Open Access and Public Domain Availability in Developing Countries

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Plan of Presentation

- Guiding questions
- How is science done in DCs?
- Comparative advantages of science in DCs
- Production of databases in DCs
- Differences in Access in ICs and DCs
- The market of DBs in DCs
- Anti-trust and subsidies
- Conclusion

Guiding questions

- *How is scientific knowledge produced in developing countries?
- *Do scientists in DCs use information differently?
- Are DBs produced differently in DCs?
- Are the impacts of DB sui-generis protection on science different for DCs?

Guiding questions (II)

- *Are institutional arrangements (such as public domain, fair use and differential pricing) relevant for the development of science DCs, as shown they are for science in ICs (Reichman Uhlir, 2000)?
- Are compensatory direct subsidies viable?
- *Summing up, what are the consequences of sui-generis DB protection for international scientific cooperation of DCs?
- *Contention: characterizing how science operates in DCs allows to answer these questions directly.

A framework for comparison:
"Consolidated" and "Emergent" Science
(states in the dynamic evolution of science)

- *Consolidated science:*
  - A concept akin to Kuhn's "normal science".
  - Diffusion and transfer may be assumed to be virtually costless.
- *Emergent science:*
  - Diffusion of knowledge cannot be assumed to be costless.
  - Replication of experiments demands heavy investments (equipment and sometimes new labs.)

Science in DCs

- *Similarities with Emergent Science in Industrialized Countries*
  - Replication of all experiments demands heavy investments.
  - % of equipment in budgets is high.
  - The process of networking and "interessing" peers is demanding.
- *Similarities with Consolidated Science in ICs*
  - Expected results are in general "normal".
  - Reliance on information is critical

Differences between science in DCs and both "emergent" and "consolidated" science in ICs

- Even the replication of simple normal science experiments demands high investments (Because of sparsity of infrastructure).
- Even in simple "normal science" projects, information resources must be built from scratch (to compensate for the sparsity of information infrastructure – libraries and databases).

Other specificities of science in DCs

- Financial resources are scarce.
- High share of library, documentation and travel expenses in project budgets.

7 benefits for world scientific community of incorporating scientists from DCs
(Forero & Jaramillo, 2002)

- 1. “putting information in the hands of a more diverse population of researchers” (David Foray 1995)
- 2. When cooperation network is wider, results may add up.
- 3. Wider set of validating peers.
- 4. Questioning of paradigms from diverse experimentation environments.
- 5. Providing diversity of environments in meta-research.
- 6. Sharing funding and execution of big-science projects in varied geographical scenarios.
- 7. Addressing wider range of problems, not in priorities of IC communities.

International Networking and Scientific Information Needs in DCs

- *Important role of altruism and interest of scientist in Ics in meeting information needs in DCs.
- Developing & transition countries have creted networks of expatriated scientist mobilizing scientific altruism and interest (Forero 1997).
- International scientific collaboration plays important role in DCs scientific research.
- *Fair use of copyrighted information has been critical (because of sparsity of library resources).
- *The counterpart: need for additional networking efforts in DCs.

