Lecture 1

INTRODUCTION TO THE NEW ECONOMIC GEOGRAPHY (NEG)

By Carlos Llano,

References:

Acknowledgments:
- This presentation incorporates graphs and examples borrowed from other authors or institutions, such as the ones offered by Brakman et al (2009) on their website.
1. Introduction.
   - Levels of abstraction.
   - Spatial scales.
   - Geography-Economy in 3D: Density, Distance, Division.

2. Density.

3. Distance.

4. Division.

5. Some open questions to be answered.

6. The “road-map” for this course (and extensions).

7. Conclusion.
1. Introduction

- There is some “geography” in Economics…and some “economics” in Geography…but there is still an empty space for linking both fields of knowledge.

- Classical approaches in this field has been developed mainly out of the main stream of Economics.

- Recently, there has been a flourishing of this field, as a consequence of developments in economic theory (endogenous growth models, imperfect competition models), tools (computers, spatial datasets), and new fields of interest (integration and globalization).
1. Introduction: Concepts & schools of thoughts

Consequence: discontinuity between fields

Different “schools of thoughts”
1. Introduction: Concepts & schools of thought

On search of common ground?

Larger emphasis on:
- Theory based general equilibrium models with micro-foundations.

Larger emphasis on:
- Data driven analysis.
- Partial equilibrium models.
1. Introduction

The objective of this first lesson is:

- To **describe concepts** that will pop-up during the course.

- To **review the main “stylized facts”** observed through history on the link between geography and economics,
  - These “facts” are described in the materials included in the reference list.
  - They are considered “stylized” because -to some extent-, they are accepted as “axioms” or “unquestionable” evidence,
  - The purpose of New Economic Geography will be to offer the economic rationale for these facts, trying to built theoretical models, characterized with the usual “features” of a scientific approach (objective, universal and generalizable knowledge, based on evidence, contrastable, “useful”)
1. Introduction: levels of abstraction.

“Economic Models”

“Real Economy-Geography”
1. Introduction: levels of abstraction.

“First-nature geographic features”: physical conditions which can be considered as “fixed”/ “given” for a certain location:
- Ex: weather, log-latt coordinates, coast/landlocked regions…

“Second-nature historical accidents”: in time each region/country have its own historical, social and cultural background that exert an influence on the current economic activity (path dependence):
- Ex: US’s initial colonies determined the language, religious, cultural and political features of the country…

Economic-Geography-circular causation: given a 1st and 2nd nature geographic and historical conditions, there is an interaction between ec-geo in the long run:
- Ex: migration, trade, FDI… accumulation in a certain spot.
1. Introduction: levels of abstraction.

“Continuous space”

“Discrete space”
1. Introduction: spatial scales.

Map 0.1  Three geographic scales—area, country, and region
Shanghai, China, and East Asia exemplify the local, national, and international scales

The first geographical scale
The area around Shanghai Province

The second geographical scale
The country of China

The third geographical scale
The East Asian region

Dots (Zip code) — Individuals (companies, families, …)
- Cities
- Sub-national unities (State, region, province, county…)
- Countries
- Regions (Multi-country): NAFTA, EU…
- World.

Polygons / Administrative units — Area
- Country
- Regions
1. Introduction: Geography-Economy in 3D.

- BGM (2010): The New introduction to Geographical Economics. Lesson 1:
  1. Economic Agglomeration
  2. Economic Interaction.

1. Density
2. Distance
3. Division
2. Density (spatial agglomeration)
2. Density (spatial agglomeration)

What is the meaning of this city?
Do you huddle close together because you love each other?"
What will you answer?
We all dwell together to make money from each other?
or "This is a community"?

T. S. ELIOT, The Rock
Nobel Prize (in Literature) in 1948
2. Density (spatial agglomeration)

- **Agglomeration**: the population and the economic activity is unevenly distributed in the space.

  **Why?**

- **Different answers in each science**:
  - **Philosophy**: human beings are “social” by nature.
  - **Psychology**: you are afraid of being alone.
  - **Sociology**: individuals within society want to interact.
  - **History**: your grandfather used to live where you live now, and you learned to develop the same job than your father.
  - **Geography**: your location is conditioned by the physical and human geography (weather, accessibility, life conditions...)

