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Do Cohesion policies impact on the economic performance of cooperatives in Italy?

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Abstract

This study provides a firm-level causal assessment of the impact of the European Union's Cohesion Policy on the economic performance of Italian cooperative enterprises during the 2014–2020 programming cycle. We construct an original panel dataset by linking administrative project-level information from OpenCoesione with balance sheet data from AIDA-BvD for the period 2013–2022, covering over 60,000 cooperatives, including approximately 5,000 treated units. Given the non-random allocation of funds, we implement a two-stage identification strategy combining Propensity Score Matching with the multi-period staggered Difference-in-Differences estimator of Callaway and Sant'Anna (2021), which allows for heterogeneous treatment timing and dynamic effects while mitigating the known biases of two-way fixed effects estimators. The results show statistically significant and robust positive effects on operating income and on fixed assets per employee, suggesting that Cohesion Policy primarily operates through capital deepening and profitability-enhancing channels. Impacts on turnover and employment are positive but not consistently significant across specifications. Spatial heterogeneity is substantial: cooperatives located in Southern Italy exhibit markedly higher treatment effects, particularly in investment intensity, pointing to context-specific complementarities between EU funds and regional economic structures. Robustness checks, including ATT estimation on the full unmatched sample, confirm the persistence of the investment-related effects. Overall, the evidence indicates that Cohesion Policy contributes to strengthening the structural economic capabilities of cooperative enterprises, especially in lagging regions, and underscores the relevance of firm-level evaluations for understanding the differentiated transmission mechanisms of place-based policies.

Plain English Summary

This study looks at whether European Cohesion Policy - one of the EU's main tools for reducing regional inequalities - has helped Italian cooperative enterprises improve their economic performance. Cooperatives play an important role in the Italian economy: they are owned and controlled by their members, they often operate with social goals in mind, and they tend to be resilient during economic crises. Despite this, little research has examined how cooperatives respond to European development funds, even though Italy receives a large share of these resources and has strong regional disparities.

To explore this question, we combined two large sources of data. The first comes from OpenCoesione, which records every project financed by Cohesion Policy in Italy. The second consists of the annual financial statements of more than 61,000 cooperatives from 2013 to 2022. By matching these two datasets, we identified nearly 5,000 cooperatives that received EU support and compared them with similar cooperatives that did not receive funds.

Because cooperatives that obtain funding tend to be larger and more structured than those that do not, we used a two-step method to make fair comparisons. First, we applied a statistical technique called Propensity Score Matching to build a control group of cooperatives that looked very similar to the supported ones before they received any funds. Then we used a method called staggered Difference-in-Differences, which allows us to study how cooperatives' performance changed over time depending on when they began receiving EU funding.

The study shows that cooperatives receiving Cohesion Policy funds tend to perform better than similar cooperatives that did not receive support. In particular, EU funds helped increase operating income and stimulated investments in fixed assets per employee. These positive effects suggest that Cohesion Policy does not simply create short-term boosts but helps cooperatives strengthen their long-term economic structure. Effects on turnover and employment were also positive, though smaller and not always statistically strong. Importantly, the effects were much stronger in Southern Italy, where cooperatives tend to be structurally weaker and where regional development needs are greater.

The findings suggest that European Cohesion Policy can effectively support cooperative enterprises, especially in less developed regions. Improving access to EU funds for cooperatives could therefore help make the Italian economy more resilient, reduce regional inequalities, and strengthen forms of enterprise that combine economic activity with social value.

Keywords: Cooperative Enterprises, Cohesion Policy, Staggered Diff in Diffs method, Italy

JEL Classification: P13; H50; E610

1. Introduction

Cohesion Policy is one of the core policy areas of the European Union (EU) and one of the largest expenditure items in its budget. For the Multiannual Financial Framework 2021-2027, € 392 billion is reserved for the promotion of economic and social cohesion among the regions of the European Union.

Since its inception, it has been the main tool for pursuing the goal of reducing economic, social, and territorial disparities between the regions of the European Union. It has developed in parallel with the integration process, accompanying all major Community strategies, from the Lisbon strategy to the Green Deal, and helping to consolidate the idea of a Union capable of redistributing resources and opportunities among different territories.

Although over the last three and a half decades Cohesion policy has contributed significantly to development and social transformation across recipient regions (Becker et al., 2018; Cerqua and Pellegrini, 2018), also fostering trust in EU institutions and strengthening a shared European identity (Rodriguez-Pose et al., 2021), there is much debate about its effectiveness (and mounting uncertainty about the policy's future) which stems from the fact that the returns of cohesion investment have not been uniform across Europe (Amendolagine et al., 2024).

Recent papers point out that the impact is not homogeneous, but mediated by the presence of "conditioning factors": industrial structure (Cappelen et al., 2003; Percoco, 2017); settlement structure (Gagliardi et al., 2017); territorial capital and regional characteristics (Fratesi et al., 2017; Sotiriou et al., 2015); human capital (Becker et al., 2013); alignment with the socio-economic structure (Crescenzi, 2009); formal institutions and administrative capacity (Becker et al., 2013; Rodríguez-Pose et al., 2015); type of expenditure (Rodríguez-Pose-et al., 2004); alignment between needs and policy axes (Di Cataldo et al., 2018); and the existence of spatial external effects of Cohesion policy expenditure (Bouayad-Agha et al., 2013, Fiaschi et al, 2018, Bourdin, 2019; Amendolagine et al., 2024).

A distinct, but relatively underexplored, approach to capturing heterogeneity involves using firm-level analysis and comparing the performance of firms from different regions in terms of performance improvements following funded projects (Beņkovskis et al., 2019; Bachtrögler et al., 2018). The increasing availability of detailed firm-level data allows for a more in-depth investigation of the direct and indirect impact of regional policies on their immediate beneficiaries. Firm-level evidence can reveal facts that are unobservable at the aggregate level, such as heterogeneity in firm competitiveness within the same sector, and can allow for comparisons of the same policy intervention in different contexts.

In this study, we enrich the relevant empirical literature by testing the impact of the Cohesion policy on the performance of Italian cooperatives, using a counterfactual evaluation technique.

