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The Reform of the Italian Procurement Code and the Reshaping of the NRRP. Impact on the Public Works Market and on the Timing of Municipal Infrastructure Projects

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The Reform of the Italian Procurement Code and the Reshaping of the NRRP

Impact on the Public Works Market and on the Timing of Municipal Infrastructure Projects

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Abstract: This work focuses on the short-term consequences for the public works procurement market for Italian municipalities of two events that occurred in the course of 2023: the reform of the Procurement Code and the reshaping of the NRRP. The results show that the new Code is associated with an increased use of negotiations and centralised purchasing solutions and a reduction in the duration of the awarding phase. Furthermore, estimates confirm that between July and December 2023 infrastructure projects at risk of being excluded from the NRRP based on the Government's announcement progressed on average 14% less than other projects.

Keywords: public works, NRRP, municipalities.
JEL classification: H57, H54, K20.

1. Introduction

In June 2023, in line with the provisions of the National Recovery and Resilience Plan (NRRP), the new Italian Procurement Code (Legislative Decree 36/2023, henceforth the Code) entered into force. In the same month, the Italian government announced the first proposal to reshape the NRRP[1],

[1] Along with the National Complementary Plan (NCP). In the remainder of the paper, the acronym NRRP alone is used to indicate a broader definition that also includes the NCP.

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marking the beginning of a revision process that was concluded only at the end of 2023 with the approval of the European Commission.

On the one hand, the introduction of the Code aimed to enhance the efficiency of the public works system; on the other, the NRRP reshaping sought to reallocate problematic projects to alternative national or EU funding sources, other than the Recovery and Resilience Facility (RRF).

Beyond their intended effects, these two interventions may have caused unintended consequences, breaking the continuity of procurement activities and potentially disrupting the implementation of the NRRP. Indeed, discontinuity and uncertainty in the regulatory or planning framework are well known to hinder the effectiveness of public administration and, in this way, significantly influence regional economic performance (European Investment Bank, 2025; Padovani, Du Boys, 2021).

One of the priorities of the reform of the Code is to simplify and accelerate the process of designing, awarding and executing public works, in continuity with recent post-crisis decrees. However, this objective involves regulatory changes that require a considerable adaptation effort from contracting authorities. This could have resulted in difficulties and delays, as happened, for example, with the 2016 reform of the Code (Legislative Decree 50/2016), which led to the adoption of significant corrective measures shortly thereafter.

Similarly, the reshaping of the NRRP may have had the effect of slowing down infrastructure spending in the short term, although it was intended to direct the Plan's resources to more rapidly implemented investment lines. The scale of the changes and the lengthening of the time between their announcement and their finalisation forced stakeholders involved in the Plan's implementation to move forward amid considerable uncertainty.

This paper analyses the consequences of two regulatory and programmatic shocks that occurred in 2023: the reform of the Italian Procurement Code and the reshaping of the NRRP. It focuses on their impact on the characteristics and volume of procurement activities carried out by municipal contracting authorities in the public works sector.

While these two events occurred in the same timeframe, their nature and implications for local governments differed significantly. The Procurement Code reform was anticipated by earlier emergency legislation and followed a rational design to streamline procedures, offering local authorities a certain degree of preparedness. Conversely, the NRRP reshaping introduced considerable uncertainty, particularly for weaker municipal administrations. It was also marked by a lack of institutional clarity and of publicly defined timelines – regarding when final decisions would be made, when suspended projects could be resumed, and when planning could safely restart without the risk of losing funds or having them reallocated. This made it harder for local authorities to plan and implement procurement activities. These differences are considered both in the analytical framing and in the empirical design of the paper.

To assess the consequences of the 2023 Code reform, this study offers an inferential analysis of its impact on key aspects of procurement: the use of open procedures, reliance on centralised procurement solutions (particularly intermunicipal Central Purchasing Bodies, CPBs), and the duration of the awarding phase.

Moreover, a causal inference approach based on propensity score matching is used to estimate whether and to what extent the reshaping of the NRRP slowed down the start of public works related to NRRP-financed projects. The estimation is conducted at the level of individual investment projects, which may involve one or more tendering procedures.

The underlying hypothesis is that the government's vague initial proposal to reshape the NRRP – despite reassurances that excluded projects would continue to be funded under other instruments[2] – induced a precautionary slowdown in municipal procurement activities, at least until the new version of the NRRP was officially approved in December 2023.

The remainder of this paper is structured as follows. Section 2 provides an overview of the key novelties introduced by the reform of the Italian Procurement Code, with particular attention to those aspects that will be subject to the quantitative analysis presented in this study. Section 3 presents a quantitative assessment of the changes in the characteristics of the public works market associated with the introduction of the new Procurement Code. Section 4 evaluates the impact of the reshaping of the NRRP on the progress of NRRP-related projects. Finally, Section 5 concludes.

2. The reform of the Italian Procurement Code

As of July 2023, most of the provisions contained in the Code reform (Legislative Decree No. 36 of 31 March 2023) came into force. The reform marks a clear shift in approach from the previous one (Legislative Decree 50/2016), introducing a comprehensive reorganisation of the regulatory framework governing the design, contracting, and execution of public works. For the purposes of this analysis, we focus on the innovations introduced by the reform that are not only capable of producing structural effects, but also likely to generate measurable impacts in the short term, given the short time that has elapsed since the reform's entry into force. These include *a*) new rules for selecting contractors, *b*) a new role for qualified CPBs and *c*) full digitalisation of procedures.

Contractor selection. Whereas the previous reform (2016) emphasised competitive public tendering as the standard method for awarding contracts, the

[2] For example, European structural funds or funds dedicated to national territorial cohesion.

new Code promotes simplified and faster procedures. Notably, for contracts valued at or below € 150,000 (or € 140,000 for services), direct awarding is once again permitted. For contracts falling within the EU threshold[3], negotiated procedures are also allowed. Simplification, however, does not apply to labour-intensive contracts, for which additional safeguards are required to protect workers' safety and economic interests. In fact, under the new Code, open or restricted competitive procedures are mandatory only for contracts above the EU threshold. Moreover, in exceptional cases and subject to prior justification, negotiated procedures may also be used for contracts exceeding the EU threshold without the publication of a contract notice.

Qualification of contracting authorities. Significant innovations concern the qualification of contracting authorities. The special legislation introduced for the launch and implementation of the NRRP tasked ANAC (the Italian National Anti-Corruption Authority) with issuing guidelines on qualification criteria (ANAC, 2022) – a long-awaited institutional step, whose absence had severely limited the application of the qualification system, formally introduced in 2016.

However, this renewed emphasis on qualification is not without contradictions. Indeed, the new Code raises the threshold under which even unqualified contracting authorities may independently manage public procurement procedures. For public works, this limit increases from € 150,000 to € 500,000.

This change may potentially hinder the development of intermunicipal Central Purchasing Bodies (CPBs), which – despite exhibiting uneven levels of activity since the 2016 reform – had contributed to the rationalisation of the contracting authority system.