- **Does Economics has an answer?**
2. Density (spatial agglomeration)

- **Definition**: Density indicates the size of economic output or total purchasing power per unit of surface area (Km$^2$). It is highest in large cities where economic activity is concentrated and lower in rural areas and slump neighborhoods.

- **Fractal dimension**: similar forces causing agglomeration apply to all levels of spatial aggregation (city, area, nation, Region, World).

- **Regular (universal) but non-linear (bumpy) relation**: There is heterogeneity in the relation between economic density and space as a consequence of: heterogeneity of space itself, sectoral variability, space-time specificities, macroeconomic context…
Uneven distribution of economic activity:

- **World level**: 50% of global GDP today is produced on just 1.5% of the world’s land (aprox: Algeria). This dense economic mass is home to about a sixth of the world’s people.

- **Country level**: the concentration of economic activity also occurs within countries, and increases with the “income level”. This agglomeration is not an artifact of the spatial unit used.

<table>
<thead>
<tr>
<th>By Administrative areas</th>
<th>Country</th>
<th>GDPpc</th>
<th># of administ. Areas</th>
<th>Concentration</th>
<th>%GDP in the consumption leading area</th>
<th>% household consumption leading area</th>
<th>Spatial Gini coefficient</th>
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<td>Tanzania</td>
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<td>5</td>
<td>51.6</td>
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<td>5</td>
<td>64.7</td>
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<td>227,540</td>
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<td></td>
<td>Lao</td>
<td>231</td>
<td>230,800</td>
<td>0.48</td>
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<td>Poland</td>
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<td>311,888</td>
<td>0.52</td>
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<td>New Zealand</td>
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<td>267,990</td>
<td>0.55</td>
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<td>Norway</td>
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<td>304,280</td>
<td>0.64</td>
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</tbody>
</table>

- **City level**: The top 30 cities by GDP, generated around 16% of the world’s output (2005). The top 100 generated 25%.
- Tokyo and New York GDPs (in PPP) ≈ of Canada and Spain.
- % urban population rise with the level of development.

- **City-level**: The richer a country, the more concentrated its economic mass.
- This positive relation is valid for the “primary city” and…

...the whole distribution of settlements by 1° long-1° latt.
2. Density: stylized facts. II-Dynamics

**World level:** strong economic growth imply first strong concentration (density), which then moderates.

- The concentration in western industrialized countries + Japan has its roots in eighteenth-century economic and technological innovation.

*Source: Maddison 2006.*
Country level: Spatial inequality of regions within countries rose and remained high before slowly declining, following an inverted-U relationship. WB, pp86.
2. Density: stylized facts. II-Dynamics

**Country level:**

- Economic development, in its early stages, is accompanied by a rapidly rising spatial concentration in a country.
- Leading areas benefit most from this compression and growth. *TWB, pp86.*
City level: Density intensifies rapidly in the early phase of urbanization before leveling off. *TWB, pp. 59.*
2. Density: stylized facts. II-Dynamics

City level: the urbanization pattern of developing countries over the last 50 years tracks the first part of the historic path earlier traversed by OECD countries between 1900-2000. *TWB, pp.58*

City level: Rural-Urban differences (drivers of rural exodus)

1. Rural-urban disparities in productivity, wages, and well-being are expected to be large in the earlier stages of development.
   - With the rapidly increasing concentration of economic mass in a country’s towns and cities in the earlier stages of development, significant disparities in productivity, wages, and basic welfare occur between urban and rural areas.
   - The agglomeration of capital, consumers, and workers quickly brings production advantages in the larger local markets, which enable firms to spread the fixed costs of production across a wider number of consumers, producing cost and productivity advantages.
   - This means higher wages in towns and cities, and greater availability of a more diversified range of goods and services.
1. But rural-urban disparities begin to narrow as the urbanization process slows. The exodus from rural areas to cities reduces surplus labor from the land in agriculture—and reduces competition between workers in rural labor markets.
   - Rural-urban disparities in GDP pc. are smaller in richer OECD countries
   - Rural-urban gaps in consumption pc. become smaller with urbanization

Source: WDR 2009 team, based on data from OECD (2007), pp. 1–256.
City level: Rural-City exodus. Risk: slums & quick growth

- Slums grow with the pace of urbanization, and fall with its level.