Being one of the main beneficiary countries of the Cohesion Policy for a long time, Italy presents remarkable data. In addition, Italy is characterized by persistent and structurally rooted territorial disparities, and has a productive fabric characterised by a large prevalence of micro and small enterprises as well as a relatively low average company size (Figure 1). Therefore, there is scope for analysing the impact of Cohesion policy on firm performance. The one-country focus allows problems of data comparability to be avoided while controlling external shocks, political regime, institutions and other exogenous factors, and, therefore, estimating the effects of Cohesion Policy more objectively than in cross-country analysis.

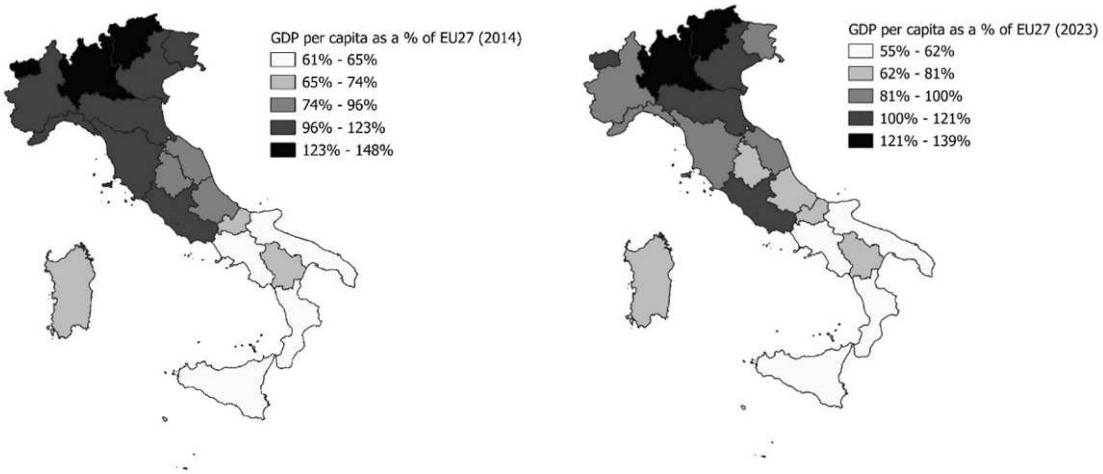
The contributions of this paper are fourfold. First, we propose an effective identification strategy to evaluate the impact of awarding investment grants to firms. The analysis that we conduct relies on a rich firm-level administrative database that includes all projects and beneficiaries involved in the Cohesion policies in Italy and all budget data covering a ten-year period. It is important to note that EU Cohesion policy heavily funds SME competitiveness through the European Regional Development Fund (Dvouletý et al., 2021): almost 1.8 million enterprises (mainly SMEs) are targeted for support.

Second, we focus on cooperative enterprises. To the best of our knowledge, this study is the first to use firm-level microdata over a long period to analyse cooperatives benefiting Europeans funds. Analysing cooperatives is important because they offer a distinctive organizational model that combines economic performance with social value creation. Unlike traditional profit-maximizing firms, cooperatives are member-owned and democratically governed, which means that their strategic decisions tend to align closely with the long-term needs of workers, producers, or consumers. Studying them helps scholars and policymakers understand how alternative ownership structures can influence economic resilience, income distribution, and community wellbeing. Moreover, cooperatives often play a critical role in strengthening local economies by retaining profits within the territory and fostering locally rooted development. They also enhance competitiveness by improving the bargaining power and market access of small producers and local firms. Cooperatives strengthen social cohesion and trust, thus supporting stable economic collaboration. Finally, cooperatives foster innovation and resilience by pooling knowledge and resources, helping territories adapt to economic challenges.

Third, the study applies a new counterfactual methodology to measure the economic impact of European Cohesion funds on cooperatives during the last period of programming, namely a multi-

period staggered DiD estimation (Callaway et al., 2021), implemented after a propensity score matching in order to best fit the control group.

Figure 1 GDP per inhabitant in percentage of the EU27, Italian Regions NUTS 2014-2023



Source: Authors' elaboration on Eurostat Data

Overall, we find evidence that EU Cohesion policy has a positive and significant impact on the performance of Italian cooperative enterprises during the 2014-2020 programming cycle. In particular, EU funds helped increase operating income and stimulated investments in fixed assets per employee. Effects on turnover and employment were also positive, though smaller and not always statistically strong. Importantly, the effects were much stronger in Southern Italy, where cooperatives tend to be structurally weaker and where regional development needs are greater.
The paper is structured as follows. Section 2 reviews the relevant literature on the effect of regional funds on firm performance. Section 3 introduces some relevant elements on cooperatives in Italy both in terms of economic dynamics and regional/sectoral aspects, highlighting their relevance and resilience over the last decade. Section 4 presents the data and the sample used for the econometric analysis. Section 5 presents the empirical strategy and discusses the results of the counterfactual analysis. The final section concludes and discusses the policy implications.

2. Related literature

The economic impact of cohesion funds is quite controversial (European Commission, 2025). Most of the studies focused on the effect of the cohesion funds on the regional economic indicators at an aggregate level, principally using economic methodologies such as regression discontinuity

design and difference-in-difference methodologies (Pellegrini et al., 2013; Becker et al., 2018; Cerqua and Pellegrini, 2018; Crescenzi and Giua, 2020).

To the best of our knowledge, there is insufficient empirical evidence on cohesion funds at firm level (Table 1), and even less at cooperative level, with the exception of two recent works (OECD, 2021; Carini, 2023).

Some studies have evaluated the SMEs impact based on their eligibility at territorial level. For instance, Bondonio and Greenbaum (2006) estimate a relevant employment growth for the firms based on the North/Center Regions, i.e. "Objective 2", through the ERDF fund, compared to the similar firms but located in no "Objective 2" regions. More recently, for Portugal a study conducted by Mesquita et al. (2025) on the effect of increased territorial eligibility to cohesion funds on firm performance, between 2003 and 2010, found a positive ITT (intention to treat effects) for sales, wages and labour productivity but not significant effects on employment.