Digitalisation. The new Code adopts a digital approach across all areas of public procurement. It introduces the mandatory use of digital procurement platforms (starting in January 2024) and automated procedures for monitoring every phase of the contract lifecycle (starting in January 2025).

Regarding this latter aspect, the Code refers to Building Information Modelling (BIM) procedures, aimed at integrating data from all public or private actors involved in a contract into a single, unified dataset.

Contracting authorities that are not adequately equipped for digitalisation may rely on platforms and procedures provided by other administrations at the same or a higher institutional level.

Beyond potential implementation difficulties in the initial phase, digitalisation is expected to reduce the overall duration of public contracts, particularly the awarding phase.

[3] The current European threshold is: € 5.4 million for works, € 140,000 for supplies, services and public design contests awarded by contracting stations that are central government authorities; € 215,000 for supplies, services and public design contests awarded by sub-central contracting stations; € 750,000 for social services and assimilated services. Different thresholds are provided for special sectors.

It is also worth noting that digitalisation was a specific target under the NRRP, which Italy had to meet by 2023 as a condition for receiving a funding tranche (Senato della Repubblica, Camera dei Deputati, 2023).

This deadline required the rapid launch of digital procurement, leading to the early adoption of IT platforms that had not been adequately tested and limiting the familiarisation phase for users (awarding bodies, contracting authorities, market operators). This aspect must be considered when assessing the initial effects of digitalisation: while the acceleration enabled Italy to meet the NRRP target and gave decisive momentum to a process that might otherwise have stalled, it may also have resulted in a suboptimal functioning of the system in the short term.

Overall, the innovations introduced by the Code represent a significant departure from the 2016 version.

Not only does the new Code definitively introduce measures aimed at stimulating and accelerating public investment, but it also marks a shift from a system characterised by rigidity and strong centralisation in ANAC to a more flexible structure.

In this new framework, responsibilities – while ANAC retains its supervisory role – are largely delegated to contracting authorities, which are considered better positioned to understand the needs, constraints, and technical specificities of individual projects, particularly in relation to local territorial demands.

In this regard, contracting authorities equipped with highly qualified technical staff will be essential to ensure the proper functioning of the procurement system.

3. Procurement patterns after the reform of the Contracts Code

This Section presents the results of an econometric analysis examining the relationship between the entry into force of the new Code and changes in key features of the Italian procurement market. The aim is not to establish causal effects, but to describe statistically significant variations observed over time and across contract types. The models are therefore descriptive in nature and should not be interpreted as offering causal identification. Using the entry into force of Legislative Decree 36/2023 (July 2023) as a temporal reference point, the study analyses how selected procurement indicators have evolved in connection with the reform, focusing on aspects related to market competitiveness and efficiency.

In particular, the analysis focuses on three procedural characteristics of public contracts: the use of open procedures, the recourse to centralised procurement solutions (intermunicipal CPBs), and the duration of the awarding phase. A more detailed description of these outcomes is provided in Section 3.1.1.

As for explanatory variables, the analysis considers both the characteristics of the contracting authority and those of the contract. The former include the source of funding, the award procedure, the nature of the contracting authority (whether centralised or not), the type of service and the economic sector. The latter include the territorial macro-area and the size of the contracting authority measured in terms of resident population.

A key aspect of the analysis is the emphasis placed on NRRP-funded projects. For these contracts, many of the Code's innovations had already been anticipated by special procurement rules introduced in February 2023 (Legislative Decree 13/2023). Comparing NRRP and non-NRRP projects allows for a preliminary assessment of the potential impact of these regulatory differences.

The database used covers the entire national territory and is built by merging ANAC OpenData on procurement procedures with information from the official Italia Domani website on NRRP projects. It includes all public procurement procedures valued at € 40,000 or more and initiated between 2022 and 2024[4].

To ensure comparability between pre- and post-reform data, only procurement procedures started a year or more before the introduction of Legislative Decree 36/2023 onwards are included.

The analysis focuses on public works – where most NRRP-related contracts are concentrated – and on municipal contracting authorities. In the Italian context, municipalities are particularly relevant, as they represent a significant proportion of contracting authorities at the national level and oversee a large number of public works. It is precisely on the municipal sector that the public debate has repeatedly focused, investigating possible causes of the difficulties in the implementation of the NRRP. Moreover, municipalities, especially the smallest and least equipped with instruments and professionalism[5], are more incisively affected by regulatory changes and face greater obstacles in adapting to the innovations introduced by the 2023 Code.

Before getting to the core of the analysis, it is useful to provide some background by examining monthly trends in the number and total value of public works procedures initiated by municipalities. A noticeable short-term response to the new Code can be seen in the values for June 2023 (Figure 1). These values are particularly high compared to previous months and are not linked to seasonal factors[6]. Municipalities may have rushed to start as

[4] In this timeframe one can fully consider the procurement activity related to the PNRR and PNC that sees municipalities as the main implementers. The period is also sufficient to grasp the first changes brought about by the reform of the Code.

[5] The importance of the administrative capacity of contracting authorities, particularly municipal ones, is evidenced by recent literature that identifies it as a key factor in procurement efficiency (Bosio *et al.*, 2022; Brown, Potoski, 2003; Decarolis *et al.*, 2020; Bandiera *et al.*, 2009; Saussier, Tirole, 2020).

[6] Such as those found in December, which are due to the usual concentration of procedures at the end of the year.

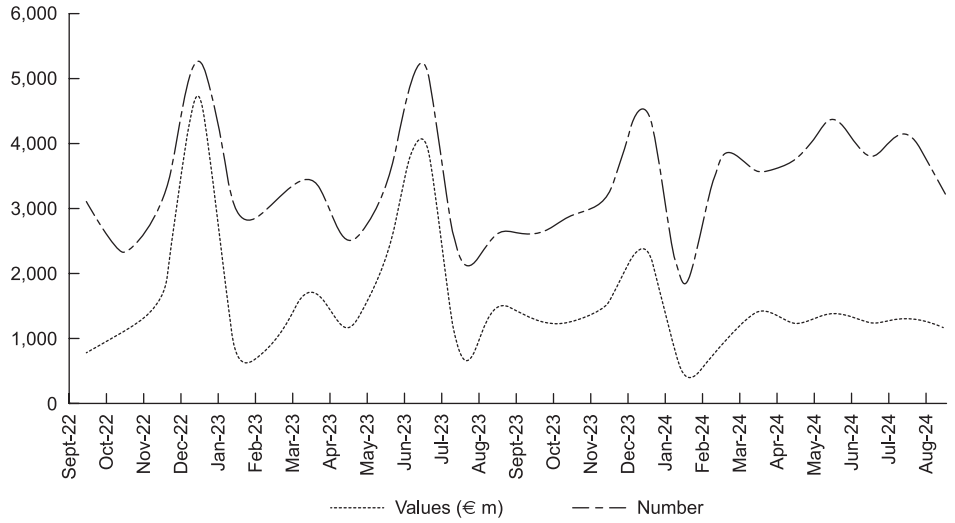

Figure 1: Total number and value of public works procedures initiated by municipal contracting authorities by month of publication of the procurement notice.
Source: Authors' elaborations on ANAC OpenData.

many planned procedures as possible to avoid uncertainties and delays under the new regulatory framework and continue operating under the old one. If the intuition were correct, this effect would not necessarily reflect the inherent complexity of the reform itself, but rather the general uncertainty that regulatory changes tend to generate among both public and private actors.

