Evaluating the Impact of Italy's National Recovery and Resilience Plan on Municipal Development and Well-being

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The NextGenerationEU (NGEU) plan

- **NextGenerationEU (NGEU)** is the EU's temporary recovery instrument of 750 billions of euro, established to support the post-COVID-19 economic rebound while advancing a greener, more digital, and resilient Europe.
- It aims at containing the social and economic harmful effects brought by the health emergency thus creating more sustainable and resilient countries to face the challenges envisaged by the ecological and digital transition.
- The centerpiece of NGEU is the **Recovery and Resilient Facility** providing both grants and loans to support national reforms and investments. Other instruments are like REACT-EU, Just Transition Fund, Horizon Europe, InvestEU, Rural Development, and rescEU
- All EU member states have developed and outlined national plans National Recovery and Resilience Plans (NRRPs), to detail how they will invest the funds received from the Next Generation EU (NGEU) recovery instrument.

Italian’s National Plan of Recovery and Resilience (NPRR)

- Italy is one of the countries that is expected to receive almost 195 billion euros in cheap loans and grants from the EU's Recovery and Resilience Facility (RRF) by 2026, more than any other state in absolute terms.
- A relevant share of investments (about 40% of total resources) have been destined to southern territories, to facilitate the convergence of these regions with the most advanced, northern ones.
- The six missions of the plan relate to: (i) digitalization, innovation, competitivity, culture and tourism; (ii) green revolution and ecologic transition; (iii) infrastructure for a sustainable mobility; (iv) education and research; (v) inclusion and cohesion; (vi) healthcare.
- By mid-2025, Italy had secured **~62.8%** of its total PNRR funds (~€122 billion), well above the EU average of **48.8%**. However, only **33.8% (~€65.7 billion)** of those available funds had been spent as of February 2025

Italian’s National Plan of Recovery and Resilience (NPRR)-municipalities

- The PNRR extends significantly to municipalities:
  - over **50,000 validated projects** out of nearly **140,000 total** are implemented by municipalities
  - 26 billion euros are allocated to municipalities

Objective of the paper

- The study aims to assess the perceived impact of PNRR funds allocated to municipalities, focusing on the areas of digital transition, green transition, social inclusion and tourism and accessibility
- To this end, a survey was administered to all municipalities to gather their views on the effects of the PNRR funding.
- A total of 376 municipalities (almost 5% of the population) completed the questionnaire

Methodology

$$\Delta_i = O_i(PNRR = 1) - O_i(PNRR = 0)$$

- Where the first term on the right-hand side is municipality's outcome in the state of the world in presence of PNRR funds,and the second term being municipality's outcome in the state of the world without PNRR funds.
- The second outcomes are counterfactual and unobserved.
- Given our small sample and the fact that almost all municipalities had receive funds regarding the main component e.g. digitalization, the approach we use in this paper follows an increasing literature (Auceju et al, 2020; Arcidiacono et al, 2020; Wiswall and Zafar, 2020).
- We directly ask municipalities for their expected outcomes in both states of the world. From the collected data, we can then directly calculate the individual-level subjective treatment effect.
- Example: We ask the municipality: «How many digital services for citizens have you implemented? The counterfactual is elicited as follows «Were it not for PNRR funds, how many digital services for citizens would you have expected to implement?

Methodology

$$\Delta_i = O_i(PNRR = 1) - O_i(PNRR = 0)$$

- We have 2 types of questions.
- **Categorical question:** *In your opinion, between 2021 and 2026, how has the use of renewable energy in the municipal territory changed?*
  Responses are measured on a scale from **–2 (strongly worsened)** to **+2 (strongly improved)**.
- **Counterfactual question:** *If there had been no PNRR funds, how would the use of renewable energy in the territory have changed during 2021–2026?*
  Responses are also measured on the same **–2 to +2 scale**.
- **Impact measure:** The difference between the two answers, ranging from **–4 to +4**.
  –4 → Maximum negative impact: situation would have been much better without PNRR funds.
  –3 → Strong negative impact: funds worsened the situation considerably.
  –2 → Moderate negative impact: funds made things worse.
  –1 → Slight negative impact: funds worsened the outcome a little.
  0 → No net impact: the outcome is the same with or without PNRR funds.
  +1 → Slight positive impact: funds helped improve a little.
  +2 → Moderate positive impact: clear improvement thanks to funds.
  +3 → Strong positive impact: funds improved the situation considerably.
  +4 → Maximum positive impact: situation would have been much worse without funds.

