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INTRANSIT
Industrial Transformation, Sustainability, Digitalization

Diversifying in green technologies in European regions: does political support matter?

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Motivation: green diversification and relatedness

- Regions show differentiated ability to develop new specializations in green activities (e.g. Barbieri and Consoli 2019): **Why does it happen?**
- **Relatedness** is a crucial driver behind green diversification of regions (Van den Berge and Weterings 2014; Tanner 2014, 2016; Montresor and Quatraro 2018; Corradini 2019)
- This tends to be **in contrast** with **transition studies** claiming that green activities are disruptive and transformative (e.g. Markard et al. 2012)
- **Easier** for a region to diversify into new green activities that are **related to existing regional activities** → some of the **necessary capabilities already exist** → **Lower searching costs**

1. Do local Capabilities matter for green diversification in regions?

Motivation: transitions and political support

- **Regional diversification** tends to **neglect** the importance of existing **political conditions**
- **Transition studies** claim that **strong policy intervention** is crucial in explaining why regions show different abilities to develop green activities
- **Case studies** suggest that environmental policies differ widely across regions (e.g. Cooke 2010)
- **No systematic approach**: little understanding of whether **national and regional support** makes a difference here (exception: Guidici et al. 2019)

2. Does policy support at NATIONAL and REGIONAL levels spur green diversification?

Data and Variables (1)

- OECD REGPAT database
- Patent applications is aggregated by 3-digit environment-related technology classes (OECD 2016) → 52 classes
- The dependent variable is dummy: 1 when a green tech specialization enters a region; 0 otherwise (Kogler et al. 2013; Rigby 2015; Balland et al. 2018)
- Period 2000-2012 is divided in periods of five years (2000-2004, 2001-2005, 2002-2006…2008-2012)
- Geographical coverage: 95 Regions (NUTS 2 and NUTS1) located in 7 European countries (Austria, Belgium, France, Germany, Italy, the Netherlands, Spain)
- Observations → Triplet constituted by a region, a five-year period and a Green tech
- Relatedness is computed based on the frequency of co-occurence of technological specializations in regions
- Manifesto Project Database Variable that measures to what extent political forces that lead national and regional governments, in their political manifestos, attach importance to environmental protection policies

Balanced Panel database with 95 Regions and 9 time periods

Data and Variables (2)

Control variables:

- Dummy: specialization in dirty technology (Dechezleprêtre et al., 2017)
- Share of green specializations
- OECD Environmental Policy Stringency Index at country level
- GDP per capita
- Share of R&D in GDP
- Share of population with higher education
- Share of elderly population
- Population density
- Unemployment rate

Empirical Strategy

- **OLS regressions** to understand the impact of Relatedenss and Policitial support to environmental protection policities (main explanatory variables) on the development of new green technological specializatios (explained variable)

- We intend to explore the panel characteristics of the dataset, therefore we adopt:

  - **Fixed-Effects approach**, controlling for time fixed effects

- Probit and Logit models are also estimated to assess the robustness of the OLS regression results and to, explicitly, consider the binary nature of our dependent variables

Main Results (1)

