Intellectual Property Rights and South-North Formation of Global Innovation Networks

Maria Comune, Alireza Naghavi, Giovanni Prarolo

CEDEPLAR-UFMG

Av. Antônio Carlos, 6627 - Belo Horizonte, MG

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Outline

- The context
- Objectives: research questions
- Methodology: the two-steps strategy
- Preliminary findings

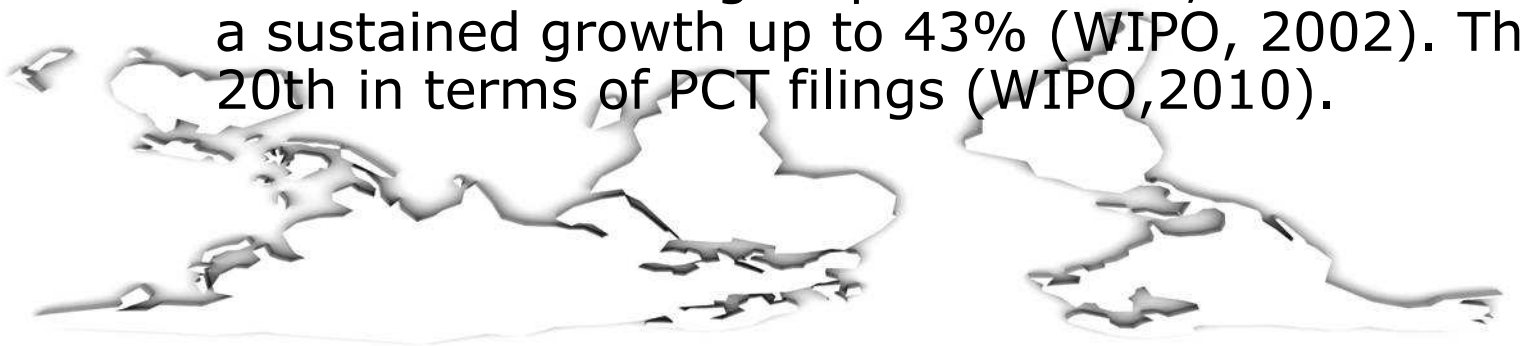
the context

- The TRIPS agreement as condition for WTO membership.
- Patent Law of PRC, 1985 was amended in 1993 and 2001.
- In India, the Patent Act, 1970 was amended in 1999, 2002 and 2005.

The context

- In the last 20 years the propensity to patent in OECD countries increased by more than 20: technological change, economic transformations and patent policy shifts since the 1990s.

- Today, the same is occurring in some emerging economies:
  - ✓ **China**: the 3rd largest patent office, the 4th world largest country in terms of PCT filings (WIPO, 2010)
  - ✓ **India**: the 8th largest patent office, since 2000 with a sustained growth up to 43% (WIPO, 2002). The 20th in terms of PCT filings (WIPO,2010).



The context

Present empirical findings:

- Chen and Puttitanum (2005): patent protection as determinant of patent applications from developing countries in US.
- Branstetter et al. (2006): R&D expenditure and foreign patent applications by MNE affiliates increase after IPR reforms.

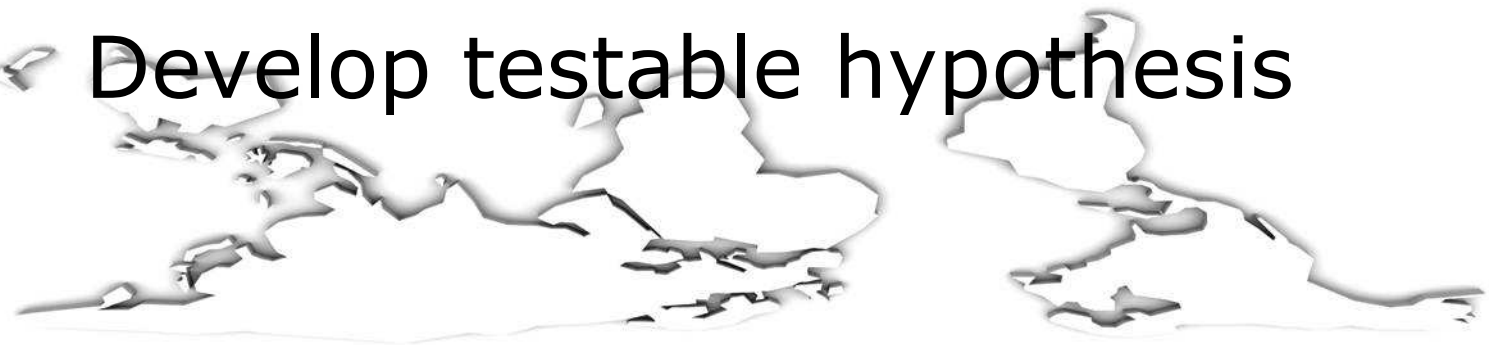
The research questions

1. To what extent are institutional frameworks for **IPR protection** relevant **for fostering GINs?**
2. How persistent **differences in IPR regimes** impact international innovation activities? What can we say about the **coutry-level propensity** to be involved in GINs?