Source: Kilroy 2008.
III. Regularity

• **City-level**: Although the growth of cities appears chaotic, the underlying patterns have a remarkable order world-wide.

• A country’s urban hierarchy is characterized by two “laws”:
  - **The “rank-size rule”**: the rank of a city in the hierarchy and its population are linearly related.
  - **Zipf’s law (special case)**: the population of any city is equal to the population of the largest city, divided by the rank of that city within the country’s urban hierarchy.

\[
\log(M_j) = \log(c) - q \log(R_j)
\]

- *M*<sub>j</sub> = size of the city j (population); \(c\) = constant; \(R_j\) = rank of city j; \(q\) = the estimated coefficient (Zipf’s law holds if \(q=1\))

- **Gibrat’s law**: a city’s rate of population growth tends to be independent of its size.
City-level: Zip’s Law: the relative size distributions of settlements remain stable over time, income levels,…

Note: Each data point represents an agglomeration area of population size of 750,000 or more.
3. Distance (spatial interaction. I)

Distance from Iowa to Hawaii

Distance from Iowa to Hawaii is 0 kilometers
This air travel distance is equal to 0 miles.

From  | To  | Measure Distance | Distance between Iowa to Hawaii:
--- | --- | --- | ---
Iowa | Hawaii | | 6299.57 km = 3914.37 miles
Definition: measures the ease of reaching markets. Accessibility to density. It determines access to business opportunities. Areas far from economically dense centers in a country are more likely to become peripheral (lagging region).

Features:

- Also “fractal dimension”, “regularity” (universal) and “non-linearity “(bumpy) holds:
  - **City level:** commuting within metropolitan areas.
  - **Country level:** interregional trade of goods and services; interregional migration and FDI flows.
  - **Regional level:** trading blocs and Regional integration policies: EU, NAFTA, Mercosur.
  - **Global level:** WTO, IMF... Actions towards globalization (trade, factor mobility, international infrastructures on connectivity).
3. Distance (spatial interaction. I)

- Distance to density affects spatial movements in goods, services, information, knowledge, and people.
  - Ex: Commuting, migration, telecommunication, information flows, and shipments of goods connect originating and receiving areas.

**Tobler’s First Law of Geography:**

“Everything is related to everything else, but near things are more related than distant things.”

- Areas closer to economic density have easier access to beneficial interactions and exchanges.
- Spillovers from proximity to density arise for all kind of economic interactions, both developed and developing countries.
3. Distance (spatial interaction. I)

- **Economic distance** is more than just geographical distance.
- It is proximity to economic density, but considering all possible channels for economic interaction:
  - Trade of Goods and Services
  - Factor mobility: Labor, Knowledge and Capital.
3. Distance (spatial interaction. I)

Locations close to markets have a natural advantage

Travel time to sizable settlements, by subnational administrative area

Contributed by Andrew Nelson; see Uchida and Nelson (2008) for this Report.
Figure 1.8 Gravity equation: German exports and distance, 2005

b. German exports, income adjusted 2005 (million euro)
• Dense areas are able to generate a circular and cumulative process of attracting workers and firms from less dense areas.

• In this process, migration balances the distribution of population against the spatial disparity in economic density.

• Integration: Reducing distance-related costs increases movements of goods, services, people, firms & ideas. This brings less developed areas into the system of production.

• With trade, the mobility of people is probably the most potent mechanism for integrating areas of low economic density with markets of high density.

• But for internal migration to bring about a convergence in living standards, large population movements may be necessary over generations.
3. Distance (spatial interaction. I)

- Every year, approximately 40 million people in the United States change residences, and 8 million people change states.

- In Brazil’s high-growth years during the 1960s and 1970s, almost 40 million people left the countryside for cities;

- One of the main problems in Europe is the lack of internal labor mobility:
  - High disparities in unemployment and per capita income within Europe and within each of its country members is explained by this lack of mobility (stickiness).
  - Slow down of the convergence process.
China company allocation: international vs local industries.

- Exporting industries concentrate in coastal areas to minimize distance to the global market.