Dependent Variable = Entry of New Green Technological Specializations					
	(i)	(ii)	(iii)	(iv)	(v)
Relatedness	0.49073***	0.44062***	0.49072***	0.49062***	0.44072***
	(0.02311)	(0.02770)	(0.02312)	(0.02311)	(0.02771)
Dirty	-0.00447**	-0.01551***	-0.00446**	-0.00388*	-0.01473***
	(0.00207)	(0.00358)	(0.00208)	(0.00211)	(0.00360)
Dirty * Relatedness		0.10109***			0.10065***
		(0.03714)			(0.03713)
Dirty * Env. (Reg)			0.00024		0.00209
			(0.00203)		(0.00224)
Dirty * Env. (Nat)				-0.00435*	-0.00536*
				(0.00249)	(0.00276)
Env. (Reg)			-0.00008		-0.00032
			(0.00168)		(0.00179)
Env. (Nat)				-0.00039	-0.00013
				(0.00222)	(0.00236)
GDP per capita	-0.00000	-0.00000	-0.00000	-0.00000	-0.00000
	(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
R&D	-0.00142	-0.00143	-0.00140	-0.00162	-0.00157
	(0.00120)	(0.00119)	(0.00123)	(0.00123)	(0.00123)
Human Capital	-0.00063	-0.00062	-0.00063	-0.00073	-0.00079
	(0.00073)	(0.00073)	(0.00073)	(0.00073)	(0.00073)
Share elderly population	-0.10477	-0.10360	-0.10403	-0.14297	-0.13503
	(0.20744)	(0.20747)	(0.20780)	(0.20591)	(0.20645)
Unemployment rate	0.00017	0.00016	0.00017	-0.00005	-0.00001
	(0.00052)	(0.00052)	(0.00052)	(0.00053)	(0.00053)
Population density	0.00002	0.00002	0.00002	0.00002	0.00002
	(0.00004)	(0.00004)	(0.00004)	(0.00004)	(0.00004)
EPS	0.00142	0.00135	0.00148	0.00054	0.00145
	(0.00504)	(0.00504)	(0.00535)	(0.00504)	(0.00535)
Share Green Spec.	-0.04236***	-0.04226***	-0.04243***	-0.04270***	-0.04323***
	(0.01350)	(0.01349)	(0.01357)	(0.01347)	(0.01357)
Constant	-0.00994	-0.00460	-0.01024	0.00732	0.00929
	(0.05274)	(0.05277)	(0.05358)	(0.05260)	(0.05329)
Time fixed effects	YES	YES	YES	YES	YES
Region fixed effects	YES	YES	YES	YES	YES
Overall R-sqr	0.023	0.062	0.062	0.062	0.062
N	39318	39318	39318	39318	39318

* p<0.1, ** p<0.05, *** p<0.01

Relatedness is associated to the development of new green technological specializations in regions

The existence of dirty technological specializations in regions tends to hamper the development of new green technological specializations

Relatedness tends to relax this negative effect of the local presence of dirty technologies, and it may even take it away when local related capabilities are strong.

No evidence that political support at regional or national scale are associated with the development of new green technological specializations in regions

But...

Main Results (2)

... it seems political support has an indirect effect

			Interaction Variables
Relatedness	0,47	***	Env (Reg) = min
	0,49	***	Env (Reg) = Q1
	0,49	***	Env (Reg) = Q2
	0,49	***	Env (Reg) = Q3
	0,53	***	Env (Reg) = max
Relatedness	0,64	***	Env (Nat) = min
	0,53	***	Env (Nat) = Q1
	0,49	***	Env (Nat) = Q2
	0,46	***	Env (Nat) = Q3
	0,34	***	Env (Nat) = max

* p<0.1, ** p<0.05, *** p<0.01

Political Support at regional scale strengthens the importance of relatedness for the development of new green technological specializations in regions

Politcal Support at national scale weakens the importance of relatedness for the development of new green technological specializations in regions

Conclusion: Policy implications

- **Transition** towards green and sustainable technological production systems in regions is **easier** if it evolves hand in hand with the use of the **existing regional capabilities**

- Particularly important for **regions specialized in polluting technologies**.
  - They are less resistant to adopting green technologies, the more cognitively related these technologies are to the existing regional capabilities
  - Otherwise, the costs of change might be too high → Obstacle to the adoption of green technologies

- Important **a coordinated strategy of national and regional policy makers**
  - Political support at **national** scale might trigger **policies that are less place-based**
  - Political support at **regional** scale might lead to **policies that favour more the use local resources**
  - The **risk of non-coordination** is real → one type of policies may offset the other.
  - **Depending on the objectives of the policies** (related or unrelated diversification), it might be important to attribute **more preponderance to one type of policy makers over the other**.

Thank you for your attention!