
  - This will be a function of $t$, geo indicators.

- Are migrants getting the average housing?
  - Rent control- but further out?

- Should have rich within as well as across city predictions
Concluding thoughts

- City shape as an amenity
  - Affects commuting within the city
  - Also possibly: sanitation, electricity, trade

- Model focuses on between-city arbitrage, but should have rich implications for within-city
  - Gradient of rent to commuting distance
  - Can we benchmark these commuting costs with e.g. migration costs between place?

- And: are developing countries different than developed countries?
  - Desmet et al. (2015) find income and population density less correlated in low income places
  - Other barriers to internal mobility/commuting within city
References


