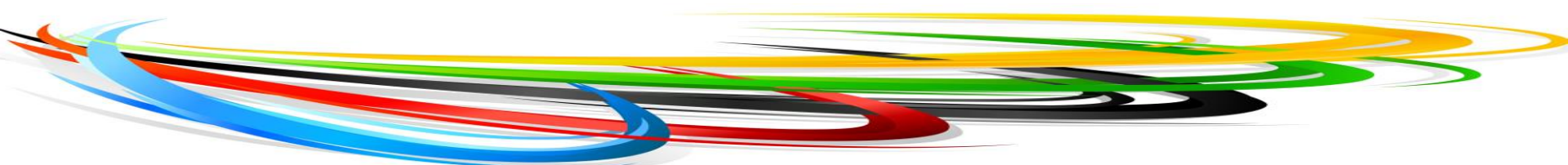


Innovation, Absorptive Capacity and Growth Heterogeneity

Development Paths in **Latin America** 1970–2010



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Agenda



- The Latin American context
- Time (the Latin rhythms)
- Latin American paths
- Conclusions and recommendations
- Next steps

The Latin American Context

- Heterogeneity is everywhere.
Out of all this heterogeneity: What can we say about the transformation process of Latin American over time?
 - 1800s, 1900s, 1980s, 1990s, 2000s, 2010s, 2020s
 - Sectoral industrialization, sectoral industrial resources.
- The “common” trend
 - Import Substitution Industrialization.
- The last four decades
 - 1970 – 2010 in LA: from state-led industrialization to globalization.



Time (the Latin Rhythms - I)

- Time means *dynamics*
 - Verspagen (1991) catching up model

$$G = \ln (K_L/K_F)$$

How does **G** change over time?

Leader $\longrightarrow \Delta K_L/K_L = I_L \longrightarrow$ Constant!