**3. Distance (spatial interaction. I)**

*a. International market-oriented industries*

*b. Domestic market-oriented industries*

*Source: He forthcoming.*
3. Distance (spatial interaction. I)

- In 2005, just 500,000 Chinese emigrated abroad, while more than 150 million people moved internally in China despite restrictions.
- Chinese workers from inner regions have massively moved to the coast (exporting regions).

Source: Huang and Luo 2008, using data from the population census of China.
4. Division: (spatial interaction. II)
**4. Division (spatial interaction. II)**

**Definition:** barriers to economic interactions created by differences in currencies, customs, and languages, which restrict market access.

**Features:**

- Also “fractal dimension”, “regularity” (universal) and “non-linearity “(bumpy) holds for division:
  - **City level:** ghettos. Spatial mismatch hypothesis: racial ethnics
  - **Country level:** regional separatism: Toronto-Quebec (Canada); Belgium; Catalonia and Basque country (Spain); Lombardi (Italy);
  - **International level:** political and army conflicts (North Africa-Israel…); commercial embargoes (US-Cuba, Iraq; India-Pakistan…);
  - **Global level:** WTO, IMF, UN... actions towards democratization + peacemaking.
Imagine there’s no countries…

…Imagine all the people leaving in the world agree.

Do we have more or less frontiers nowadays?

Make a guess?
The width of each country’s borders is proportional to restrictions that each country imposes on the flow of goods, capital, people, and ideas with all other countries.

Source: Stinnett and others 2002.
**Language and culture:** The heterogeneity of language is very high in Africa and increases with proximity to the Equator.

5. Some open questions to be answered

1. Is globalization promoting an extreme unequal distribution of wealth?
2. Does geography dictate the destiny of countries?
3. How can a country change its internal density or its economic distance (integration) with the denser areas?
4. If economic growth implies strong levels of concentration of firms and workers, growth is always associated with inequality? Is there a trade-off between external openness and internal cohesion?
5. Does the governments in the developing countries have to moderate the rural exodus? Is urbanization good or bad? Should they, and how, moderate the speed of urbanization?
6. Should current government be more concerned about regional inequalities in production and income than developing countries were at a comparable stage of development?
7. What is the role of government policies in facilitating the convergence between the lagging areas with the leading ones?
1. Population and economic activity is **uneven** distributed in space.

2. **Fractal dimension** of Agglomeration. Similar patron at all spatial levels.

3. The association between agglomeration and economic growth is **regular (universal?)**, both in space (Zip’s Law) and time (common patterns of urbanization in different countries and periods).

4. Several levels in the relation between Geography-Economy:
   - **1st nature** determine endowments and location advantages;
   - **2nd nature**: human action create a **circular causation** process that may produce convergence or divergence in terms of per capita income distribution in space.

5. To date it has been emphasized the relation between economic growth and innovation + population expansion, but it can be also associate to:
   1. **Urbanization**: Cities are where innovation takes place!
   2. Quick spatial agglomeration,
   3. Primal increase in spatial divergence and posterior spread of wealth through spillovers and internal migration movements.
# 7. The “road-map” for this course

## Classic models and NTT.
- **Why Agglomeration?**
- **What market structure and pattern of trade?**

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<tr>
<th>Lect</th>
<th>Topic</th>
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<tbody>
<tr>
<td>L-1</td>
<td>Imperfect competition and economies of scale</td>
</tr>
<tr>
<td>L-2</td>
<td>Factor mobility: labor and FDI</td>
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## NEG core models:
- **Source of dynamic causation.**
- **Agglomeration and Intermediate trade**

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<tr>
<th>Lect</th>
<th>Topic</th>
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<tbody>
<tr>
<td>L-3</td>
<td>The Dixit-Stiglitz-Krugman model</td>
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<td>L-4</td>
<td>The Core-Periphery Model I: interregional labor mobility</td>
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<td>L-5</td>
<td>Core-Periphery Model II: intermediate goods</td>
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<td>L-6</td>
<td>The empirics of economic geography</td>
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## Date Seminars

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<th>Date</th>
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<tbody>
<tr>
<td>8-April</td>
<td>Seminar: export complexity. Francisco Alcalá</td>
</tr>
<tr>
<td>12-April</td>
<td>Lab: gravity model and border effects</td>
</tr>
<tr>
<td>8-April</td>
<td>Lab: simulations with the C-P model</td>
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