Additional argument: comparative advantages of DCs researchers

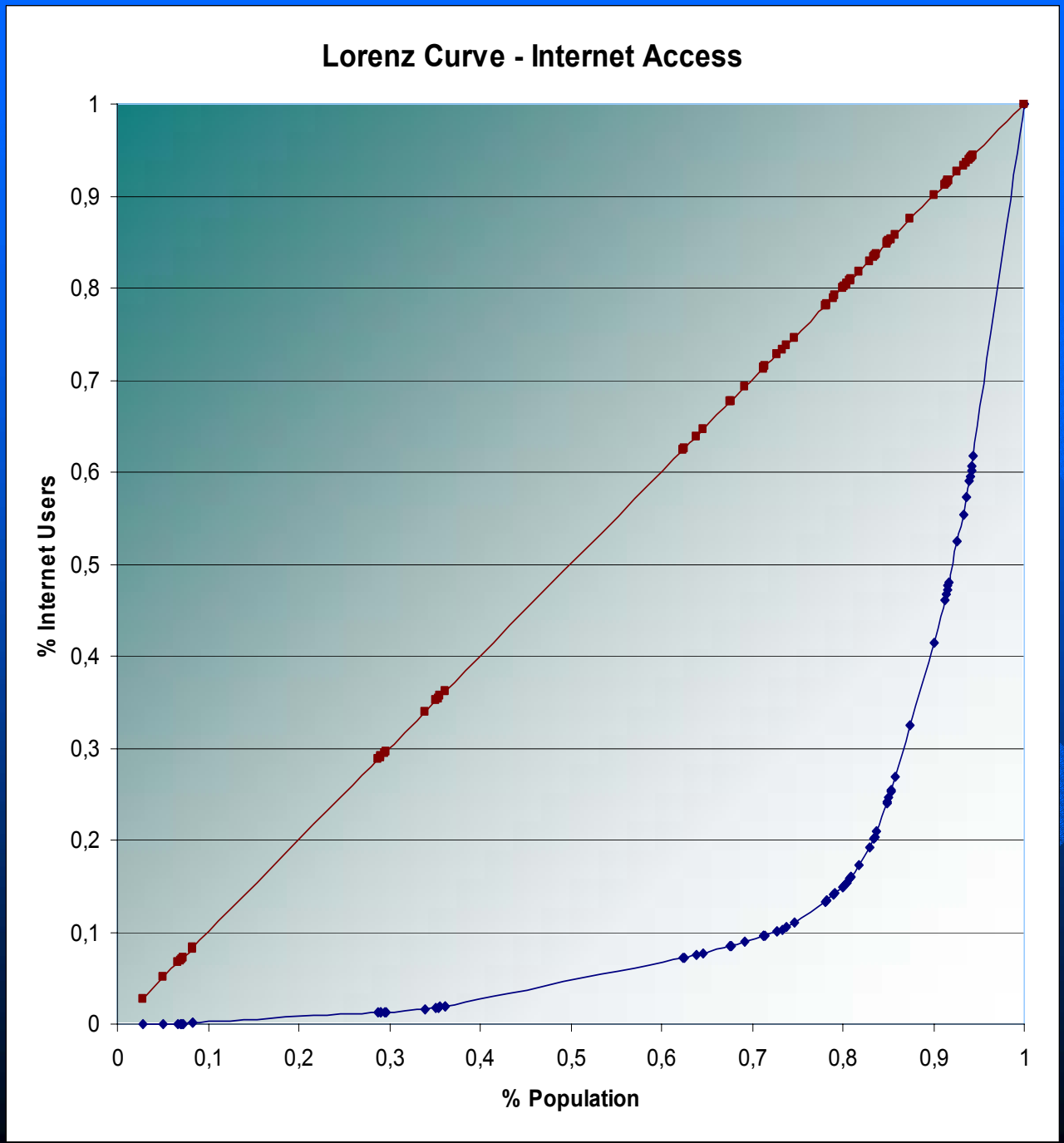
- Comparison of efficiency of DCs in different types of research:
- *Costs of equipment considerably higher than costs of information. This drives researchers in DCs towards:
  - Theoretical research in all fields;
  - Evidence-based research (medicine and social practice)
  - Environmental, climatic, econometric and even genetic research based on internationally available data;
  - Case-based or best-practices research in management and technology applications.
- *Conclusion: DCs have comparative advantage for information-intensive research, provided access to info is maintained and enhanced.

Production of databases in DCs

- *Highly concentrated in North America and Western Europe (94 % of 12,111 listed by Gale Directory of Databases – cited by Braunstein 2002).
- Gale does not cover all databases. Gale 21 for South America, Pereira 694 for Brazil. Gale 413 for all Asia, Vandrevala mentions 400-500 for only the science sector in India. Gale lists globally traded. Most in DCs are Governmental, legislative, library not globally sold.
- *Local interest.
- *Many not digitalized.
- *Provided with no charge.
- Concentration reported by Gale still reflects North-South balance of payments for DBs.