Other studies about Cohesion funds impact focused on the subsidized firms, taking non-subsidised firms as control group. While the effect of a public policy on firms generally shows high heterogeneity, Cohesion funds, especially ERDF that support investments, business services and R&D development, entailed more productivity for firms receiving R&D incentives, even if only 25% of them had a TFP growth below the mean, according to a test on European manufacturing firms (Fattorini, 2018). Differently, Fernando et al. (2025) analysed the impact of R&D ERDF grants on Portuguese firms during two programming periods (2007-2013 and 2014-2020) with a regression discontinuity design. They found positive effects on investments, employment, value added and labour productivity but not for TFP and, above all, the effects become much stronger with the second-round of grants. Then, for the 2007-2013 programming period and using ORBIS data set, important results were obtained from a DiD evaluation on firm performance in Europe related to their benefiting from cohesion funds (Bachtrögler, 2018). After a propensity score matching and a DiD estimation on 52 thousand firms, Bachtrögler and Hammer (2018) estimate a positive average treatment on treated effect (ATT) for Italian firms on the operating revenue (3%), on TFP, fixed assets per employee (9%), and the number of employees (+12%). Following the same approach, some relevant results for Latvian firms are shown by Beņkovskis (2019): studying the impact of the ERDF in Latvia from 2008 to 2015 at firm level and after a propensity score matching (PSM) and a DiD methodology, they found a positive ATT for capital to labor ratio, for employment and for turnover, but not for productivity; with stronger effects in the long term. Similarly, but considering differently refundable and non-refundable projects, a study conducted in Hungary during 2007-2013 programming period by Banai et al. (2017) found that non-refundable subsidies produced a positive effect on employment, real value added and real tangible asset (less

intensive for real sales revenue), but negatively impacted labour productivity despite this, with regard to refundable funds, they estimated smaller effect for all the variables.

Table 1 Principal literature at micro firms level

PAPER	AIM	METHODOLOGY AND DATA	MAIN RESULTS
Bondonio D., Greenbaum R. T., (2006). "Do business investments incentives promote employment in declining areas? Evidence from EU objective-2 regions". European Urban and Regional Studies, 13(3), pp. 225-244.	to estimate impact of ERDF in North/Center Regions (OB 2) at firm-level on employment growth;	SME: fewer than 200 employees; at NUTS-3 level; t=1995-1998; dummy=treatment (to be in ObJ2); pre-treatment: specific province/sector characteristics and employmentè longitudinal parametric model (with 9 specifications);	**+0,5-+0,7% employment growth (24k new jobs in mean)….per 22k € "cost-payment"**
Fattorini L., Ghodsi M., Rungi A., (2018). "Cohesion Policy Meets Heterogenous Firms", Vienna: The Vienna Institute for International Economic Studies	to test the effect of Cohesion policies (ERDF) on European Manufacturing Firms (273,5 k) at NUT-2 level;	ERDF: business services investment/support and R&D development; Only manufacturing Firms in Southern Regions; Control group: rejected firms; TFP by ORBIS BVD data set: heterogenous and (for Italy: 26% of firms, manufacturing, for 64% employment and 74% of turnover) ; Heckman Selection Model for TFP (max likelihood estimation)	**+ productivity for RTD (- for Business support); high heterogeneity (TFP: 25% of firms < mean): median>mean**
Bachtrögler J, Hammer C., (2018), "Who are the beneficiaries of the structural funds and the cohesion fund and how does the cohesion policy impact firms-level performance?", OECD Economics Department Working Papers No 1499.	Cohesion Policy impact at firm level performance in Europe	Cohesion data+ ORBIS data set; t: 2007-2013; for Italy: 52k firms matched; variables: productivity TFP, operating income, fixed asset per employee et al; Propensity score matching (logit regression for treatment + Kernel matching) + Diff in Diff	**ATT for Italy + log change in Operating revenue (3%), TFP, log change in Fixed Assets per employee (9%), + 12% number of employees**
Beņkovskis, K., Tkačevs, O., & Yashiro, N. (2019). Importance of EU regional support programmes for firm performance. Economic Policy, 34(98), 267–313.	Impact on firms of Cohesion Fund (ERDF) in Latvia	ERDF in Latvia during the 2007-2013 period; Dataset includes balance sheet firms from 2008 to 2015; Beneficiaries are 1,289 vs 574 thousand of firms not participating; PSM and DIFF in DIFF	**ATT is positive for Capital to labor ratio (+10%), for employment (+7%) and for turnover (+7,5% in the t+1), not for productivity; more intense is the magnitude in the long term**

Banai A.& Péter Lang & Gábor Nagy & Martin Stancsics, 2017. "Impact evaluation of EU subsidies for economic development on the Hungarian SME sector," MNB Working Papers 2017/8, Magyar Nemzeti Bank (Central Bank of Hungary).	Impact on Hungarian enterprises of cohesion fund	Economic Development Operational Programme during 2007-2013 period; 2,5 thousand of refundable subsided enterprises as treated and 9,6 thousand for non-refundable; PSM for the control group and DIFF in DIFF with the SUTVA (stable unit treatment value assumption)	**For non-refundable subsidies: positive effect on employment, real value added and real tangible asset (less intensive for real sales revenue), negative for labour productivity; for refundable: smaller effect for all the variables**
Mesquita Josè & João Pereira dos Santos & José Tavares, 2025. "European funds and firm performance: evidence from a natural experiment," Small Business Economics, Springer, vol. 65(4), pages 2143-2178, December.	Impact of increased eligibility to cohesion funds on firm performance in Portugal	All Portuguese private firms between 2003 and 2010 (in 2007-2013 programming period some areas became eligible); treatment period is 2007-2010; DIFF in DIFF estimations, after data restrictions	**ITT (intention to treat effects) is positive for sales (+7,4%), for wages (+ 11€ per month), and labor productivity (not significant for employment)**
Alexandre Fernando, Miguel Chaves & Miguel Portela, 2025. "Investment grants and firms' productivity: how effective is a grant booster shot?," Small Business Economics, Springer, vol. 64(4), pages 1601-1641, April.	Impact of R&D ERDF grants on Portuguese firms	Two programming periods (2007-2013 and 2014-2020); Regression Discontinuity Design starting on 13,6 thousand non treated and 10,9 treated (one time or with multiple treatments). The panel is on 3754 treated and 2622 not treated;	**Positive effects on Investments, Employment, value added and labour productivity (not for TFP); stronger effects for second grants**

Source: authors elaboration

3. Cooperative enterprises in Italy According to the literature, cooperatives represent a form of enterprise that historically works differently compared to the classical and capitalistic firm (Bernardi, 2024). While classical and capitalistic enterprises should maximize profit for the ownership, cooperative enterprises work to maximise and satisfy the needs of the owners in a mutualistic manner. Basically, cooperatives are divided in four types: users, producers, workers and social cooperatives (Zamagni, 2012) and they depend on the mutualistic purpose that they

internalize (Horowitz, 2021; Venturi et al., 2022), i.e. they try to address the needs of producers, users, workers and communities that market itself would otherwise not be able to satisfy.