the two-steps strategy

1. Empirical findings using INGINEUS survey/data:

- **Measure** firms' involvement in GINs
- Find the **determinants** of firms' involvement in GINs
- Develop testable hypothesis



the two-steps strategy

2. Empirical findings using global data:

- **define** a country-wide measure of GIN involvement
- test if what holds for firms can be **generalized** to countries

Step 1: INGINEUS data

Firm-level survey data analysis:

(i) all countries

(ii) China (243) and India (324), both ICT sector, both NICs.

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Step 1: INGINEUS data

Measures of GIN

- **GIN1**: dummy variable, 1 if a firm undertook collaboration for developing innovation outside its country of origin.
- **GIN2**: dummy variable, 1 if a firm performs some specific innovation activities through offshoring or outsourcing abroad.

→ *Whole data*: GIN1 (GIN2) is detected in 42.5% (25,93%) of INGINEUS sample

→ *Correlation coeff across sectors: 0.47 (Agro); 0.39 (Auto); 0.29 (ICT).*

Step 1: INGINEUS data

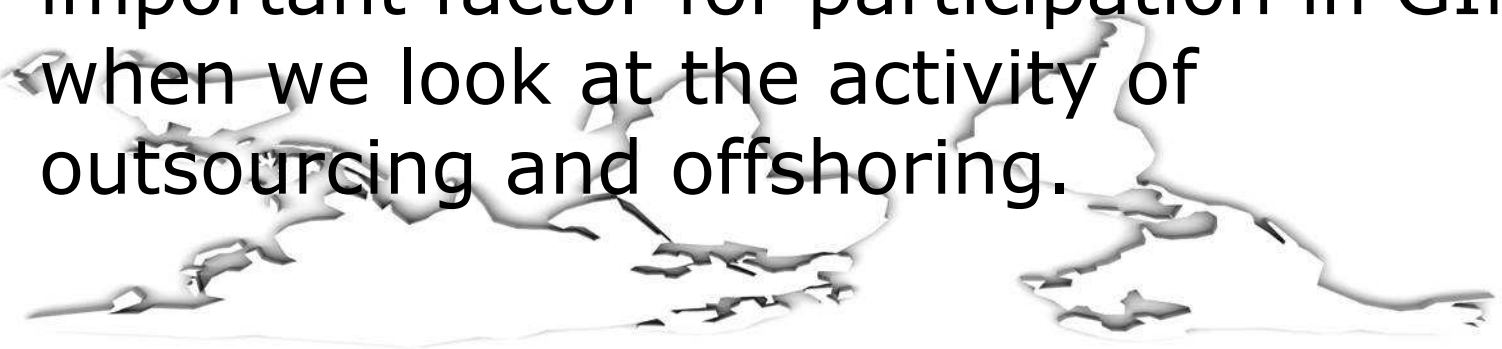
Focus on factors for the internationalization of firms' innovative activities:

(i) human resource (HR) → relevant labour force training and skills

(ii) national system for intellectual property protection (IPR) → regulations, practices and jurisprudence around IPRs.

