Does NextGenerationEU Address Local Needs?[‡]

Municipal Participation and Territorial Fragility in Italy's National Recovery Plan

Clio Ciaschini Barbara Ermini Fabio Fiorillo

Department of Economics and Social Sciences
Università Politecnica delle Marche

February 3, 2026:

PRIN Closing Conference

[‡] Research project *"A survey-based Impact Evaluation of NRRP on Italian Municipalities"* - PRIN 2022 PNRR (Project code P2022RR82F, CUP I53D23007340001) financed by the European Union - NextGenerationEU within the National Recovery and Resilience Plan - Mission 4 "Education and Research" - Component 2 "From research to enterprise" - Investment 1.1 "National Research Programme and Projects of National Interest (PRIN).

Research questions: does PNRR reach fragile territories?

Context

The Plan emphasizes equity and convergence, allocating $\sim 40\%$ of resources to the South

Yet absorption depends on administrative and political capacity

Research questions

RQ1: Do *fragile* municipalities receive different **implementation intensity** (projects and funds per capita)?

RQ2: Does this relationship differ across **North vs South** and across components?

RQ3: How important is **selection** (participation) for inference on intensity outcomes?

Related literature (for further reading)

The literature on **place-based policy**, **territorial inequality**, and **implementation capacity** is broad.

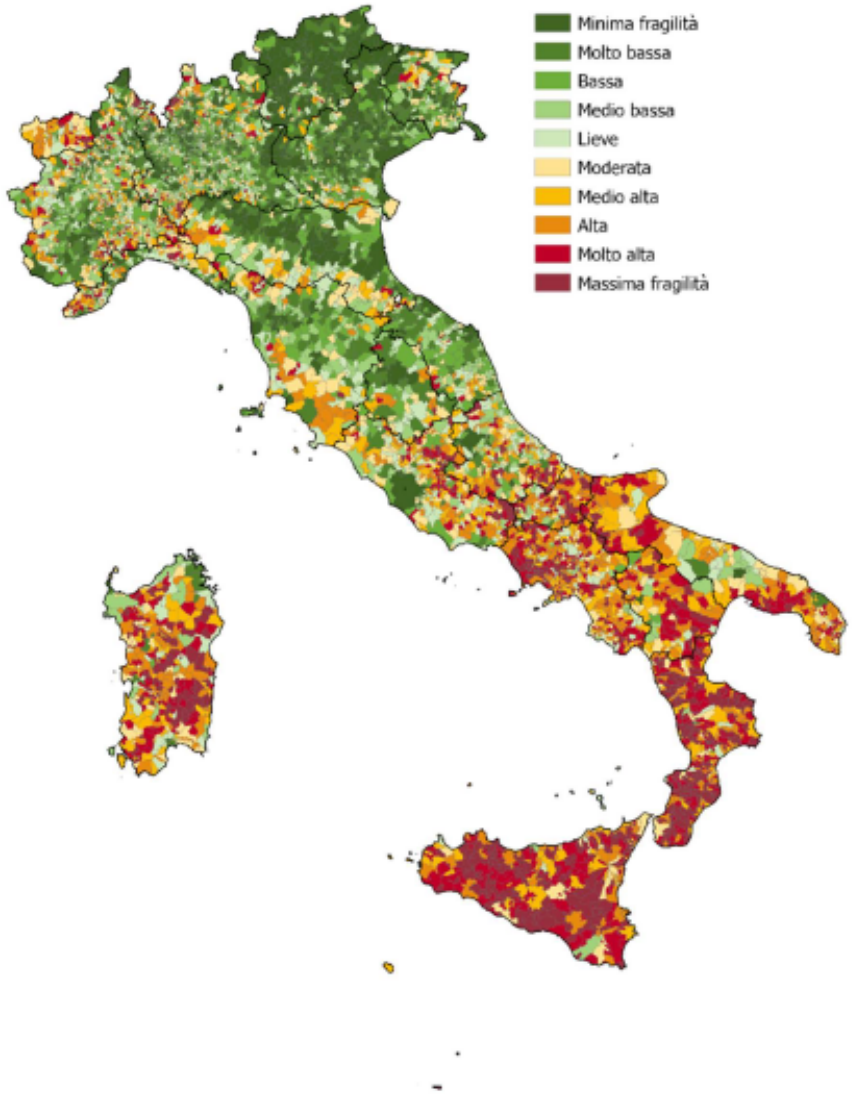
Place-based / place-sensitive implementation: (Rodriguez-Pose and Fratesi, 2004; Barca, 2009; Barca et al., 2012; Berkowitz et al., 2025)

Cohesion policy, territorial outcomes, and convergence: (Crescenzi and Giua, 2020; Albanese et al., 2025; Crucitti et al., 2024)

Missions, strategic investment, and territorial heterogeneity: (Mazzucato, 2018; Foglia et al., 2025; Santos and Conte, 2024)

NextGenerationEU macro/regional effects and participation patterns: (Aparicio-Pérez et al., 2025; Bańkowski et al., 2021, 2022; Almazán-Gómez et al., 2025)

Territorial fragility in Italy (IFC)



Fragility is spatially concentrated and overlaps with long-standing regional disparities.