3.1. An inferential analysis

3.1.1. The outcome variables

The first outcome variable analysed is the probability of using an open procedure[7]. To this end, a binary indicator is introduced, taking the value of 1 for open procedures (a definition that also includes restricted procedures), and 0 for negotiated or direct awards. Before the implementation

[7] Much of the recent economic literature on public procurement has focused on how the choice of tender format influences the efficiency performance of public contracts. Contributions grounded in contract theory and mechanism design – especially those addressing the issue of contractual completeness in the presence of a clearly defined object – have highlighted the advantages of open procedures (i.e. public tenders) over negotiated ones, including greater competition and reduced corruption risks (Bulow, Klemperer, 1996). More recent studies, however, have drawn attention to specific features of the procurement market – such as the complexity of the works involved, especially in the case of public infrastructure, or the limited number of active firms – that can make open procedures inefficient. These conditions may lead to higher rates of re-tendering, thereby increasing both durations and costs (Bajari *et al.*, 2009; Decarolis, 2018).

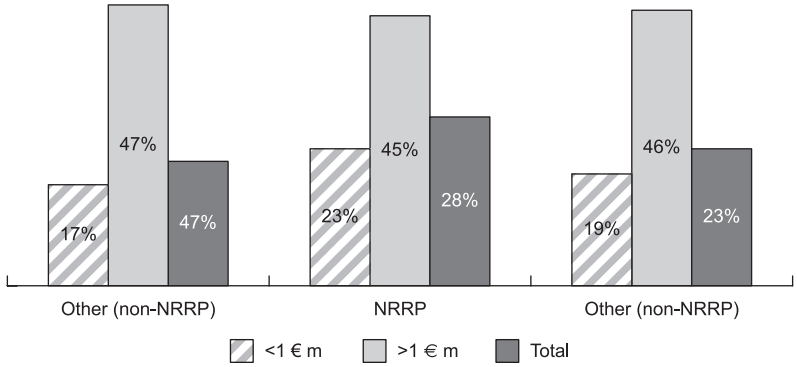

Figure 2: Share of open procedures by class of value and by inclusion in the NRRP. Pre-Code Reform Period.
Source: Authors' elaborations on ANAC OpenData and ItaliaDomani.

of the new Code, the share of open procedures was 23% across all types of contracts (both NRRP and non-NRRP), and – unsurprisingly – higher for those exceeding € 1 million (46%, Figure 2).

Contracts related to the NRRP exhibit a greater incidence of open procedures compared to others, especially for works valued at less than € 1 million. Such a pattern is favourable in terms of market competitiveness and the mitigation of corruption risks. NRRP-related procurement activity appears more formalised and structured around tendering procedures. This trend diverges from those observed in recent years across all regional areas, as well as from the most recent regulatory developments preceding the new Code, which had widened the scope for negotiated and direct awards.

The second outcome variable is the probability of using CPBs for the procurement of public works. In this case, the indicator takes a value of 1 when the procedure is initiated by a CPB and 0 when it is initiated by the contracting authority of the individual municipality. As noted earlier, the focus is on intermunicipal CPBs[8], which play a significant role in public works contracts characterised by a low degree of standardisation, situations where joint procurement may offer substantial advantages to municipalities with similar needs. For the same reason, a relatively low propensity to delegate the awarding phase to national-level CPBs can be assumed in such contracts.

Gains in efficiency and competitiveness can be expected from increased reliance on Central Purchasing Bodies (CPBs), driven by economies of scale and scope (compared to a multitude of small contracting authorities), improved management of complex procedures through pooled expertise

[8] The definition of intermunicipal CPBs includes contracting stations of Unions of Municipalities and Mountain Communities and Associations or Consortia of smaller contracting stations serving municipalities (pursuant to Article 37(4)(b) of Legislative Decree 50/2016).

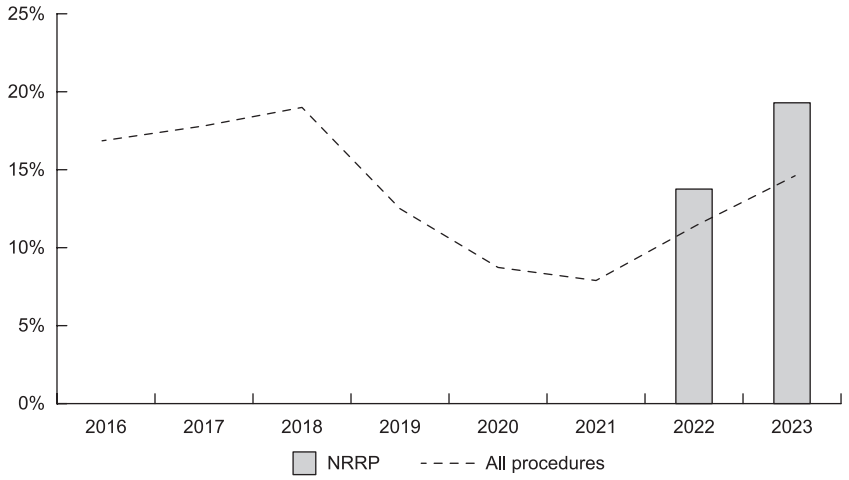

Figure 3: Proportion of procedures initiated by intermunicipal CPBs by year of publication of the procurement notice and by being related to the NRRP.
Source: Authors' elaborations on ANAC OpenData and ItaliaDomani.

(Ferrentino, Vota, 2023), larger average lot sizes, and greater openness of local markets to competition (Arachi *et al.*, 2024).

To assess whether the use of CPBs has been effectively promoted, the analysis focuses on public works contracts exceeding € 150,000. This threshold corresponds to the limit established in the previous Code, above which contracting authority qualification was mandatory, thus making CPB involvement more likely. The number of procedures initiated by intermunicipal CPBs rose between 2016 and 2018, following the reform introduced by Legislative Decree 50/2016. It then declined between 2019 and 2021, as a result of the COVID-19 crisis and the approval of the so-called «Sblocca Cantieri» decree (DL 32/2019), which relaxed the requirements introduced only a few years earlier (Figure 3).

In 2022 and 2023, the increase in procurement activity related to NRRP gave a new impetus to CPBs, as the use of qualified contracting authorities became a condition for accessing European and national funding. In 2023, the degree of «local centralisation» reached its highest point, even exceeding the levels recorded throughout the entire observation period (Figure 3).