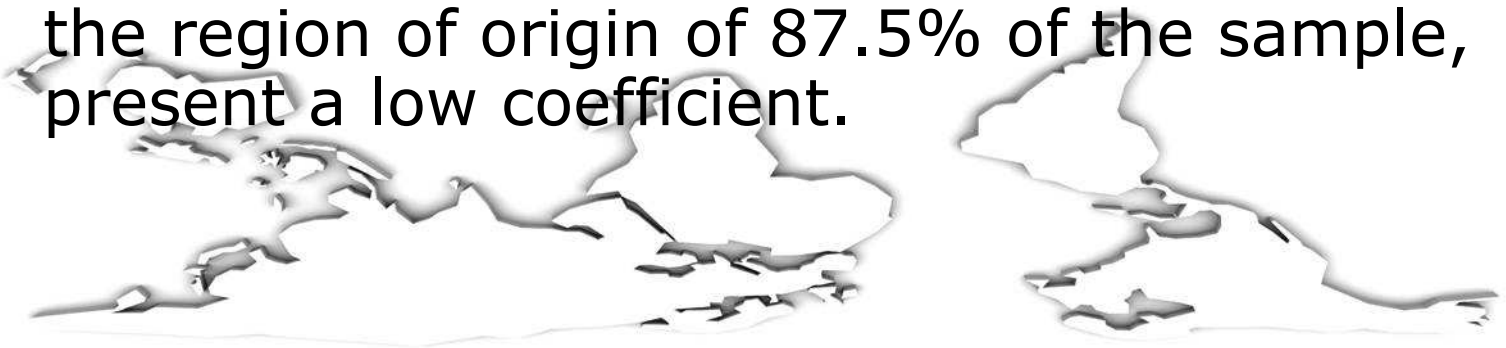
INGINEUS data: total sample

- Having had a positive experience with **IPRs regulations** and **skilled labor force** increases significantly the probability of networking with foreign actors for innovative activities.
- However, we can observe **human resource availability** tends to be **the** important factor for participation in GINs when we look at the activity of outsourcing and offshoring.



INGINEUS data: total sample

- **Formal linkages** present a greater marginal effect than the informal ones when we look at the activity of networking (***GIN1***), while their effect lower when we observe activities that could be performed across branches of a same firm, i.e. by offshoring (*GIN2*).
- **South America** and **North America** are the most prominent foreign partners for innovative activities for firms that offshore and outsource innovation. **Europe and Asia**, even if they are the region of origin of 87.5% of the sample, present a low coefficient.



INGINEUS data: total sample

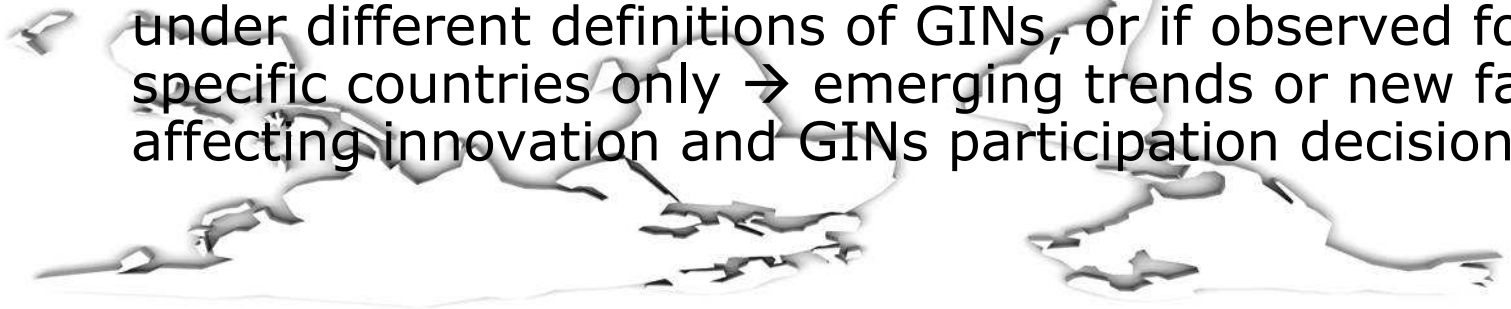
- **India** is the only emerging economy with a strong and positive probability of being part of a GIN while **China** in all cases results amongst the least involved.
- **Chinese firms** are amongst the most unsatisfied with regard to relevant labour force skills (68.3%) and the greatest national sample requiring more stringent IPR regulations to consider future innovation activities (64.2%).

INGINEUS data: Chinese and Indian sample

- Both IPRs and HR availability are determinants of Indian participation to GINs.
- The same cannot be confirmed in the case of China.
- The statistical insignificance of IPRs and HRs for the Chinese sample may be driven by the lower percentage of Chinese firms involved in GINs compared to India.

From INGINEUS to GLOBAL data

- The high tech industry was the most represented in the entire sample. However, the survey, as designed, does not let us advance considerations with regard to **IPR framework** in the countries of origin of **innovation partners**.
- **The impact of IPRs**:
  - ✓ positive and statistically significance (when considered alone) → general argumentations on the impact of the IPR framework on the business environment and its relevance for the internationalization of R&D activities.
  - ✓ lower significance when considered with other factors, under different definitions of GINs, or if observed for specific countries only → emerging trends or new factors affecting innovation and GINs participation decisions.