Data and outcomes

Unit of analysis

Municipality $\times$ Mission/Component (Italy; excluding Special Statute Regions)

Key outcomes (implementation intensity)

Projects: log number of PNRR projects per capita

Funds: log total PNRR funding per capita

Participation and sample selection

Outcome is observed only if the municipality obtains at least one funded project

Data sources (quick overview)

PNRR implementation

Municipal projects and funding by Mission/Component

Data provided by **IFEL (2024)**, based on information extracted from the **"Italia Domani"** platform

Key covariates

Territorial fragility (IFC): ISTAT Municipal Fragility Index (IstatData)

Capacity (MAQI): two pillars (bureaucratic and political)

Selection shifters (exclusion restrictions)

Municipal finance and COVID-era measures (SIOPE/MEF; cash-flow variations; compensations; budget indicators)

Method: selection and outcomes (CMP/FIML)

Two-equation framework

Selection (participation) D**:** municipality obtains at least one funded project

Outcome (intensity): projects/funds per capita, observed only if participation $D = 1$

Key modeling choice

Fragility (IFC) enters the outcome equation only (intensity among participants)

Selection is handled via a **bivariate selection model estimated by CMP/FIML**

Predicted objects (for the next slide)

$\widehat{P}(D = 1)$: predicted **participation probability** from the selection equation

$\widehat{y} \mid D = 1$: predicted **intensity outcome** conditional on participation

Identification: selection shifters and outcome drivers

Minimal structure

$$D_i^* = W_i\delta + X_i\gamma + u_i, \qquad D_i = \mathbf{1}[D_i^* > 0]$$
$$y_i = \alpha + \theta\, IFC_i + X_i\beta + \varepsilon_i \qquad \text{observed if } D_i = 1$$

What goes where

X_i: common controls (macro-area, municipal characteristics, **MAQI pillars**, ...)

W_i: exclusion restrictions (COVID/fiscal shifters, budget structure indicators)

$\mathrm{corr}(u_i, \varepsilon_i) \neq 0$ motivates CMP/FIML (non-random participation)

North–South gaps in predicted outcomes and participation

Predicted **participation probability** $\widehat{P}(D = 1)$ from the selection equation

Predicted **intensity outcomes** $\widehat{y} \mid D = 1$ (projects and funds per capita)

We report **North–South differences** across missions/components

Component	Δ Projects pc	Δ Funds pc	Δ Selection prob.
M1C1	-0.095***	-0.076***	-0.013***
	(0.027)	(0.023)	(0.002)
M1C3	-0.439***	-0.565***	-0.022***
	(0.102)	(0.137)	(0.008)
M2C1	-0.034	-0.360**	-0.083***
	(0.077)	(0.142)	(0.009)
M2C2	0.138	0.197	0.001
	(0.161)	(0.322)	(0.002)
M2C3	-0.849***	-0.404**	-0.016***
	(0.212)	(0.158)	(0.005)
M2C4	0.286***	0.694***	-0.055***
	(0.100)	(0.262)	(0.008)
M4C1	-0.572***	-0.484***	-0.258***
	(0.055)	(0.042)	(0.013)
M5C2	-1.546***	-0.085	-0.668***
	(0.155)	(0.129)	(0.011)

Notes: Preferred model per component/outcome.

North–South reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Territorial fragility (IFC) and implementation outcomes: Projects

Component	North	South	North–South
	Projects per capita		
M1C1	0.579***	0.186***	0.393***
	(0.035)	(0.065)	(0.074)
M1C3	0.402***	0.148	0.254
	(0.129)	(0.164)	(0.208)
M2C1	0.039	0.186	-0.147
	(0.089)	(0.122)	(0.151)
M2C2	0.168	-0.019	0.187
	(0.143)	(0.121)	(0.183)
M2C3	0.080	0.108	-0.028
	(0.076)	(0.129)	(0.150)
M2C4	0.310***	0.265***	0.045
	(0.058)	(0.073)	(0.093)
M4C1	0.099	0.304***	-0.206**
	(0.062)	(0.068)	(0.092)
M5C2	0.347**	0.102*	0.245
	(0.139)	(0.059)	(0.151)

North–South reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Digitalisation—Public Administration (M1C1): fragile municipalities in the **North** implement **more projects** per capita.
Education (M4C1): fragile municipalities in the **South** implement **more projects** per capita.