Moreover, they represent a democratic form of enterprise that operates beyond market logics, in a collective form where information and decisions are shared among all members, regardless of the capital they own (Stiglitz, 2009). Their empowerment also contributes to increase social trust and social capital within communities and territories (Sabatini et al., 2014).

Finally, cooperatives embody the iconic entrepreneurial way to develop long-term practices and economies with the objective to strengthen sustainable development, because norms and cooperative principles do not allow any of the cooperatives' members to gain annual share of profit and to make personal profit using the net capital of their enterprise, even when their businesses are dissolved (Daconto, 2024). The consequence is that next generations could benefit from the profits derived from the annual revenues using them for "their needs".

In a nutshell, cooperatives could be defined as a typical "inter-generation" form of enterprise as well as the most internationally relevant economic form of social economy, that includes associations, social enterprises, foundations, cooperatives, mutual societies. All these entities are managed democratically, respecting people and workers, and avoiding as much as possible profit-sharing among the members. Particularly distinguished in social economy panorama are Italian Cooperatives that insist in the whole country and in all productive sectors (Galera et al., 2024).

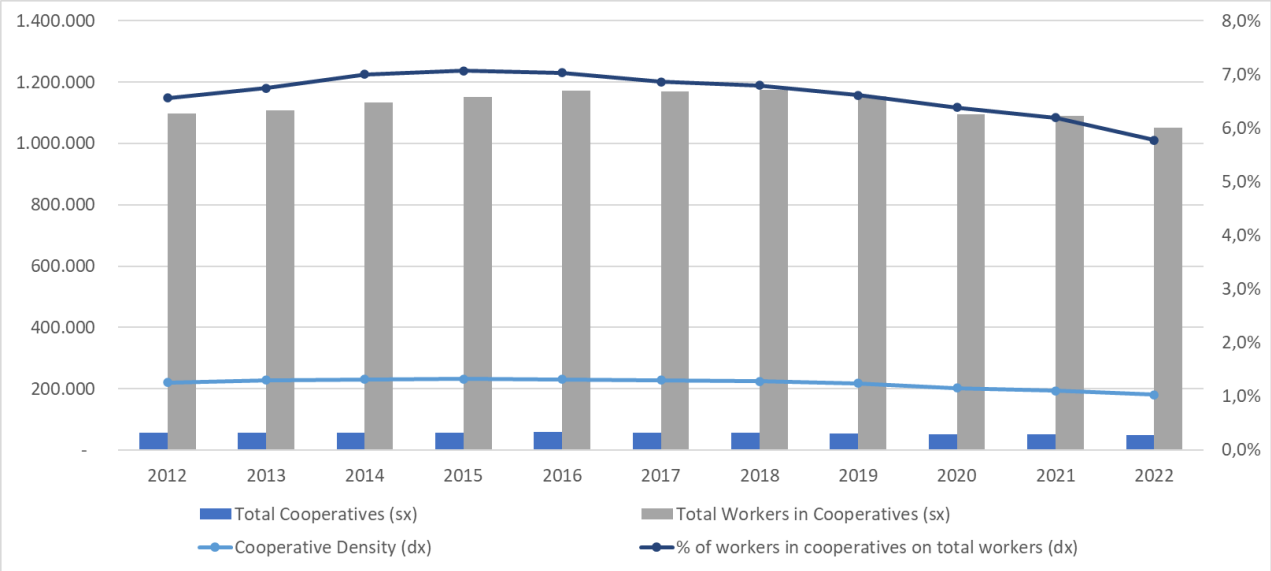
Even though cooperatives are crucial for economic and social development (Marino, 2024) and their role is essential in regions where the "lack of development" and the potential "or unexpressed development" (Hirschman, 1970) is greater, in Italy they tend to be less performative in those regions where Cohesion funds are more relevant (less developed regions), even if they are more widespread there. In fact, fifty per cent of Italian cooperatives are in such regions but they perform worse than in the other regions (Carini and Fontanari, 2023; OECD, 2021).

3.1. Cooperatives in the Italian economic system

The active cooperatives registered in the official registers of firms in Italy in 2023 are around 73,000, and more than 50% are in Southern regions. Considering the ASIA-ISTAT data (that excludes enterprises from the primary sector), cooperatives are 48,000 (1% of the Italian private enterprises). In both data sets, the number of cooperatives decreased: in 2018 there were over 80,000 cooperatives in the Chamber of Commerce data while in 2012 in the ASIA-ISTAT data there were 56,000 cooperative units. The negative trend was less intensive for the Southern regions.

In terms of employees, the representative share of cooperatives in Italy remains significant, confirming their typical essence as "labour-intensive" enterprises: over 1,05 million in 2022 (less than 6% of the private employees) (Figure 2).