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From INGINEUS to GLOBAL data

Do differences in national systems of IP protection hamper or facilitate global innovation activities?

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Step 2: GLOBAL data

- **Level of analysis:** *oriented* empirical gravity model.
- **Measure for GIN (of country *i* in country *j*):** PAT_{ijt} = the number of patents filed in country *j* by a resident of country *i* (at time *t).*

  As Yang and Kuo (2008) but only 1995-1998 and not for South-North.
- **Countries involved:** 14 NICs (*i*) and 31 OECD countries (*j*)
- **Time variation:** Three 5-year intervals (1995-2000-2005).

Step 2: GLOBAL data

- **Regression equation:**
  $PAT_{ijt}=G_t+D_i+D_j+\boldsymbol{X}_{it}+\boldsymbol{Y}_{jt}+\boldsymbol{D}_{ij}+\boldsymbol{D}_{ijt}+u_{ijt}$

- Fixed *time* and *country*-specific fixed effects
- Country-specific controls: IPR protection index (0-4), from **Park(2008)**, POP, GDPpc; **share of ICT exported goods**, **educational level (Barro-Lee, 2010)**
- Time-invariant country-pair variables: **distance**, common border, **common language**
- Time-variant variables: distance in IPR protection
- Obs.: $I*T*J=1293$

Step 2: GLOBAL data

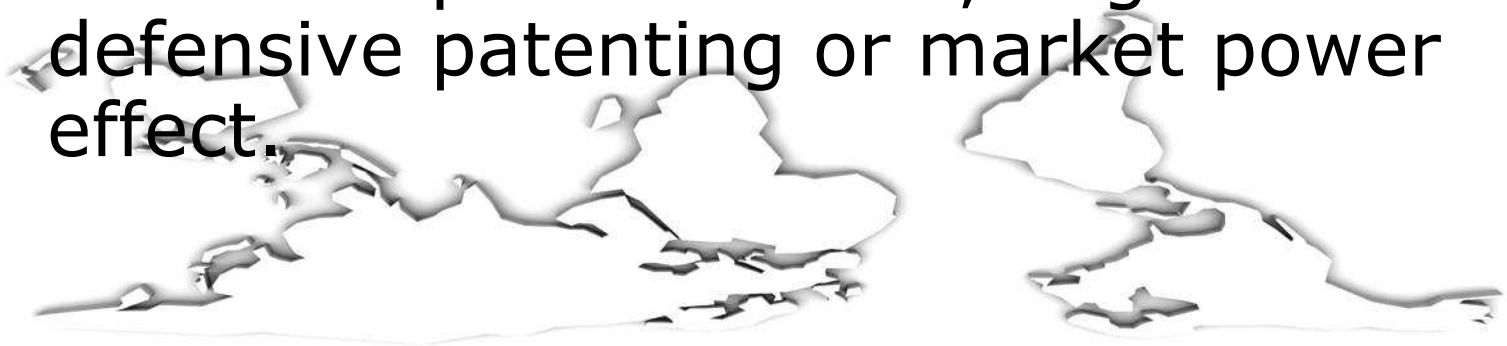
What do we expect?

- the level of IPR in the origin country:

  Picci (2010), poor IPR and less internationalization of R&D, more when MNCs subsidiaries patenting activities.

- The level of IPR in the destination (OECD):

  Allred and Park (2007), positive when market expansion effect, negative when defensive patenting or market power effect.



Global data: preliminary findings

- Pop of origin: positive impact.
- GDPpc has a positive effect in the origin country.
- **Educational level** in the origin country results positive and significant.
- Pop of destination: positive impact.
- GDPpc has a negative effect in the destination country.

•**Language** as important determinant, while common borders not and **geographical distance lower than expected**.

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Global data: preliminary findings

- IPR index for origin country is **positive** but not significant → Taking into account also no-patent observations (PAT is count variable), IPRs of the origin country results **strongly and positively significant**.
- Interaction between the share of the ICT exports and IPR in NICs is **positive and strongly significant**.
- IPR in the destination country is negative and strongly significant: defensive patenting and/or market power effect, Allred and Park (2007).

Excluding country pairs involving China or India (two countries that host many headquarters of MNCs), results hold. Less significant in some cases, possibly due to the smaller sample.

Global data: preliminary findings

IPR protection in NICs works as **extensive margin**.

MNCs open up research branches in NICs only if IPR is strong enough,

while once research branches are operative,

the level of IPR protection plays a limited role in defining the intensive margin of innovation activity.

Thanks for your attention

Maria Comune
maria.comune@feem.it

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