Territorial fragility (IFC) and implementation outcomes: Funds

Component	North	South	North–South
	Funds per capita		
M1C1	0.446***	0.125**	0.321***
	(0.031)	(0.056)	(0.064)
M1C3	0.440**	0.199	0.241
	(0.211)	(0.238)	(0.318)
M2C1	0.144*	0.230**	-0.086
	(0.075)	(0.097)	(0.123)
M2C2	0.352**	0.231**	0.121
	(0.168)	(0.116)	(0.204)
M2C3	0.159*	0.182	-0.023
	(0.094)	(0.148)	(0.176)
M2C4	0.489***	0.489***	0.000
	(0.064)	(0.078)	(0.101)
M4C1	0.165***	0.511***	-0.346***
	(0.056)	(0.066)	(0.087)
M5C2	0.411**	-0.175***	0.586***
	(0.163)	(0.085)	(0.184)

North–South reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Digitalisation—Public Administration (M1C1): fragile municipalities in the **North** receive **more funds** per capita.
Education (M4C1): fragile municipalities in the **South** receive **more funds** per capita.
Social infrastructure, families, communities and the third sector (M5C2): opposite signs across macro-areas (**North** positive, **South** negative), with a **large North–South gap**.

MAQI pillars and implementation outcomes: Projects

Component	Bureaucratic capacity (Pillar 1)			Political capacity (Pillar 2)		
	North	South	N–S	North	South	N–S
	Projects per capita					
M1C1	0.003	0.013***	-0.009**	-0.034***	-0.031***	-0.003
	(0.003)	(0.004)	(0.005)	(0.002)	(0.002)	(0.003)
M1C3	0.046***	0.023	0.023	-0.011	-0.012	0.001
	(0.013)	(0.015)	(0.020)	(0.007)	(0.009)	(0.011)
M2C1	-0.004	0.007	-0.012	-0.030***	-0.015**	-0.015*
	(0.010)	(0.010)	(0.014)	(0.009)	(0.006)	(0.011)
M2C2	0.003	0.027**	-0.024	-0.027**	-0.018*	-0.009
	(0.018)	(0.012)	(0.022)	(0.011)	(0.009)	(0.014)
M2C3	0.012	0.003	0.009	-0.018**	-0.013*	-0.005
	(0.012)	(0.010)	(0.016)	(0.007)	(0.007)	(0.010)
M2C4	0.013*	0.028***	-0.016*	-0.021***	-0.016***	-0.005
	(0.007)	(0.009)	(0.011)	(0.004)	(0.004)	(0.006)
M4C1	-0.013**	-0.013**	0.000	-0.014***	-0.025***	0.012*
	(0.005)	(0.006)	(0.008)	(0.004)	(0.006)	(0.007)
M5C2	0.041***	0.007	0.034	0.011	-0.018***	0.029***
	(0.013)	(0.008)	(0.015)	(0.010)	(0.006)	(0.012)

N–S reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.

Bureaucratic capacity (Pillar 1): positive associations with project intensity are component- and area-specific: in the **North** they are strongest for **Tourism and Culture 4.0** (M1C3) and **Social infrastructure, families, communities and the third sector** (M5C2), while in the **South** they are more evident for **Digitalisation—Public Administration** (M1C1), **Hydrogen, grid and sustainable mobility** (M2C2), and **Land and water protection** (M2C4). For **Education** (M4C1), the coefficient is **negative** in both macro-areas.

Political capacity (Pillar 2): coefficients are **mostly negative** across components, suggesting that higher political capacity is associated with **fewer projects per capita** among participants. Notable North–South differences emerge for **Education** (M4C1) and **Social infrastructure, families, communities and the third sector** (M5C2), where effects are **more negative in the South** (significant N–S gaps).