Figure 2 Total Cooperatives and Total workers in cooperatives, 2012-2022



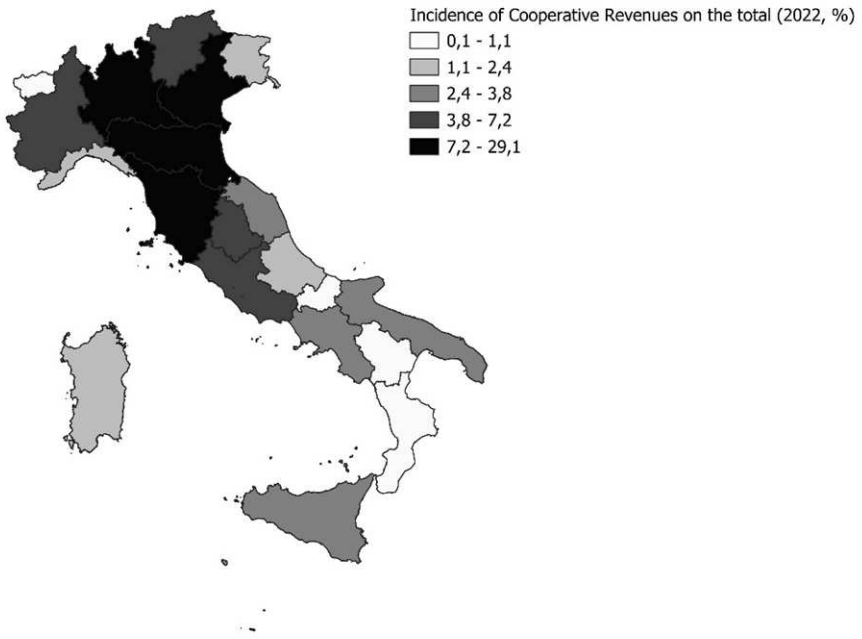
Source: Authors' calculations on ASIA ISTAT Data

In the same period, the number of cooperatives dropped, whereas their size increased. While cooperatives represent 1% of Italian businesses and they are predominantly SMEs, those with at least 250 employees account for over 13% of Italy's large enterprises (Appendix A – Figure A1).
Despite the challenges of COVID-19, the economic and social results of Italian cooperatives have been particularly positive over the last decade: between 2013 and 2022, revenues (€137 billion, + 60%), value-added (€41 billion, +56%), and operating incomes (€13 billion) rose significantly. (Appendix A- Figure A2). Indeed, employment grew significantly from 718,000 in 2013 to over 1,01 million in 2022 (+40.7%) and it kept steady during the pandemic until 2022.
This phenomenon confirms the tendency for the "labor hoarding" in cooperatives, where labor demand is relatively inelastic to the economic cycle (Caselli, 2022; Borzaga, 2022). Yet, this period represented an extraordinary opportunity for cooperatives to strengthen their financial and capital structure: total assets (€450 billion in 2022) increased by 57%. Notably, over 10% of cooperative assets consist of fixed assets (tangible, intangible, and financial); during the pandemic crisis, investments fell rapidly, then they found a strong recovery. Similarly, the aggregate amount of equity showed a growth (over €60 billion in 2022, + 49%) (Appendix A – Figure A3).

3.2. Cooperatives at sectoral and regional level

The relevant dichotomy between cooperatives in Central-Northern and Southern Italy reflects the economic differences between the two macro-regions. Although the gap within the economic sector has narrowed slightly over the years, it remains large and consistent with national trends. Currently, cooperatives in Southern Italy are nearly half of all Italian cooperatives but they represent less than one-fifth of total revenue (€18 billion in 2022, the incidence is roughly equivalent to the South's share of Italian GDP) and slightly less than one-fourth of cooperative employment, about 220,000 in 2022 (Appendix A - Figure A4). In term of regional revenues, Emilia-Romagna ranks first among Italian regions, generating nearly one-third of total cooperative revenue (29.1% in 2022), followed by Lombardy (12.2%), Veneto (8.6%), Tuscany (8.2%), Piedmont (6.9%), and Trentino-Alto Adige (6.7%) (Figure 3). The picture remains similar when looking at employment shares (Appendix A – Figure A5).

Figure 3 Incidence of cooperative revenues by regions (2022)

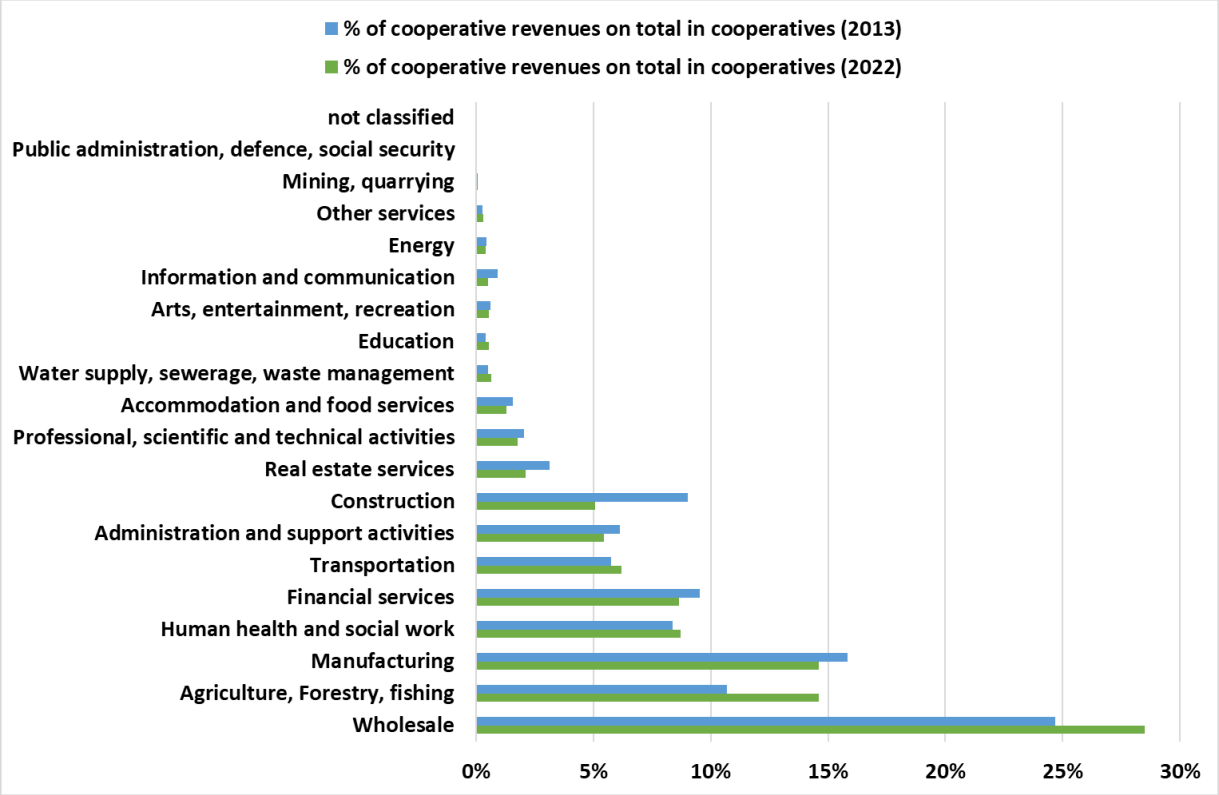


Source: Authors' calculations on ASIA ISTAT Data

Finally, sectoral analysis using ATECO 2-digit classifications provide additional insights. Revenue and employment distribution by sector show prominent differences over time. In particular, the wholesale and retail trade sector produced less than one-third of the total revenues (28.5% in 2022), followed by the agri-food sector, 14.6% (notably, many cooperatives in agro-food are classified as industries), with the manufacturing and building sector also showing a constant decline. Other significant sectors are health and social care, financial services, transportation and logistics (Figure 5).