Finally, one of the main priorities of the Code reform – underpinning many of the provisions introduced by Legislative Decree 36/2023 – was to accelerate the start of works. For this reason, the third outcome considered is the duration of the awarding phase, measured in days. This is calculated as the time interval between the deadline for bid submission and the official date of the award. While much of the existing literature on public works lifecycle duration has focused on the execution phase and on so-called time overruns (Baltrunaite *et al.*, 2024; Lewis, Bajari, 2011; Carlucci *et al.*, 2019;

Guccio *et al.*, 2014), the duration of the awarding phase also serves as an important proxy for administrative efficiency. The shorter this phase, the faster and more efficient the contracting authority – and, more broadly, the administrative process – is likely to be (Gori *et al.*, 2017, 2020, 2022, 2024).

3.1.2. The econometric approach

To assess changes in the outcome variables described above following the entry into force of the new Code (July 2023), different models are estimated depending on the nature of the dependent variable. For binary outcomes – such as the use of open procedures or the involvement of intermunicipal CPBs – a logit model is employed. For continuous outcomes – such as the duration of the awarding phase (measured in calendar days) – we use linear regression estimated via ordinary least squares (OLS). The logit models can be expressed in compact form as follows:

$$Pr(Y_i = 1) = \Lambda(\alpha + \beta \cdot Code_i + \gamma \cdot NRRP_i + \delta \cdot \\ \cdot (Code_i \times NRRP_i) + \mathbf{X}_i'\boldsymbol{\theta} + \mathbf{Z}_i'\boldsymbol{\psi} + \varepsilon_i) \quad [1]$$

where Λ represents the standard logistic cumulative distribution function.

The linear model is instead specified as:

$$Y_i = \alpha + \beta \cdot Code_i + \gamma \cdot NRRP_i + \delta \cdot (Code_i \times NRRP_i) + \\ + \mathbf{X}_i'\boldsymbol{\theta} + \mathbf{Z}_i'\boldsymbol{\psi} + \varepsilon_i \quad [2]$$

In both cases, Y_i represents the status or value assumed by one of the three outcome variables described in Section 3.1.1: the use of the open procedure (dummy), the use of an intermunicipal CPB (dummy), or the duration of the awarding phase (continuous, in calendar days).

The explanatory variables include: a dummy for NRRP-related projects (NRRP); a dummy indicating whether the tender was published before or after the reform (Code); and a vector $\mathbf{X}_i'$ of categorical variables containing contract amount class (below or above € 1 million), sector of the work (transport infrastructure, other civil infrastructure, energy/gas/water/waste networks), type of work (new construction, maintenance, recovery, restoration or renovation), macro-area (North, Centre, South), and population size class of the awarding municipality (≤ 20,000; 20,000-100,000; > 100,000 residents).

Whenever not used as dependent variables, the use of an open procedure and the use of an intermunicipal CPB are included as additional covariates. The vector $\mathbf{Z}_i'$ collects all interaction terms involving Code, NRRP, and the covariates in $\mathbf{X}_i'$. Specifically, it includes the full set of interactions: $Code_i \times \mathbf{X}_i'$, $NRRP_i \times \mathbf{X}_i'$, and $Code_i \times NRRP_i \times \mathbf{X}_i'$. These interactions allow the estimated effect of the reform to vary across project characteristics and local contexts.

It is worth noting that the unit of analysis in all estimations is the individual project, indexed by *i*. However, several explanatory variables – including population size and macro-area – refer to the characteristics of the municipality in which the project is implemented. These controls are included to capture the contextual differences in procurement capacity and regulatory environments across local governments[9].

3.2. Results

3.2.1. Open procedures and intermunicipal CPBs

Table 1 shows the estimates of the change in the likelihood of using open procedures and of relying on CPBs, associated with the regulatory discontinuity introduced by the new Code, distinguishing between NRRP-related and other contracts.

We estimate logit models and report average marginal effects to facilitate interpretation. Specifically, each marginal effect measures the average change in the predicted probability of the outcome (e.g., use of open procedure) when the variable Code changes from 0 to 1 – i.e., before vs after the entry into force of the new regulatory framework – while holding all other covariates constant. For instance, the marginal effect reported for Southern municipalities corresponds to the average difference in the predicted probability of using an open procedure, before and after the reform, among contracts awarded in the South. These estimates are obtained by computing, for each observation, the change in predicted probability when the variable Code switches from 0 to 1 and averaging these differences across all observations within the relevant group. To keep the tables concise and readable, we present only the marginal effects[10], omitting the underlying logit coefficients.

The launch of the new Code is associated with a statistically significant reduction in the use of open procedures and a statistically significant, though not particularly high, increase in the use of intermunicipal purchasing centres.

Controlling for various contract characteristics, the probability of resorting to open procedures decreases, on average, by 5.4%. This finding

[9] We also considered the possibility of using hierarchical models – either with random effects or fixed effects at the municipal level – to explicitly account for the nested structure of the data. However, given the complexity introduced by the joint analysis of NRRP-related and regulatory discontinuity effects, and the substantial increase in model dimensionality that would result, we opted for a more parsimonious specification. Future research could usefully explore multilevel approaches to better assess the role of unobserved heterogeneity at the local government level.

[10] Marginal effects are calculated as the partial derivative of the predicted probability with respect to the binary treatment variable (Code), evaluated at the observed values of all covariates and averaged across all observations. Standard errors are obtained using the delta method, which approximates the variance of a non-linear transformation of estimated parameters and allows for valid inference in non-linear models (see Wooldridge, 2010). These estimates were computed in Stata using the *margins*, *dydx(Code)* command following the logit estimation.

Table 1: Estimated change in the probability of using open procedures (left) and intermunicipal CPBs (right) after the new Procurement Code

	Probability of resorting to an open procedure *Sample size (N): 31,100*				Probability of resorting to an intermunicipal CPB *Sample size (N): 26,981*			
	Post-Code change	P > z	[95% Conf. Interval]		Post-Code change	P > z	[95% Conf. Interval]	
All procedures	-0.054***	0.000	-0.062	-0.045	0.023***	0.000	0.013	0.031
Other (non-NRRP) procedures	-0.041***	0.000	-0.052	-0.030	0.02***	0.000	0.009	0.030
NRRP procedures	-0.073***	0.000	-0.089	-0.057	0.032***	0.000	0.016	0.048
North	-0.033***	0.000	-0.045	-0.021	0.029***	0.000	0.015	0.043
Centre	-0.029**	0.011	-0.051	-0.006	0.036***	0.000	0.017	0.056
South and Islands	-0.085***	0.000	-0.100	-0.070	0.015**	0.031	0.001	0.028

Notes: Estimates obtained using the logit model specified in equation [1], estimated by maximum likelihood, and reported as average marginal effects. The unit of analysis is the individual public works project initiated by municipal contracting authorities. Reported values indicate the average percentage point change in the predicted probability of the outcome for each category.
Source: Authors' estimation on OpenData ANAC and ItaliaDomani. Significance level: 1% (***), 5% (**), 10% (*).

is not unexpected, given the expanded opportunities for direct awarding introduced by the new Code, a provision that was anticipated by the special legislation governing the NRRP's implementation since 2020. Moreover, the equal treatment of open and negotiated procedures within the new Code further contributes to this outcome.

