

Territorial Spillovers in the Implementation of Italy's NRRP

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Extended Abstract

The National Recovery and Resilience Plan (NRRP) includes a broad set of investments and reforms with long-term objectives, primarily aimed at supporting the green and digital transition, strengthening the country's resilience to external shocks, and enhancing potential economic growth. In addition to these structural effects, NRRP interventions also contribute to short-term economic growth by stimulating aggregate demand through new public investments and public expenditure on goods and services.

However, the location of NRRP interventions, and therefore the territories where long-term structural effects are expected to be concentrated, does not necessarily coincide with the location of the firms involved in implementing those interventions and, consequently, with the location of the short-term impact.

The first objective of this study, developed within the framework of the VisitINPS PNRR-Labour 2024 research project, is to analyze and quantify the magnitude of territorial spillovers generated by NRRP projects. These spillovers arise when a project located in a given territory is carried out by a firm located in a different area, thereby generating the use of production factors and activating aggregate demand outside the territory where the infrastructure is physically implemented.

To this end, NRRP projects are mapped (in terms of number and awarded amounts) along two dimensions: the location of the project ("origin") and the location of the contracting firm ("destination"). The analysis focuses on infrastructure interventions (public works), which — compared to the supply of goods and services — are expected to have a greater capacity to mobilize local production systems. Both the "origin" and "destination" locations are identified at the level of Local Labour Systems (LLSs). LLSs are geographically defined areas where the majority of residents both live and work, forming a relatively self-contained labor market characterized by strong internal commuting flows and economic interdependence.

The results show that, out of €90.4 billion in awarded projects, those located across the various LLSs were, overall, awarded to non-resident firms for 72% of their total value ("imports"). This corresponds to the share of contracts awarded to resident firms in the various LLSs that are, overall, engaged in public works in LLSs other than those where they are located ("exports").

Table 1 presents the interregional origin–destination matrix of NRRP awarded projects, measured in million euros, where each row represents the region of origin of the beneficiary institution and each column the region of the firms that won the contracts. In terms of originating regions, the largest volumes are associated with Sicily (€10,799 million), Campania (€10,400 million), Lombardy (€10,203 million), Veneto (€9,395 million), and Piedmont (€8,439 million), whereas Valle d'Aosta (€60 million) and Basilicata (€703 million) display comparatively limited totals. Looking at destination regions, Lazio emerges as the main "export" oriented region with €16,698 million received, followed by Lombardy (€15,904 million) and Campania (€13,574 million), with substantial inflows also recorded in Emilia-Romagna (€7,715 million) and Veneto (€5,612 million). The main diagonal of the matrix captures intra-regional allocations, that is, resources originating and implemented within the same region, and its relatively high values in regions such as Lombardy (€4,380 million), Lazio (€2,498 million), Campania (€4,058 million), Veneto (€1,978 million), Emilia-Romagna (€2,156 million), and Sicily (€1,296 million) indicate that a significant share of funding is retained within regional boundaries, while the remaining off-diagonal entries reflect the intensity of interregional project linkages and the presence of strong territorial hubs attracting resources from multiple areas.

Building on the origin–destination framework described above, we build a set of synthetic indicators at the level of each LLS, including a normalized trade balance index defined as the difference between total inflows (column total) and total outflows (row total) divided by their sum, and an internal demand coverage index measured as the ratio between intra-LLS allocations (diagonal values) and total originating resources (row total), in order to summarize the relative positioning of each territory in terms of net spillover exposure and capacity to retain NRRP-related demand within its local production system.

To preliminarily explore the determinants of domestic demand and the normalized trade balance, we estimate a set of OLS regressions reported in Table 2. We focus mainly on the construction sector stress indicator. The construction sector stress indicator measures tensions in the public works construction market at the level of individual SLLs. It is constructed as a normalized deviation of a proxy for the local demand–supply balance in the construction sector. Demand is proxied by municipal building permits, measured as the total surface area (or volume) of permits issued in 2022 for new buildings. Supply is proxied by total wages paid in 2022 by firms operating in the construction sector. The ratio between permits and total construction wages provides an indicator of demand pressure relative to productive capacity. This measure is then normalized across SLLs to capture relative deviations from the average. Higher values indicate stronger demand pressures and therefore higher levels of tension in the local public construction market. In the baseline specifications (Columns 1–2), the construction sector stress indicator is negatively and highly significantly associated with both dependent variables. The magnitude and significance of the coefficients remain stable after the inclusion of socioeconomic and geographic controls (Columns 3–4), suggesting a robust negative relationship. Among the controls, gross income per capita and population are positively and strongly associated with both domestic demand and the normalized trade balance. Mean elevation also enters with a positive and statistically significant coefficient. MAQI (a synthetic indicator for the quality of the public administration) displays a negative coefficient but is only weakly significant in the domestic demand regression and not significant for the trade balance. The results provide preliminary evidence that higher levels of stress in the public construction sector are associated with weaker domestic demand and external trade performance.