Follower $\longrightarrow \Delta K_F/K_F = I_F + S_F$

$$I_F < I_L$$

$$S_F = \phi G \cdot \exp (-G/\delta)$$



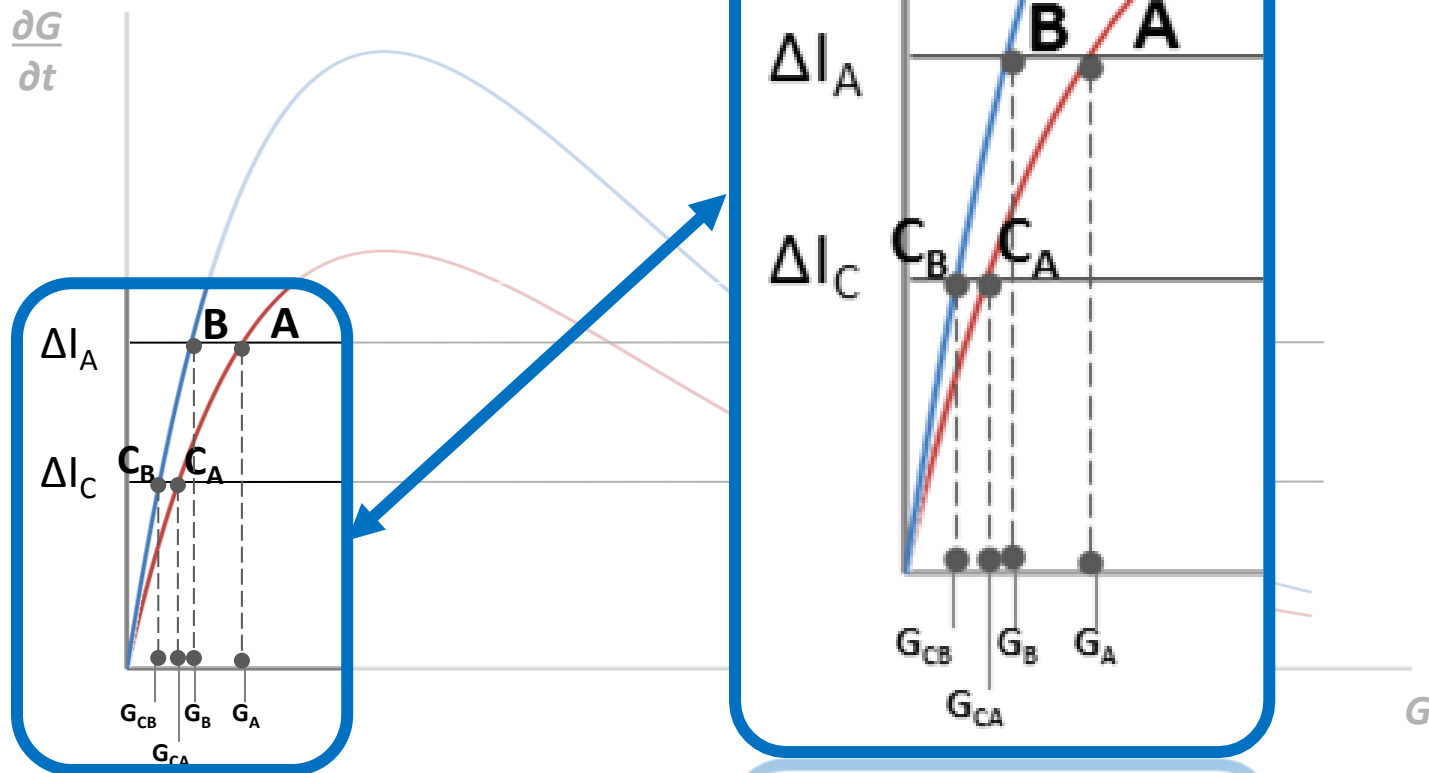
Openness

Specialization Patterns

- The term ϕG represents the *potential spillovers*
- Absorptive capacity, or imitation capability, is noted by the parameter δ

Time (the Latin Rhythms - II)

- Time means *movement*
 - Verspagen (1991) model could be useful to analyze the transitional dynamics



Time (the Latin Rhythms - III)



- Time means *differences*
 - Countries follow different growth trajectories depending on the combination of policies they adopt to catch up (openness, structural change and/or innovation policy).
- Time means *changes*
 - The combination of imitation policy (openness and industrial structure) and innovation policy leads to a higher rate of growth along the transitional dynamics than either imitation or innovation policy alone.

Time (the Latin Rhythms - IV)

- We need to include time in the analysis!
 - 18 Latin American countries
 - Data from 1970 to 2010
 - Indicators:
 - Productivity: GDP per capita.
 - Innovation: Patents per capita.
 - Absorptive Capacity:
 - Specialization patterns: Industrial Structure (% of GDP) - Industry, Services, Natural resources.
 - Openness: FDI Inward Flow.

Time (the Latin Rhythms - V)

- We need to *use* time in the analysis!
 - Johansen (**system**) cointegration approach.

$$\Delta Y_t = \alpha \beta Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \nu + \eta t + \varepsilon_t$$

- Granger long-run causality: the driving forces
 α is significant and positive

The Latin American paths (I)



- Unit root tests confirm the presence of $I(1)$ processes.
- Cointegration was not rejected.
- Many structural changes were identified: instability has been taken into account.
- We looked at 3 different types of Industrial structure for each country.
- We identified the driving forces and group countries accordingly.

The Latin American paths (II)

Best Performers

| | Specification | Industrial structure | Inward FDI | Innovation |
|---------------------|-------------------|----------------------|------------|------------|
| Argentina | Natural resources | | | |
| Bolivia | Services | | | |
| Brazil | Manufacturing | | | |
| Chile | Services | | | |
| Colombia | Manufacturing | | | |
| Costa Rica | Services | | | |
| Cuba | Manufacturing | | | |
| Dominican Republic | Services | | | |
| Ecuador | Natural resources | | | |
| El Salvador | Services | | | |
| Guatemala | Natural resources | | | |
| Honduras | Natural resources | | | |
| Mexico | Natural resources | | | |
| Nicaragua | Natural resources | | | |
| Panama | Natural resources | | | |
| Peru | Manufacturing | | | |
| Trinidad and Tobago | Manufacturing | | | |
| Venezuela | Natural resources | | | |

Conclusions & Recommendations



- Let's take *time* seriously!
- **Heterogeneity** matters
 - Latin American economies have responded differently to the opportunities and challenges of globalization
- There's **no easy solution** for development
 - Countries that have combined the new market-led model with an active role for the State in industrial and innovation policies currently face better prospects for further economic growth

Next Steps



- **Sensitivity** analysis:
 - Innovation: Trademarks, Scientific papers, Scientific content
 - Openness: trade, FDI stocks.
 - Specialization patterns: schooling, employment rates.
-
- Investigating *time* once again: for how long should we wait?
 - **Complexity is complex**
 - How do capabilities relate to each other so they can evolve?

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Thanks!

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Gracias... totales!

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