The additional element that now emerges is that the reduction is the result of decreases of 7.3% for the NRRP procurements and 4.1% for the other procurements.

It should be emphasised that the possibility of resorting to procedures other than open and restricted tenders (direct awarding and negotiated procedures), provided for by the new Code, seems to have been taken up to a greater extent for NRRP contracts, probably because of the need to carry out the awarding procedures quickly, as direct awarding allows. Another explanation could lie in the greater complexity of these contracts, which therefore benefit, more than the others, from a greater interlocution between the contracting authority and market operators, that can be achieved through negotiation (Decarolis, 2018).

Looking at the observed differences across territorial areas, the analysis reveals that, following the adoption of the new Code, there was a reduction in the use of open procedures in the South by a greater magnitude than in the Centre-North. This differential may reflect varying degrees of preference for open procedures among contracting authorities in different regions. The broader possibility of resorting to direct awarding and negotiated procedures under the new Code may have had a more pronounced impact on municipal administrations in the South, which, on average, are less inclined to use the open procedure.

In fact, southern municipalities, often characterised by smaller administrative teams and lower levels of technical expertise, may find it more difficult to manage open procedures, which are more complex and time-consuming. In this context, the simplification of awarding methods may have had a disproportionately larger impact in the South, where lower administrative capacity makes direct and negotiated procedures more attractive and feasible. This hypothesis would be coherent with existing literature linking bureaucratic quality with procedural choices and procurement performance (Decarolis *et al.*, 2020; Brown, Potoski, 2003).

Within the positive *trend* that started in 2022 (Figure 2), the introduction of the new Code appears to be linked with an increased recourse to CPBs for both NRRP and other contracts. In fact, the probability of using CPBs increased by 2.3%, due to increases of 3.2% for contracts related to the NRRP and 2% for others. This occurred although the new Code raised the threshold for the obligation to use qualified contractors. The results also indicate that the probability of employing CPBs increased significantly in the Centre-North, while in the South the increase was smaller and less significant.

The weaker increase in CPB reliance in the South may also relate to lower levels of institutional cooperation and to the uneven development of intermunicipal procurement platforms. In areas where administrative fragmentation combines with limited professionalisation, the institutional capacity needed to stimulate the joining of CPBs may still be lacking. This underlines the importance of strengthening technical assistance and capacity-building efforts in less equipped regions.

If the result concerning the procedural choice should be read in the light of the renewed possibilities of directly awarding works and of the regulatory equalisation between competitive and negotiated procedures, the one concerning the centralisation of procurement is unexpected after the new Code raised the contract value threshold requiring the use of qualified contracting authorities (from 150,000 to 500,000 euro). It can be inferred that two factors have likely influenced this outcome: first, the perception of the binding nature of the qualification system, which was largely unenforceable until 2019; and second, the learning effects associated with increased CPB activity in the years immediately preceding the reform, primarily driven by the implementation of the NRRP.

3.2.2. Duration of the awarding phase

Finally, the estimation of the variation in the duration of the awarding phase associated with the new Code[11] has a negative sign and is significant for both the public works procedures under the NRRP and the other ones (Table 2). On average, the reduction is just under 9 days (13.5 days for NRRP projects and 6.1 for the others). If the time gain may seem small, it takes on greater significance if one considers that the procedures initiated in the South, those that historically suffer the greatest delays, record reductions in awarding times that are greater than those of the other macro-areas: approximately 16 days for negotiated procedures and 26 days for open procedures. The short period of time that has elapsed since the new Code came into force leads one to give weight above all to the activation of a downward *trend*, especially in the South, rather than to the absolute value of the reductions in duration.

As a further demonstration that, although different per macro-area, the gain is by no means negligible, one can compare it with the historical durations of the awarding phase *prior to the* launch of the new Code, separately for open and negotiated procedures.

[11] In the case of continuous outcomes, marginal effects coincide with the estimated coefficients from the linear regression model. For consistency with the results presented in Section 3.2.1, we report average marginal effects obtained using the Stata margins command, which ensures comparability of interpretation and standard error computation across specifications.

Table 2: Estimated change in the duration of the awarding phase (days) after the adoption of the new Procurement Code

	Duration (Days) *Sample size (N): 8,866*			
	Post-Code change	P > z	[95% Conf. Interval]	
All procedures	-8.8***	0.00	-10.61	-6.92
Other (non-NRRP) procedures	-6.1***	0.00	-8.63	-3.42
NRRP procedures	-13.5***	0.00	-16.34	-10.58
Negotiations				
North	-1.3	0.36	-4.16	1.52
Centre	-3.6	0.11	-7.93	0.76
South and Islands	-16.2***	0.00	-19.82	-12.70
Open procedures				
North	-11.3***	0.00	-16.0	-6.6
Centre	-13.5***	0.00	-19.1	-8.0
South and Islands	-26.2***	0.00	-30.6	-21.8

Notes: Estimates obtained using the linear regression model specified in equation [2], estimated by Ordinary Least Squares (OLS), with the duration of the awarding phase (calendar days) as dependent variable. The unit of analysis is the individual public works project initiated by municipal contracting authorities. Reported values indicate the average change in awarding duration (days) for each category. **Source:** Authors' estimation on OpenData ANAC and ItaliaDomani. Significance level: 1% (***), 5% (**), 10% (*).

In the Centre and in the North, there is a moderate reduction in durations for negotiated procedures (-8 and -5%, respectively) and a more marked reduction for open procedures (-23% in both macro-areas; Figure 4, right). In the South, where at the date of the entry into force of the new Code average durations were in line with those of the Centre for negotiated procedures and longer for open procedures, the reduction reaches 38% for negotiated procedures and 35% for open procedures. The result is a picture characterised by a substantial reabsorption of the territorial *disparities* in the duration of open procedures and, at the same time, by a strong acceleration of negotiated procedures in the South, which, if confirmed, would bring the average duration of negotiated procedures and of the complex of all procedures below the national figure. Since a rapid recovery could also be accompanied by counter-effects, especially in the first application phase of digitalisation and the gradual spread of qualified contracting authorities, the estimate should be repeated in some time, when the effects of the Code will have stabilised in all aspects and all macro-areas[12].