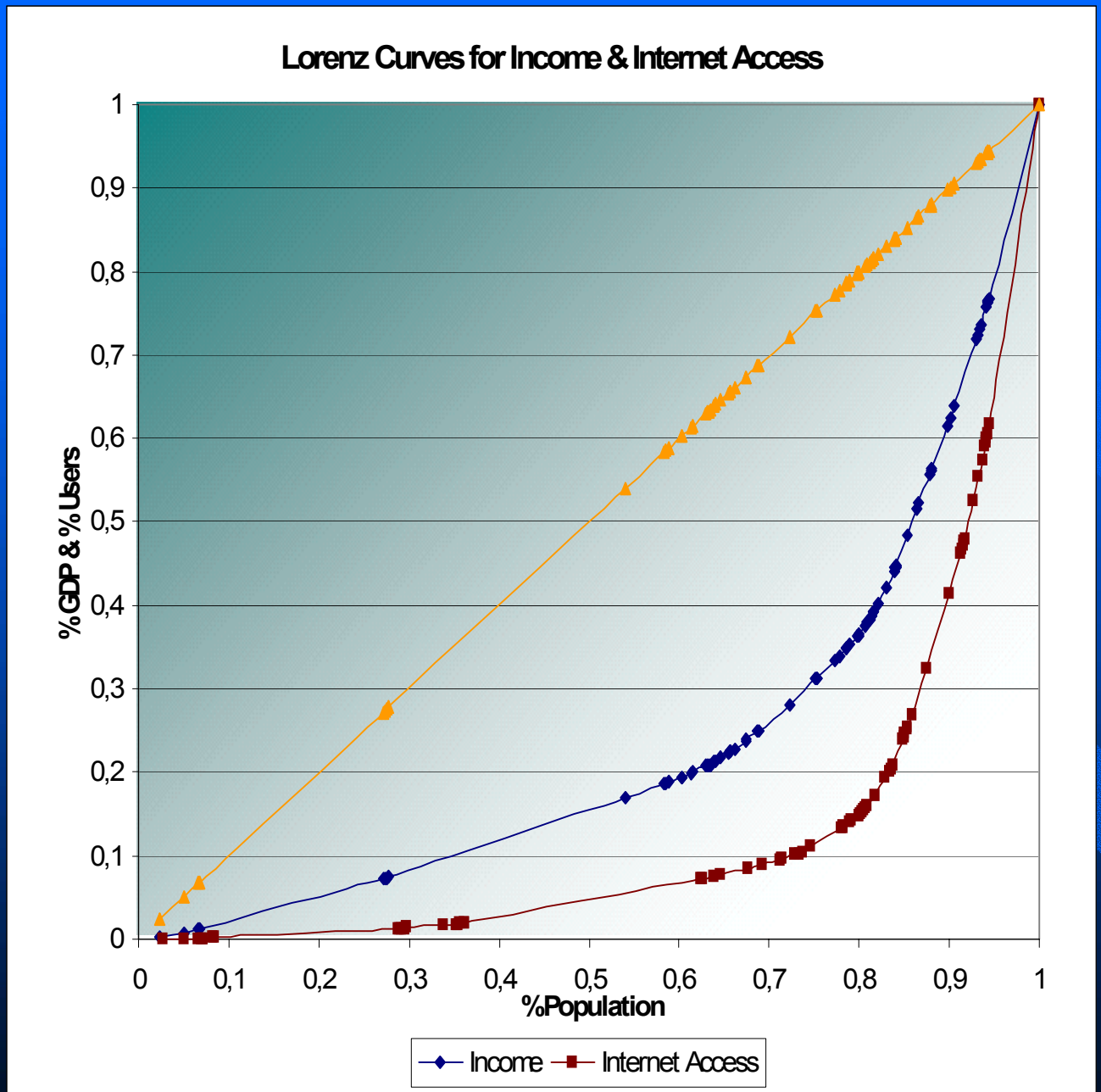
Network limitations to access

- *DCs have important infrastructure limitations for competing in the world market of databases.
- They are illustrated in the following graphs, based on statistics collected by Kirkman, Sachs (2001) for 75 countries and calculations made for this presentation.