MAQI pillars and implementation outcomes: Funds

Component	Bureaucratic capacity (Pillar 1)			Political capacity (Pillar 2)		
	North	South	N–S	North	South	N–S
	Funds per capita					
M1C1	0.006**	0.016***	-0.010**	-0.028***	-0.024***	-0.004
	(0.003)	(0.005)	(0.006)	(0.003)	(0.003)	(0.004)
M1C3	0.041*	0.017	0.023	-0.029**	-0.028*	-0.001
	(0.021)	(0.021)	(0.030)	(0.013)	(0.016)	(0.021)
M2C1	0.003	0.009	-0.006	-0.014*	-0.006	-0.008
	(0.010)	(0.010)	(0.014)	(0.008)	(0.006)	(0.010)
M2C2	0.027	0.020	0.007	-0.025*	-0.016	-0.009
	(0.023)	(0.013)	(0.025)	(0.015)	(0.010)	(0.018)
M2C3	0.012	0.004	0.008	-0.020**	-0.014*	-0.006
	(0.014)	(0.011)	(0.018)	(0.008)	(0.008)	(0.011)
M2C4	0.020**	0.024**	-0.004	-0.022***	-0.014***	-0.008
	(0.009)	(0.010)	(0.013)	(0.005)	(0.005)	(0.007)
M4C1	0.000	-0.016**	0.016*	-0.012***	-0.020***	0.008
	(0.007)	(0.007)	(0.010)	(0.004)	(0.006)	(0.007)
M5C2	0.033**	-0.004	0.037**	0.006	-0.019***	0.025**
	(0.015)	(0.009)	(0.017)	(0.012)	(0.006)	(0.014)

N–S reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.

Bureaucratic capacity (Pillar 1): positive associations with funding intensity are component- and area-specific: in the **North** they are stronger for **Tourism and Culture 4.0** (M1C3), **Land and water protection** (M2C4), and **Social infrastructure, families, communities and the third sector** (M5C2). In the **South**, they are more evident for **Digitalisation—Public Administration** (M1C1) and **Land and water protection** (M2C4). For **Education** (M4C1), the coefficient is **negative** in the South.

Political capacity (Pillar 2): coefficients are **mostly negative** across components, suggesting that higher political capacity is associated with **lower funding per capita** among participants. Notable North–South differences emerge for **Social infrastructure, families, communities and the third sector** (M5C2), with a significantly more negative effect in the **South** (significant N–S gap).

MAQI pillars in the selection equation (participation)

Component	Bureaucratic capacity (Pillar 1)			Political capacity (Pillar 2)		
	North	South	N–S	North	South	N–S
Selection: $D = 1$ (at least one funded project)						
M1C1	-0.028**	0.036	-0.065**	0.011**	-0.003	0.014
	(0.011)	(0.027)	(0.029)	(0.005)	(0.017)	(0.018)
M1C3	0.015**	0.014*	0.001	0.022***	0.016***	0.006
	(0.006)	(0.008)	(0.010)	(0.003)	(0.004)	(0.005)
M2C1	-0.009*	-0.007	-0.002	0.008***	0.016***	-0.008*
	(0.005)	(0.006)	(0.008)	(0.003)	(0.004)	(0.005)
M2C2	0.079***	0.159*	-0.079	0.058***	0.138***	-0.080*
	(0.025)	(0.085)	(0.089)	(0.011)	(0.017)	(0.020)
M2C3	0.003	0.011	-0.007	0.020***	0.014***	0.006
	(0.010)	(0.008)	(0.013)	(0.005)	(0.005)	(0.007)
M2C4	0.002	0.020***	-0.018**	0.012***	0.005	0.007
	(0.006)	(0.006)	(0.009)	(0.005)	(0.006)	(0.008)
M4C1	-0.006	0.011**	-0.017**	0.014***	0.017***	-0.003
	(0.004)	(0.005)	(0.007)	(0.004)	(0.005)	(0.007)
M5C2	0.043***	0.023	0.020	0.012***	0.006*	0.006
	(0.009)	(0.025)	(0.026)	(0.004)	(0.004)	(0.006)

N–S reports the test $H_0 : \beta_N = \beta_S$. SEs in parentheses.

Bureaucratic capacity (Pillar 1): the association with participation is **heterogeneous** across components and macro-areas. It is **positive and sizeable** for **Hydrogen, grid and sustainable mobility** (M2C2) in both areas, and for **Land and water protection** (M2C4) in the **South**. In several components, North–South differences are statistically significant (e.g., M1C1, M2C4, M4C1).

Political capacity (Pillar 2): coefficients are **consistently positive** and often highly significant across components, indicating a robust link between political capacity and **participation** (entry). North–South gaps are generally small, with notable differences for **M2C1** and **M2C2**.

"Paradox"): Political capacity (Pillar 2) is a strong predictor of participation in both macro-areas, even though **conditional on participation** it is often **negatively associated** with project and funding intensity (previous slides).