Based on these findings, the study proceeds to estimate, using multivariate regression models, the main determinants of territorial spillovers, also distinguishing between infrastructure interventions of different financial scales and types. In particular, the analysis considers the role of potentially activatable productive capacity and the intensity of local demand in the construction sector at the territorial level, as well as the size characteristics of firms operating in this sector and the relevant characteristics of the implementing authorities responsible for NRRP interventions, such as their size and institutional quality.

Table 1 – Destination and origin regional matrix of NRPP awarded projects.

	PIEMONTE	VALLE D'AOSTA	LOMBARDIA	TRENTINO ALTO ADIGE	VENETO	FRIULI VENEZIA GIULIA	LIGURIA	EMILIA ROMAGNA	TOSCANA	UMBRIA	MARCHE	LAZIO	ABRUZZI	MOLISE	CAMPANIA	PUGLIE	BASILICATA	CALABRIA	SICILIA	SARDEGNA	TOTAL
PIEMONTE	1.188	5	601	53	154	16	3.103	796	90	19	11	1.014	187	11	880	176	18	10	78	27	8.439
VALLE D'AOSTA	12	33	3	0	0	0	0	1	1	0	0	1	1	0	4	0	0	0	2	0	60
LOMBARDIA	300	2	4.380	132	650	47	106	908	130	72	61	942	164	18	1.723	224	15	39	258	32	10.203
TRENTINO ALTO ADIGE	3	0	104	626	249	2	2	58	28	1	0	89	4	0	108	7	47	1	15	0	1.345
VENETO	146	0	2.360	71	1.978	226	88	449	40	64	12	2.228	66	6	1.278	245	6	9	116	8	9.395
FRIULI VENEZIA GIULIA	33	0	120	7	157	348	22	75	10	6	2	62	18	0	75	12	0	6	35	1	989
LIGURIA	119	0	273	26	162	1	1.482	240	80	31	33	844	77	9	205	89	3	9	50	11	3.746
EMILIA ROMAGNA	284	0	407	9	283	7	16	2.156	87	88	143	359	58	25	383	108	39	66	121	6	4.645
TOSCANA	187	0	571	16	239	7	50	602	937	166	108	424	59	8	522	166	44	21	169	201	4.498
UMBRIA	33	0	67	2	20	6	3	23	34	307	33	313	41	0	101	16	4	4	21	0	1.028
MARCHE	65	0	130	8	23	90	8	83	35	19	932	412	75	10	264	171	26	5	114	10	2.478
LAZIO	255	0	350	119	153	21	73	292	138	55	25	2.498	177	16	578	268	110	91	52	6	5.278
ABRUZZI	557	0	1.558	15	37	0	1	120	75	12	43	173	425	27	668	24	3	3	15	552	4.308
MOLISE	135	0	337	5	25	0	0	7	3	6	7	92	21	130	231	22	0	2	6	123	1.151
CAMPANIA	659	0	1.523	3	347	8	41	607	116	40	120	1.908	183	4	4.058	280	68	30	89	317	10.400
PUGLIE	221	0	396	21	176	0	103	162	38	48	26	947	32	6	1.368	1.514	70	10	73	0	5.211
BASILICATA	13	0	9	0	334	0	1	12	6	7	3	70	11	0	39	44	137	2	14	0	703
CALABRIA	39	0	778	1	216	32	8	168	523	90	4	435	63	17	207	136	21	584	585	19	3.925
SICILIA	919	0	1.726	36	370	200	11	882	71	63	20	3.789	135	3	763	452	6	45	1.296	12	10.799
SARDEGNA	79	0	212	8	37	2	27	74	14	155	44	98	36	1	121	162	28	3	148	541	1.788
TOTAL	5.247	41	15.904	1.160	5.612	1.017	5.143	7.715	2.454	1.248	1.628	16.698	1.831	291	13.574	4.118	647	939	3.257	1.865	90.389

Notes: data in million of euros.

Table 2 – Determinants of domestic demand and normalized trade balance.

<i>Dep. Variable</i>	Domestic demand	Normalized trade balance	Domestic demand	Normalized trade balance
	(1)	(2)	(3)	(4)
Construction sector stress indicator	-0.882*** (0.223)	-9.791*** (1.444)	-0.933*** (0.213)	-9.619*** (1.415)
Gross income per capita			4.184*** (0.813)	22.127*** (5.407)
Population			0.071*** (0.011)	0.307*** (0.072)
Mean elevation			0.004*** (0.0006)	0.011*** (0.004)
MAQI			-0.056* (0.030)	-0.064 (0.198)
Costant	0.055*** (0.003)	-0.441*** (0.021)	-0.932*** (0.035)	-0.751*** (0.216)
Number of Observations	610	610	610	610
R-square	0.0238	0.0704	0.1924	0.1426

Standard errors in parentheses, * p -value=0.1, ** p -value=0.05, *** p -value=0.001