From an employment perspective, the health and social care sector was the largest employer (over 32% of cooperative employees in 2022). (Appendix A – Figure A6).

Figure 5 Cooperative Revenues by economic sectors (2013-2022)



Source: Authors' calculations on ASIA ISTAT Data

4. Data and sample description

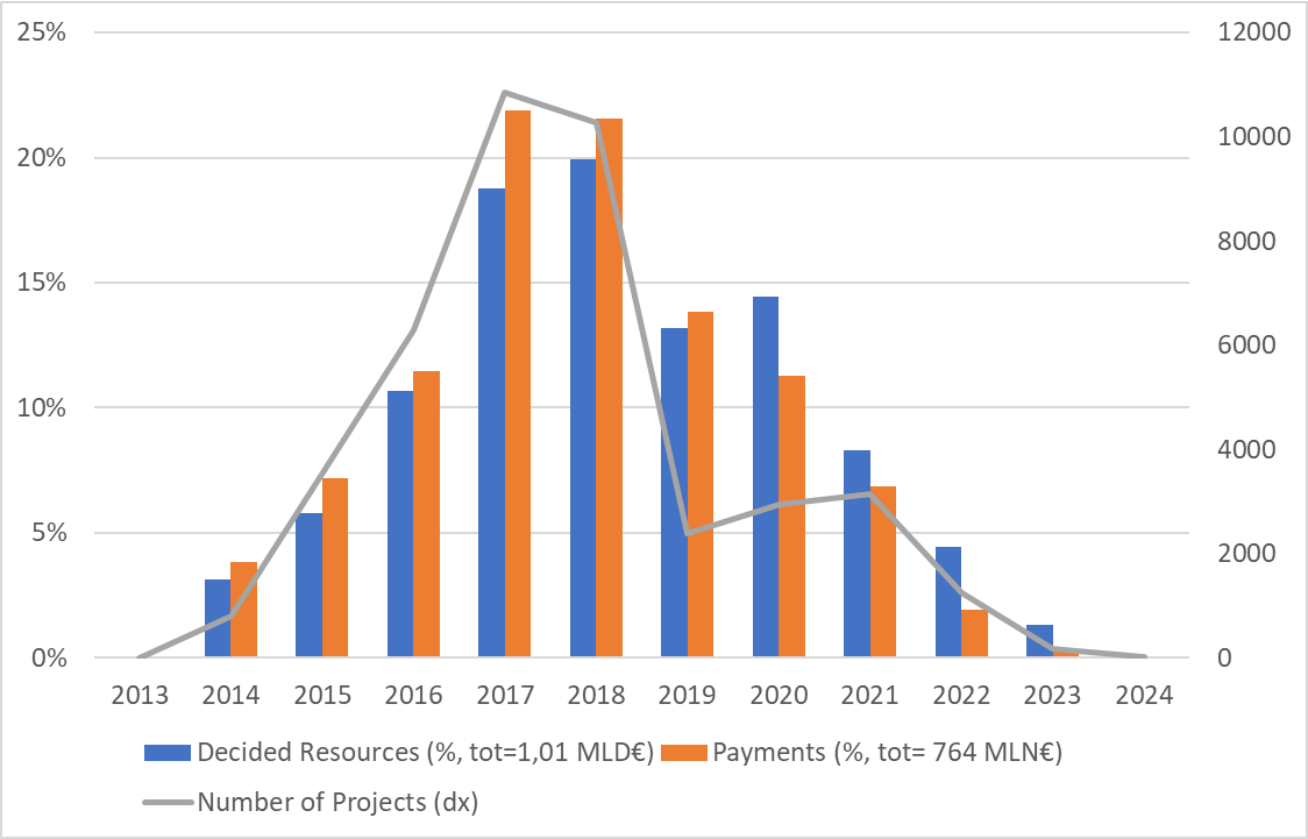
Analysing the Cohesion policy budget by theme in 2014-2020, Competitiveness of SMEs ranked third, after Infrastructure in Transport and Energy or Research and Innovation. It counts €60 billion, mainly owned by the European Regional Development Fund, with Italy being the first beneficiary of these resources (around €6,1 billion).

SMEs benefits from several categories of expenditures, for example generic productive investment or Research and Innovation activities (for more details, see Appendix A - Figure A7). Therefore, counting the European budget as a whole, the resources direct to SMEs expenditures are much higher (almost €600 billion), and 13% of them are allocated in Italian programmes. Actually, half of them deal with productive investment and SMEs business development.

When the data were downloaded by Open Coesione (February 2024), the total planned public resources (including the national resources from the Development and Cohesion Fund, as well as national co-financing) amounted to €154 billion, €55 billion of which consisted of European funding (ESF €19 billion and ERDF €33 billion). The survey included over 992,000 projects. Within the private sector, there were fewer than 500,000 projects, with more than 64,000 belonging to the Thematic Objective "Competitiveness of SMEs" (for a total of €7 billion). Among them, the number of cooperatives' projects were 41,671 and the cooperatives involved were 5,043. They managed €1,024 billion of total resources, €580 million of which were European funds: 62.5% for ESF and 29.3% for ERDF.

The distribution of cooperatives benefiting from projects changed over time, peaking in 2018, with the highest concentration observed between 2016 and 2021 (Figure 6). Because of this, firms with projects starting in or after 2022 were excluded from this analysis.