Solving the paradox: interpreting political capacity

A political-incentives explanation

Accountability / signalling (entry): where political engagement is high (turnout, inclusiveness), *not participating at all* is politically costly. This creates strong incentives to secure **at least one** funded project ($D = 1$).

Lower marginal demand for scale (intensity): conditional on entry, additional projects/funds are pursued less aggressively—either because **needs are lower on average** in high-engagement municipalities, or because **scrutiny of implementation risks** (delays, co-financing, administrative burden) discourages scaling up.

Testable implication: Pillar 2 reduces **zero-participation**, but among participants it is associated with a **thinner portfolio** (lower per-capita intensity on average).
TO DO

Takeaways

Does PNRR reach fragile municipalities? Partly yes, but not uniformly: conditional on participation, fragility (IFC) is associated with higher implementation intensity in some components (e.g., **Digitalisation—PA** in the North; **Education** in the South), while other components show weaker or opposite patterns.

Are territorial gaps closed? Not automatically: North–South differences in predicted participation and predicted outcomes remain **component-specific** rather than converging to a single pattern.

How much does administrative capacity matter? A lot, and differently across dimensions: bureaucratic capacity relates to intensity in a component- and area-specific way, while **political capacity** is a **robust predictor of participation** (entry).

Why selection matters. Participation and implementation intensity reflect different margins; separating them is essential to assess whether resources reach fragile territories.

Thank you!

Questions and comments welcome.

f.fiorillo@staff.univpm.it

References I

Giuseppe Albanese, Vincenzo Carrieri, Antonella Rita Ferrara, and Maria Maddalena Speziali. Beyond gdp: assessing the impact of the 2007–13 eu cohesion policy. *Regional Studies*, 59(1):1–21, 2025.

Miguel Ángel Almazán-Gómez, Carlos Llano, Julián Pérez, Dimitris Kallioras, and Maria Tsiapa. Regional economic impact of the next generation european union recovery plan. *Papers in Regional Science*, 104(4):100105, 2025.

Daniel Aparicio-Pérez, Priscila Espinosa, Jose M Pavía, and Emili Tortosa-Ausina. On the impact of next generation eu funds: A regional synthetic control method approach. *Papers in Regional Science*, 104(2):100082, 2025.

Krzysztof Bańkowski, Marien Ferdinandusse, Sebastian Hauptmeier, Pascal Jacquinot, and Vilém Valenta. The macroeconomic impact of the next generation eu instrument on the euro area. *ECB Occasional Paper*, (2021/255), 2021.

Krzysztof Bańkowski, Othman Bouabdallah, João Domingues Semeano, Ettore Dorrucci, Maximilian Freier, Pascal Jacquinot, Wolfgang Modery, Marta Rodríguez Vives, Vilém Valenta, and Nico Zorell. The economic impact of next generation eu: a euro area perspective. *ECB Occasional Paper*, (2022/291), 2022.

Fabrizio Barca. An agenda for a reformed cohesion policy, 2009.

Fabrizio Barca, Philip McCann, and Andrés Rodríguez-Pose. The case for regional development intervention: place-based versus place-neutral approaches. *Journal of regional science*, 52(1):134–152, 2012.

Peter R Berkowitz, Michael Storper, and Max Herbertson. Place-based policies of the european union: Contrasts and similarities to the us experience. Technical report, National Bureau of Economic Research, 2025.

Riccardo Crescenzi and Mara Giua. One or many cohesion policies of the european union? on the differential economic impacts of cohesion policy across member states. *Regional Studies*, 54(1):10–20, 2020.

Francesca Crucitti, Nicholas-Joseph Lazarou, Philippe Monfort, and Simone Salotti. The impact of the 2014–2020 european structural funds on territorial cohesion. *Regional Studies*, 58(8):1568–1582, 2024.

Francesco Foglia, Francesco Molica, and Anabela M Santos. Exploring the drivers of irregular spending in the eu cohesion policy. *Regional Studies, Regional Science*, 12(1):252–269, 2025.

Mariana Mazzucato. Mission-oriented innovation policies: challenges and opportunities. *Industrial and corporate change*, 27(5):803–815, 2018.

Andrés Rodriguez-Pose and Ugo Fratesi. Between development and social policies: the impact of european structural funds in objective 1 regions. *Regional studies*, 38(1):97–113, 2004.

Anabela M Santos and Andrea Conte. Regional participation to research and innovation programmes under next generation eu: The portuguese case. *Papers in Regional Science*, 103(1):100006, 2024.