Methodology

$$\Delta_i = O_i(PNRR = 1) - O_i(PNRR = 0)$$

- Numerical questions We ask the municipality: «How many digital services for citizens have you implemented? The counterfactual is elicited as follows «Were it not for PNRR funds, how many digital services for citizens would you have expected to implement?. The impact is the difference

Methodology

- The soundness of this approach depends on a key assumption that municipalities have well-formed expectations for outcomes in both the realized state and the counterfactual state.
- This approach is particularly sound in the case of municipalities because they operate within a formal planning framework that requires the preparation of annual and multi-year investment plans, giving them well-defined expectations for project implementation under different funding scenarios. They also have direct control over the execution of public investments and service improvements, which reduces uncertainty and allows for more accurate assessments of both realized and counterfactual outcomes.

Descriptive statistics

Area	Frequency	Percent
North West	115	30.59
North East	78	20.74
Centre	67	17.82
South	70	18.62
Islands	46	12.23
Total	376	100

Population Range	Frequency	Percent
0–3,000	186	49.40
3,000–5,000	38	10.11
5,000–10,000	52	13.83
10,000–20,000	47	12.53
Over 20,000	53	14.10
Total	376	100

Descriptive statistics

Stage	Category	Frequency	Percent
Submission	No, did not submit projects	4	1.08
	Yes, exclusively as implementing body	274	73.66
	Yes, exclusively as executing body	21	5.65
	Yes, as both implementing and executing body	73	19.62
Outcome (of those who submitted)	All submitted projects approved	174	47.54
	Only some projects approved	188	51.37
	No projects approved	4	1.09
Role (in approved projects)	Exclusively as implementing body	267	72.95
	Exclusively as executing body	7	1.91
	As both implementing and executing body	92	25.14

Results – Green transition

Panel A: Green transition		With PNRR funds	Without PNRR funds	Impact (Δ)	Proportion Δ>0	Proportion Δ=0
Energy sustainability within the municipal territory	categorical	1.16	-0.73	1.89***	0.97	0.02
Savings in the annual primary energy consumption within the municipal territory	categorical	1.17	-0.76	1.92***	0.95	0.04
Capacity installed for renewable energy within the municipal territory	categorical	1.05	-0.75	1.80***	0.93	0.06
MWh produced from renewable sources	numerical	787	773	9.68***	0.2	0.76

Results – Social inclusion and wellbeing

Panel B: Social inclusion and wellbeing		With PNRR funds	Without PNRR funds	Impact (Δ)	Proportion Δ>0	Proportion Δ=0
Services that promote social inclusion (e.g., support for vulnerable groups, employment opportunities for women, etc.)	categorical	0.92	-0.86	1.79***	0.99	0.01
Socio economic wellbeing of citizens	categorical	0.74	-0.88	1.62***	0.99	0.01
Nr of places in nurseries and preschools per child aged 0-6	numerical	26.1	21.9	4.19***	0.31	0.67
Square meters allocated to municipal school canteens per child aged 0–6	numerical	43.5	38.9	4.6***	0.17	0.82

Results – Tourism and accessibility

Panel C: Tourism and accessibility		With PNRR funds	Without PNRR funds	Impact (Δ)	Proportion Δ>0	Proportion Δ=0
Tourist attractiveness	categorical	0.76	-0.70	1.46***	0.97	0.03
The ability to attract new residents	categorical	0.69	-0.78	1.47***	0.97	0.03
Physical and cognitive accessibility to public spaces	categorical	0.95	-0.72	1.68***	0.98	0.02
Number of interventions aimed at improving accessibility (removal of physical and/or cognitive barriers) in public buildings and infrastructures	numerical	2.07	1.42	0.65***	0.25	0.74

Results – Digitalization

Panel D: Digitalization		With PNRR funds	Without PNRR funds	Impact (Δ)	Proportion Δ>0	Proportion Δ=0
Digital public services for citizens	categorical	1.65	-0.65	2.2***	0.99	0.01
Digital public services for businesses	categorical	1.32	-0.64	1.96***	0.99	0.01
Digitalization of the municipal authority	categorical	1.68	-0.48	2.16***	0.99	0.01

Results – Digitalization

Panel D: Digitalization		With PNRR funds	Without PNRR funds	Impact (Δ)	Proportion Δ>0	Proportion Δ=0
Services for which payment is active via PagoPA	numerical	28.25	17.6	10.6***	0.58	0.42
Online services provided to citizens accessible through SPID/CIE or other electronic identities	numerical	22.1	14.31	7.8***	0.61	0.37
Services integrated into the "IO" application	numerical	19.1	8.2	10.86***	0.55	0.45
Services migrated to the cloud	numerical	11.93	6.86	5.07***	0.56	0.42
Municipal employees who participated in IT training	numerical	36.57	28.67	7.91***	0.41	0.58

Conclusions

- The impact of the funds appears to be mostly positive, with municipalities perceiving a stronger **subjective impact**.
- NPRR resources have had the greatest effect on **digitalization**, while the impact on other measures remains relatively limited.
- Further research is needed to develop a **composite index** and to assess the impact in relation to the **amount of funds allocated**.