Figure 6 Number of cooperative Projects, decided resources and payments (2013-2024)



Source: Authors' calculations on Open Cohesion data

To conduct this study, a panel dataset covering the period 2013-2022 was specifically constructed, matching Open Coesione database with AIDA-Bureau Van Dijk database for financial statements, extracted on April 29, 2024. Specifically, the AIDA dataset is unbalanced and includes a total of 61,868 active cooperative enterprises with complete financial statements for the period 2013-2022 (available for up to ten years prior, not earlier). Within this sample, 4,747 observations correspond to treated cooperatives (although the total number of cooperatives receiving European Cohesion Funds is higher, at 5,043; however, complete financial statements are not available for some of them), while 57,121 observations correspond to untreated cooperatives. For first treatment we consider the year when a firm begins its project, considering that a great deal of the projects is mainly related to employment and training incentives that usually end in the same year. As table A2 in Appendix A shows, most of the first treatments happened in the second part of the cycle, especially in 2018, 2020 and 2021.

Following the literature on firm-level analyses regarding the effects of European cohesion policies (Bondonio, 2006; Bachtrögler et al., 2018; Fattorini, 2018; Beņkovskis, 2019, Alexandre, 2025), the

variables considered in the model include operating income (profitability capacity), value added per employee (productivity), labor cost on operating income (operational efficiency), net equity (capitalization), fixed assets per employee (investment/innovation), and the number of employees. The variables selected as covariates in the econometric model are in logarithmic form to reduce covariance, i.e.: sales revenue (this variable also lagged for one year); labor costs; operating income; value added; number of employees; total assets; total fixed assets; current assets; net equity; total debts; value added per employee; labor costs on operating income; total fixed assets per employee. Differently from the approach made by Bachtrögler and Hammer (2018), we exclude TFP for two reasons: the first one is empirical, i.e. Aida BVD differently from ORBIS does not consider TFP at firm-level; the second one is theoretical, i.e. productivity is a quite controversial issue in the cooperative sector (OECD, 2021).

Descriptive statistics reveal a highly diverse panel of enterprises: the fund beneficiaries (treated) are on average more structured and larger than the overall population of Italian cooperative enterprises (Appendix A – Table A3 and A4). Over the years, all variables have shown positive trends. Standard deviation and median suggest that the cluster has an inequal distribution and is highly polarized with substantial heterogeneity within the cooperatives and between treated and untreated groups.

5. Empirical analysis

5.1. Empirical strategy

This section outlines the identification strategy adopted to identify the causal impact of EU Cohesion policy (programming cycle 2014-2020) on the economic performance of Italian cooperative firms. Given the non-random assignment of public support and the substantial heterogeneity between beneficiary and non-beneficiary cooperatives documented in the descriptive statistics, the identification strategy that we propose combines propensity score matching (PSM) with a multi-period staggered Difference-in-Differences (DiD) approach à la Callaway and Sant'Anna (2021). This integrated design allows us to construct a well-grounded counterfactual for treated cooperatives and to exploit the longitudinal structure of the data to estimate dynamic and heterogeneous treatment effects.

The treatment variable is defined at the firm-year level and takes value one from the year in which a cooperative starts its first EU-funded project within the 2014-2020 programming cycle, and zero otherwise. The outcome variables capture key dimensions of firm performance, including operating income, value added per employee, fixed assets per employee, employment, capitalization and

efficiency indicators, consistently with the firm-level literature on Cohesion Policy (Bachtrögler et al., 2018).

We proceed to follow two steps. First, we implement a propensity score matching procedure to restrict the control group to cooperatives that are observationally similar to treated ones before the receipt of funds. Second, on the matched sample, we estimate treatment effects using a staggered DiD design that is robust to heterogeneous and dynamic effects. The PSM stage aims at reducing the initial imbalance between treated and untreated cooperatives and mitigating selection on observables. Specifically, we estimate a probit model in which the dependent variable indicates whether a cooperative receives Cohesion funds over the 2014-2020 programming cycle, conditional on a vector of pre-treatment firm characteristics. The propensity score is obtained from the following specification (Rosenbaum et al., 1983; Abadie et al., 2006):

$$P(T_i = 1 \mid X_i) = \Phi(X_i\theta) \qquad (1)$$

where T_i is an indicator equal to one if cooperative i is ever treated and zero otherwise, X_i is a vector of pre-treatment covariates capturing firm size, profitability, productivity, capital intensity, financial structure and labor inputs, θ is the vector of parameters to be estimated, and $\Phi(\cdot)$ denotes the standard normal cumulative distribution function.

The results indicate that treated cooperatives tend to be larger, more capitalised and more investment-intensive, while exhibiting different profiles in terms of productivity and leverage, confirming the presence of non-random selection into treatment.

Table 2 PSM Probit Regression of covariates

	(Treated $T_i = 1$)
ln_turnover	-0.1355***
	(0.007)
ln_turnover$_{t-1}$	-0.0298***
	(0.006)
ln_labour Cost	-0.0841***
	(0.011)
ln_Operating Income	0.0046
	(0.003)
ln_Value Added	0.2069***
	(0.015)
ln_ Total Assets	-0.0128
	(0.014)
ln_ Current Assets	0.1134***
	(0.010)
ln_ Net Worth	0.0291***
	(0.003)
ln_ Debt	-0.0725***
	(0.006)
Employment	-0.000***
	(0.000)
ln_Valued Added per Employee	-0.2790***
	(0.007)
ln_ Fixed Assets per Employee	0.0677***
	(0.003)
Constant	-0.1191***
	(0.025)
N. observations	184.016
LR chi2(12)	7564,91
Prob>chi2	0.0000
Log likelihood	-70.148
Pseudo r2	0.0512

The table reports probit estimates of the probability of receiving EU Cohesion funds. The dependent variable equals one if a cooperative is ever treated during the 2014-2020 programming period. Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Based on the estimated propensity scores, we perform matching with replacement and impose a common support condition, retaining only observations with comparable scores across groups. To ensure a close alignment between treated and control units, we adopt a strict weighting scheme, which reduces the original sample of about 184.000 firm-year observations to roughly 44.000 observations, corresponding to about 2.000 cooperatives per year on average. As a consequence, the effective pre-treatment period starts in 2014, which becomes the baseline year for the subsequent DiD analysis. The improvement in covariate balance after matching is illustrated by the

kernel density plots of the propensity score before and after matching (Appendix A – Figure A8 and Figure A9), which show a substantial increase in overlap between treated and control groups. Balance diagnostics reported in Table 3 further confirm that the matching significantly reduces standardized biases across covariates. Although most variables satisfy conventional balance criteria, some residual imbalances remain for current assets and total debt. To improve the quality of the matched sample, these two variables are excluded from the final specification used in the DiD analysis. Overall, the PSM procedure allows to construct a comparison group that closely resembles treated cooperatives in terms of pre-treatment observable characteristics, thereby strengthening the credibility of the parallel trends assumption in the subsequent DiD framework.