[12] It should also be considered that, even with the same dimensional characteristics of the individual contracts, the estimates presented may be conditioned by the delays in the communication of the closure of the awarding phase by the contracting authorities, which determine an over-representation

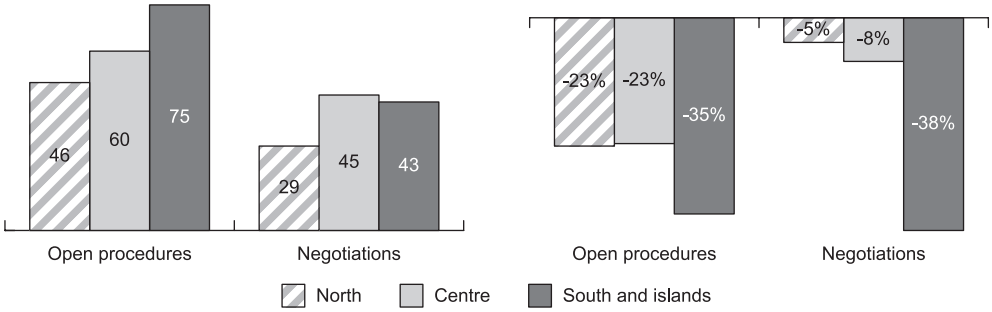

Figure 4: Average duration (days) of the awarding phase in the pre-New Code period (left) and estimated percentage change in average duration after the new Code (right) by territorial area and type of procedure.
Source: Authors' elaborations on ANAC OpenData and ItaliaDomani.

3.2.3. Discussion

The empirical evidence presented in this section suggests that the new Code has achieved some of its immediate objectives in terms of procedural acceleration and rationalisation of procurement functions, particularly in the South. However, these trends should not be interpreted uncritically. The broader use of simplified awarding procedures – while beneficial for speeding up investment implementation – may reduce the scope for market competition and transparency, especially in procurement contexts where administrative capacity and institutional safeguards are weaker (Bandiera *et al.*, 2009; Decarolis, 2018; Bosio *et al.*, 2022). The expansion of negotiated and direct procedures, particularly in NRRP-related projects, may reflect a strategic choice to expedite delivery, but it also increases discretion in contractor selection, which can heighten the risk of opportunistic behaviour or passive waste. Maintaining a balance between procedural efficiency and the principles of transparency and competition remains a critical challenge, particularly in institutional contexts with weaker safeguards.

In this framework, the increased recourse to intermunicipal CPBs appears as a particularly relevant counterbalance. By pooling professional expertise, standardising procedures, and aggregating demand, CPBs can reinforce procedural quality and support more competitive outcomes, even when simplified awarding methods are used (Arachi *et al.*, 2024). The positive effects observed in terms of CPB use, especially in NRRP-related contracts, suggest that strengthening shared procurement capacity can mitigate the potential downsides of simplified procedures.

of short durations and a consequent downward estimate of the average duration of the award. In this sense, if the delays in communication were mainly concentrated in the South, it would be observed, precisely for public works in this macro area, an amplification of the downward distorting effect.

Some of the positive patterns observed in this section – such as the increased use of inter-municipal CPBs or the reduction in awarding times – may also be shaped by factors other than the reform itself. Although we control for observable characteristics such as contract value, project type, geographic area, and features of the contracting authority, important dimensions such as administrative capacity and managerial routines may still act as unobserved confounding factors. These elements are difficult to measure and may influence the procurement outcomes observed across municipalities.

Such sources of unobserved heterogeneity are likely to underpin part of the territorial differences highlighted in the analysis. In interpreting the regional heterogeneity of effects, it is therefore essential to consider the role of administrative capacity.

Although the analysis does not directly include a measure of municipal competence, the observed geographical differences – especially the more marked reduction in awarding times and use of open procedures in the South – are consistent with a capacity-based interpretation. In weaker administrative contexts, reforms that promote procedural flexibility may generate faster responses, but also raise concerns about the ability to maintain quality and oversight. Future work should explore more explicitly how differences in staff qualifications, institutional routines, and prior exposure to complex programmes like the NRRP mediate the effects of procurement reforms.

In conclusion, even acknowledging limitations due to non-observable local conditions, the evidence points to a number of developments that appear consistent with the reform's intended goals in the short term. However, while these improvements may reflect genuine progress, they also come with tradeoffs that should be carefully monitored in light of their potential long-term implications for procurement quality and institutional accountability.

4. The effects of the reshaping of the NRRP on the progress of infrastructure projects

Among the factors that are most blamed for the long implementation times of public works in our country are the long duration of the planning phase and the constant second-guessing of intervention choices imposed by politics.

In the summer of 2023, a first phase of the redetermination of the interventions financed under the NRRP and NCP began, and lasted until March 2024; later in the year, further changes were proposed and approved, and the process may not yet be complete. The climate of uncertainty associated with the first revision phase may have slowed down the publication of calls for tenders and their awarding in the second part of 2023 and the first part of 2024. These effects must be taken into account because both the theoretical and empirical literature suggest that the timing and implementation of public

investment projects are deeply affected by planning uncertainties and policy revisions (Capello *et al.*, 2024; European Investment Bank, 2025; Padovani, Du Boys, 2021). Such uncertainties arise on the side of contracting authorities – which often operate under incomplete or unstable information about the financial resources available – as well as on the side of market operators, who perceive the risk of committing to tenders that may subsequently be revised, postponed, or even cancelled.

This Section first describes the details of the reshaping and then proposes an econometric estimation with *a propensity score matching* technique of the effects of the first reshaping of the NRRP on the timing of project contracting and progress.

4.1. The reshaping of the Italian NRRP for the projects pertaining to municipal administrations

The initial version of the Italian NRRP (approved by EU Council Implementing Decision of 13 July 2021) has so far been subject to four amendments[13]. The most significant, and the subject of analysis in this paper, was officially requested by the Government in August 2023 and was approved by the EU Council on 8 December 2023. The reshaping entailed an increase of 2.9 billion euros of EU funds for Italy (currently 194.4 billion), the inclusion of the new Mission 7 *RePowerEU*, and several changes to the measures originally planned. The latter have become necessary due to criticalities of an objective nature caused mainly by rising costs, scarcity of materials, and the limitations of the production system (with the consequent increase in the number of unsuccessful tenders).

As in Section 3, we focus on municipalities as contracting authorities. For Italian municipalities, the reshaping involved a total of two Missions and four Components (Mission 2, Components 2 and 4, and Mission 5, Components 2 and 3). Information on both the initial funding and the subsequent resource adjustments can be reconstructed from the data available on the ReGiS platform. In some cases, the reshaping affected all measures within a given Component, while in others it concerned only a subset of them. For municipalities, these measures correspond to specific investment lines.

[13] The first amendment, formalised in July 2023 and approved by the EU Council's Implementing Decision of 19 September 2023, concerned *milestones* and *targets* (M&T) related to the fourth instalment due on 30 June 2023. The second amendment, the one analysed in this Note, was requested by the Government in August 2023 and was approved by the EU Council with the Implementing Decision of 8 December 2023. The third amendment, requested by the Government on 4 March 2024 and approved by the Council of the EU on 14 May 2024 with the relevant Implementing Decision, concerned the correction of 55 clerical errors. The fourth amendment was requested by the Government on 10 October 2024 and approved by the Council of the EU on 12 November 2024 with the relevant Implementing Decision.