85 % of Internet users are in countries with 20 % of world Population.

Gini = 0.3521



The concentration of Internet access is higher than that of income.

Network "readiness" and size:

- Kirkman-Sachs network-readiness index (0 is highest possible, 100 is lowest):
  - DCs average: 55.8
  - OECD average: 18.6

- **Average population of countries in K-S survey:**
  - **DCs: 101 million**
  - **OECD: 37 million**
- **But average size of networks is considerably higher in OECD:**
  - ***Average size telephone network:**

    DCs 8.040.951

    OECD 20.239.590
  - ***Average Size Internet (# Users):**

    DCs 1.570.478

    OECD 12.292.560

Four important economic consequences of statistical analysis:

- *Less opportunity in DCs to take advantage of network economies.
- * Therefore, less potential for database development.
- *Though database markets appear to be global, database development is linked to data production. Data production is also concentrated.
- Paradox:
  - Most databases in DCs are of local interest.
  - More difficult market entry in DCs.

The market for IC databases in DCs (I: pricing)

- *As in al network products (Ox Shy, 2000), there is incentive to use "introductory prices": (20,000 in country A vs. 6,000 in Country B).
- Differential pricing is common practice and University Consortia have been succesful in obtaining important discounts:
- *Example of differential pricing:
  - Posted price: 50,000
  - Price paid by University consortium in country A: 20,000
  - In Country B: 6,000
- University Consortia have been a succesful strategy in DCs for negotiating access to databases.

The market for IC databases in DCs (II: high transaction costs)

- *There is a dense network of intermediaries operating in DCs.
- In Andean countries, at least 5 intermediaries.
- *"Negotiations with intermediaries are considerable harder", according to the manager of one university consortium.

The market for IC databases in DCs (III: incentives for production of DBs)

- In the case of Europe, new database firms increased sharply for one or two years after Directive, not afterwards (Maurer, Onsrud et al. in *Science,* 2000)
- In DCs: Lopez (2002): "... we have not observed that infant DB industry in the region (apparently concentrated in the most advanced countries) is being affected by the absence of sui-generis legislation. Commercial losses seem instead to derive from an inadequate enforcement".

But more research is needed, as well as a longitudinal follow up of the Mexican experience. It would be erroneous to generalize on Mexico's experience, a member of Nafta, a circumstance which weights heavily in results.

The market for IC databases in DCs (IV: Sui-generis protection and network pricing and incentives)

- Is there statistical evidence of a higher increase of prices in DBs from Europe and the US?
- It would be a mistake to interpret this lack of evidence as evidence against:
  - DB market is incipient, so network-pricing strategies are at work (introductory prices).

Anti-trust laws and direct subsidies

- The argument:
- If pricing practices are undesirable, use antitrust laws.
- If legal prices are undesirable for income distribution or externality reasons, use subsidies.

- Is it viable?
- Undesirable pricing practices are used internationally, but anti-trust laws and enforcement are not evenly practiced (transactions costs of suing are excessive).
- Who is going to collect the taxes to finance subsidies, whether internationally or in the legislature of DB-rich countries?

Conclusion (1)

- The arguments presented here –based on a stylized analytical description of how science is produced in DCs - are different from those of other authors who have dealt with the impact of DB protection on DCs, though the conclusions are similar.
- The conclusions differ from those of other authors (Braunstein for instance) who presents a nice institution-less overview of a classical argument in favor of protection, without taking into account the specific ways of producing science in developing countries.

Conclusion (II)

- If one adopts a view where institutions and the ways of doing science matter, then the fair use exception of copyright over original material as well as non-original databases, the disclosure provision of patent law and effective limits to the time span of property rights appear to be fundamental for the advancement of science in developing countries.