Table 3: New infrastructural projects held by the municipalities and potentially affected by the reshaping: number, funding from NRRP and total project cost

	Number	NRRP Funding (€ m)	Total project cost (€ m)
M2.C4.2.1 – Flood risk management and risk reduction	550	284	297
M2.C4.2.2 – Energy efficiency for municipalities	2,339	1,343	1,390
M2.C4.3.1 – Urban green areas preservation	45	79	79
M5.C2.2.2 – Integrated Urban Plans	2,727	6,226	7,243
M5.C3.1.1.1 – Social infrastructures for marginal areas	429	230	245
Total	6,090	8,162	9,255

Source: Authors' elaborations on ItaliaDomani.

Among the projects falling under the investment lines affected by the reshaping, the focus is on newly formulated public works projects, thus excluding the so-called existing projects resulting from programming acts predating the NRRP. This choice makes it possible to focus the assessment of the impact of reshaping on projects that are certainly not affected by long-standing problems (from legal disputes to construction site variants), thus separating and emphasising the critical points strictly related to the new rules of the Contracts Code and to the conduct of the NRRP[14].

These projects – the public works commissioned by municipalities for the realisation of new public works – belong to Mission 2, in Component 4 and investment lines 2.1, 2.2, and 3.1, and to Mission 5, in Components 2 and 3, in investment lines 2.2 and 1.1.1, respectively. For these same projects, the total authorised amount of financing is approximately 8.2 billion euros, which corresponds to approximately 9.3 billion euros in total costs when co-financing by the beneficiaries is included (Table 3).

Although the Government had assured financial coverage for all projects since the first reshaping proposal was formalised in July 2023, considerable uncertainty remained regarding the alternative sources of funding, their actual availability, and the potential displacement of other projects due to the reallocation of originally earmarked resources.

Moreover, in the six months following the first reshaping proposal – i.e. until its final approval in December 2023 – uncertainty also affected the identification of projects that would actually be removed from the NRRP or partially defunded.

As a result, the entire set of projects falling under the investment lines listed in Table 3 can be considered, between July and December 2023, as

[14] Some of the existing projects are characterised by problems of a certain magnitude that have historically hindered and slowed down their implementation. Including them in the analysis would entail the risk of blaming the new rules and/or the NRP/NCP and its reshaping for problems that go back to pre-existing issues, even distant in time.

subject to a certain degree of uncertainty regarding whether they would ultimately be completed with adequate funding from national or EU sources.

Building on these premises, the reshaping of the NRRP offers an interesting opportunity to assess how uncertainty about the actual availability of funding may affect the implementation of public investments. Given the limited time frame (July to December 2023), the most direct and practical way to investigate the potential effects of reshaping is to examine project progress. This is measured as the total value of public works already procured, expressed as a percentage of the total cost of the associated investment project. The frequent updating of information on launched procurement procedures allows this indicator to capture more accurately – compared to other process indicators – whether uncertainty may have caused a slowdown or even a halt in the advancement of projects exposed to reshaping risk between July and December 2023.

Starting from this measure, the next section presents the results of a propensity score matching analysis that compares the progress of projects eligible for reshaping with that of comparable projects not affected by the reshaping process[15].

4.2. The results of the propensity score matching

The reshaping approved in December 2023 provides an opportunity to carry out a causal inference analysis aimed at measuring the effect of programmatic and financial uncertainty on the implementation of NRRP projects. July 2023 – the month in which the reshaping proposal began to circulate[16] – is taken as the policy start date, or the point at which the shock occurred.

The performance (progress) of projects that were not affected by the reshaping proposal, realised between July and December 2023, can be used as the best approximation of what the projects affected by the reshaping proposal might have achieved in the counterfactual (unobservable) scenario in which the reshaping had not been announced and implemented.

In policy evaluation terminology, projects affected by the reshaping are considered «treated», while those not affected are regarded as potential

[15] The choice of using propensity score matching (PSM) as a causal inference strategy is motivated by the specific configuration and constraints of the available data. To this regard, a difference-in-differences (DiD) approach was considered but deemed infeasible due to the limited temporal structure of the available data. A credible DiD design would require at least three distinct time periods to test the parallel trends assumption and capture pre-treatment dynamics. In our case, however, we observe only two periods – before and after the policy shock of July 2023 – and the outcome variable (project progress) is measured only once, at the end of the post-treatment period. Moreover, the short time window (July–December 2023) does not support additional periodisation. For these reasons, we opted for a PSM approach to estimate the Average Treatment Effect on the Treated (ATT), conditioning on a rich set of observable project and municipal characteristics.

[16] The amended PNRR was submitted to the European Commission, in accordance with Article 21c of Regulation (EU) 2021/241, on 7 August 2023.

«controls». The objective is to estimate the Average Treatment Effect on the Treated (ATT), i.e. the average effect of the treatment (in this case, the reshaping proposal) on the projects that were actually subject to it.

To this end, using the individual project (identified by the CUP – Unique Project Code) as the basic unit of analysis, both the characteristics of the individual project and those of the municipality are considered.

Table 4 provides a summary of the characteristics of the 13,900 projects examined. Overall, a substantial degree of homogeneity emerges between the treated and untreated groups with respect to project count, financial characteristics (such as average amount and average share of NRRP funding), average progress prior to the reshaping announcement, geographical distribution by macro-area, and municipal characteristics. One notable difference concerns the average progress achieved prior to the announcement: 25% for treated projects, compared to 36% for those not affected. However, given that this is a relatively modest gap (11 percentage points), and that the average in both groups remains well below 50%, it is unlikely that the government's selection of projects for reshaping was primarily driven by delays in their implementation.

The most significant imbalance between the two groups of projects is in terms of the sector of intervention, with projects not subject to reshaping falling almost entirely in the social sector (91%), while those subject to reshaping are primarily in the environmental sector (35%) and the social sector (50%), with a non-negligible share of projects in the transport sector (15%). To facilitate the interpretation of Table 4, it should be noted that the projects eligible for reshaping are all those in the Measures and Components of the NRRP listed in the government's first reshaping announcement – regardless of whether they were actually selected for reshaping at a later stage. Conversely, the not reshaped projects are those excluded from the initial announcement and therefore never at risk of being reshaped.

In order to be able to associate each project eligible for reshaping with a project that is as similar as possible but not subject to reshaping, it is necessary to estimate *propensity scores*. The variables listed in Table 4 are used as regressors of a *logit* model with dependent variable the subjection (Y = 1) or non-subjection (Y = 0) of the project to the reshaping treatment. The *propensity score* estimate returns a picture of almost complete *overlap* between the two groups of projects in the space defined by the characteristics listed in Table 5.

The statistical *matching* procedure is carried out with replacement and associating each treated unit with a single control. As a natural consequence of the *matching* process, the number of projects on which the treatment effect is estimated is 12,180, twice the number of treated projects.

As mentioned in Section 4.1, the outcome variable, the degree of progress of the individual project after the reshaping announcement, is calculated as the ratio between the value of the tenders launched in the July-December

Table 4: Pre-treatment characteristics of the groups of projects not subject to reshaping (controls) and potentially reshaped (treated)

	Controls	Treated
Number	7,810	6,090
Average progress pre- announcement	36%	25%
Average cost	1,540,575	1,519,700
Average NRRP financing share (%)	91%	94%
Area		
North	35%	42%
Centre	19%	17%
South and Islands	46%	41%
Total	100%	100%
Project sector		
Environment	6%	35%
Social	91%	50%
Transport	3%	15%
Total	100%	100%
Characteristics of the municipality		
Number of municipalities	2,848	2,769
Average total cost of NRRP financed projects per municipality (€)	7,452,332	7,006,258
Average number of NRRP financed projects per municipality	4.2	3.9
2020-2022 average yearly value of PWs procedures (€)	1,666,499	1,650,712
Average resident population	15,136	16,240

Source: Authors' elaborations on ANAC OpenData and ItaliaDomani.

2023 period and the total funding allocated to the same project (i.e. the project cost). The effect of reshaping (ATT) is estimated as the simple average of the differences in the post-announcement progress between each project eligible for reshaping and its non-reshaped «twin» project.

Estimates suggest that as of 31 December 2023, projects eligible for reshaping are 14.2% less advanced than projects excluded from reshaping (Table 5). In another perspective, reshaping has slowed down the execution of projects by 14.2% compared to what could have happened if they had never been considered for reshaping. The estimated delay is very significant, as are the estimates for the three macro-areas. The latter show a certain heterogeneity, although not such as to suggest different mechanisms for generating the effect or significantly different intensities of the phenomenon. While in the Centre, the slowdown attributable to the Plan's reshaping announcement stands at 10.4%, in the South and the North it reaches higher values of 14.2 and 18.3%, respectively.

Table 5: Average Treatment Effect on the Treated (ATT) of the NRRP reshaping announcement on project progress

	ATT	Std. Err.	P > z	[95% Conf. Interval]		Sample size (N)
All projects	-0.142***	0.013	0.00	-0.166	-0.117	12,180
Area						
North	-0.183***	0.023	0.00	-0.228	-0.137	5,148
Centre	-0.104***	0.023	0.00	-0.149	-0.057	2,052
South and Islands	-0.142***	0.018	0.00	-0.178	-0.106	4,980
Class of resident population of the municipality						
< 20.000	-0.177***	0.022	0.00	-0.219	-0.134	7,652
[20.000-100.000]	-0.049**	0.018	0.01	-0.083	-0.013	3,638
> 100.000	-0.06**	0.025	0.02	-0.109	-0.010	890

Notes: Estimates obtained using Propensity Score Matching (PSM) with one-to-one matching and replacement, as described in Section 4.2. The unit of analysis is the individual project (CUP) financed under the NRRP. Reported values correspond to the Average Treatment Effect on the Treated (ATT), i.e. the average difference in project progress between reshaped and comparable non-reshaped projects.
Source: Authors' estimation on OpenData ANAC and ItaliaDomani. Significance level: 1% (***), 5% (**), 10% (*).

The larger delay observed in the South may be partially explained by the limited administrative flexibility available to smaller and less equipped municipalities when faced with uncertainty. Municipalities with lower managerial capacity may lack the ability to reorganise procurement pipelines in response to shifting policy signals, exacerbating the effects of institutional shocks.

Of particular interest is also the breakdown by size class of municipalities. In this case, the only significant effect concerns small municipalities (with a population of less than 20,000 residents), for which reshaping delays projects by about 18%. It is not difficult to imagine that it is mainly the small realities, less equipped in terms of resources and human capital, that are negatively affected by the uncertainty over programming and available resources. Perhaps this is the most important evidence for *policy*, in the light of the fact that small administrations account for about 90% of those implementing the NRRP and are responsible for about 60% of the projects.

5. Conclusions

Among the major concerns of public administrations, particularly local ones, when planning the implementation of investments, is the instability of the regulatory framework and the uncertainty associated with potential changes in political directives. In fact, both regulatory discontinuity and uncertainty regarding the availability of national or EU co-financing may significantly influence the activities of contracting authorities, thereby impacting the participation of companies in the procurement market.

In July 2023, Italy experienced both types of discontinuities: the entry into force of the new Procurement Code and the initiation of the reshaping process of the NRRP, which was concluded only at the beginning of 2024.

This paper evaluates the consequences of these two shocks on the Italian public works procurement market, and in particular on those contracts managed by municipal administrations.

The results indicate that the introduction of the new Code is associated with a greater use of simplified procedures – such as direct and negotiated procedures – and with the increased adoption of intermunicipal central purchasing bodies. We also observed a reduction in average awarding times following the implementation of the Code, particularly in Southern Italy, which has historically faced significant disparities when compared to other territorial macro-areas. It can therefore be inferred that, in this case, the new Code did not produce the anticipated effect of slowing down the activities of municipal contracting authorities, as was the case with the previous structural reform of the procurement market in 2016. The adjustment to the new Code was likely facilitated by its overall simplifying nature, compounded by the

fact that the Code largely systematised a set of rules that had already been implemented during the pandemic crisis.

Our study also examined the discontinuity introduced by the initial reshaping of the NRRP. Using a causal inference approach, we estimated its impact on the slowdown of the implementation process for projects that were exposed to the reshaping risk between July and December 2023. The results show a significant slowdown effect, averaging 14%, with notable peaks in both the North and South, as well as in small municipalities.

In conclusion, at least in the short term, the two shocks had a non-negligible impact on the Italian procurement market. However, the effect of the most significant intervention, i.e. the reform of the Procurement Code, does not appear to have slowed the activities of municipal contracting authorities. On the contrary, it is associated with a speed-up in the awarding phase and other positive outcomes, such as an increased reliance on centralised procurement solutions. These short-term outcomes, although encouraging, also raise important questions regarding the broader implications of the reform. The expansion of simplified awarding procedures – while instrumental in speeding up investments – may limit market exposure and reduce safeguards against opportunistic behaviour, particularly where institutional capacity is weaker. Similarly, the growing reliance on intermunicipal CPBs can strengthen procurement quality and efficiency but may also centralise decisions in ways that weaken responsiveness to local priorities. These developments underscore the need for continued monitoring of procurement practices to ensure that gains in administrative efficiency are not achieved at the cost of transparency, competition, or the long-term quality of public procurement.

Finally, our findings indicate that the slowdown in procurement activity affected only a subset of investment projects and appears to be more strongly associated with the uncertainty generated by the reshaping of the NRRP than with the entry into force of the new Procurement Code. More broadly, this evidence reinforces the idea that uncertainty – whether stemming from regulatory discontinuity or from evolving political and institutional directives – can have a disruptive effect on local administrations' ability to plan and implement public investments, irrespective of the formal quality or intent of the reforms introduced.

The heterogeneity observed across macro-areas suggests that the impact of both shocks was mediated by differences in local administrative capacity. Municipalities in the South – typically smaller and with fewer qualified staff – appear to have responded more markedly to the simplification brought by the new Code, but were also more affected by the uncertainty generated by the NRRP reshaping. These results point to the need for more nuanced implementation strategies, including differentiated support and capacity-building initiatives, to ensure that regulatory reforms do not exacerbate territorial disparities in institutional performance.

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