Table 3 Balancing Covariates

Variable	Treated mean	Control mean	% Bias	t-stat	p-value	V(T)/V(C)
Log Turnover	65.603	66.106	-2.9	-3.06	0.002	0.88
Log Turnover (lagged)	64.196	64.714	-2.8	-3.01	0.003	0.88
Log Labour cost	56.662	56.865	-1.1	-1.23	0.219	0.95
Log Operating income	30.109	30.576	-2.5	-2.76	0.006	0.93
Log Value added	59.923	59.546	-2.0	-2.06	0.039	0.93
Log Total assets	65.537	66.608	-3.2	-3.41	0.001	0.89
Log Current assets	61.572	62.123	-3.2	-3.51	0.000	0.90
Log Net worth	47.505	47.998	-2.3	-2.50	0.012	0.90
Log Total debt	56.061	56.667	-3.3	-3.62	0.000	0.87
Employment	70.738	78.080	-2.1	-2.06	0.040	1.74
Log Value added per employee	31.731	31.184	-1.5	-1.74	0.082	0.75
Log Fixed assets per employee	17.841	17.963	-0.6	-0.65	0.514	0.79

This table reports covariate balance statistics after propensity score matching. % Bias refers to standardized mean differences between treated and control groups. V(T)/V(C) is the ratio of variances between treated and control units. A variance ratio outside the interval [0.98; 1.02] signals residual imbalance. Following these diagnostics, Log Current assets and Log Total debt are excluded from the final DiD specification.

After the matching, we estimate the causal impact of Cohesion funds using a staggered DiD design à la Callaway and Sant'Anna (2021). In its canonical design, the format of DiD presents two time periods (say *t-1* and *t*) and two groups: in the first period, no units receive the treatment; in the second period, some units are treated (the treated group) while others remain untreated (the comparison group). When treatment assignment is not random, causal identification depends on the idea that, in the absence of the treatment, treated and untreated units followed parallel paths over time (*parallel trends assumption*). In this setting, the average treatment effect on the treated (ATT)

can be recovered by comparing the average change in outcomes experienced by the treated group with the average change in outcomes experienced by the control group. This comparison is typically implemented through a two-way fixed effects (TWFE) specification, which accounts for both unit-specific and time-specific unobserved heterogeneity (Imbens and Wooldridge, 2009):

$$Y_{it} = \alpha_t + \lambda_i + \beta D_{it} + \epsilon_{it} \qquad (2)$$

where D_{it} is a treatment indicator equal to one if firm i is treated in period t, and β captures the average treatment effect on the treated under the parallel trends' assumption. However, in our context, treatment occurs at different points in time across cooperatives, and treatment effects may vary across cohorts and over time. In such settings, traditional two-way fixed effects (TWFE) estimators may yield biased or difficult-to-interpret estimates due to negative or non-convex weights (Goodman-Bacon, 2021; Sun and Abraham, 2021; Baker, 2022).

To address these issues, we adopt the staggered DiD framework proposed by Callaway and Sant'Anna (2021), which explicitly accounts for multiple treatment periods and heterogeneous effects. We define G as the time period when cooperatives first become treated (in our case every year in the 2014-2020 programming cycle) which also identifies the group it belongs to. Therefore, the average treatment effect for the cooperatives who are members of a particular group g at a particular time t is given by:

$$ATT(g,t) = E[\, Y_t(1) - Y_t(0) \mid G_i = g \,] \qquad (3)$$

where G_g is binary variables equal to 1 if cooperatives are first treated in period $g \in \{2014, \ldots, 2021\}$. The group-time average treatment effect, when the parallel trends assumption holds potentially only after conditioning on observed pre-treatment covariates, are nonparametrically identified. In particular, the group-time ATT for group g in period t is given by:

$$ATT\,(g,t) = \mathbb{E}\left[\left(\frac{G_g}{\mathbb{E}[G_g]}\right) - \frac{\frac{p_g(X)C}{1 - p_g\,(X)}}{\mathbb{E}\left[\frac{p_g(X)C}{1 - p_g\,(X)}\right]}\right](Y_t - Y_{g-1}) \quad (4)$$

where $p_g(X)$ is the generalised propensity score (GPS), with $C = 1$ for untreated units, Y_t is the potential outcome in the period at time t and Y_{g-1} is the potential outcome in the period $g - 1$.

This measure is computed as a weighted average of the "long difference" in the outcome variable, where the weights are determined by the propensity score. Consequently, the algorithm focuses solely on observations from the control group and group g, disregarding data from other groups, and places greater emphasis on control group observations that exhibit characteristics similar to those commonly found in group g..

Estimation follows the two-step procedure proposed by Callaway and Sant'Anna (2021). In the first step, nuisance parameters, such as the GPS and outcome regressions, are estimated separately for each group and period. In the second stage, these estimates are fed into the analogous sample equation (3) to obtain group-time ATTs. This approach separates identification, estimation and aggregation, thereby avoiding the implicit and potentially problematic weighting scheme embedded in TWFE regressions. Inference is conducted using the multiplier bootstrap procedure suggested by Callaway and Sant'Anna (2021), which delivers asymptotically valid confidence intervals and simultaneous confidence bands for the group-time effects. Throughout the analysis, we adopt the "*not-yet-treated*" units as the control group, which is particularly appropriate in our setting given the staggered adoption and the matched sample, thus preventing contamination from already-treated cooperatives.

5.2. Results

The estimates obtained through the staggered Difference-in-Differences framework provide clear and robust evidence that EU Cohesion Policy funds produce a positive and significant impact on the performance of Italian cooperative enterprises during the 2014-2020 programming cycle. After carefully accounting for non-random selection into treatment through propensity score matching and allowing for treatment effect heterogeneity across cohorts and over time, our results consistently point to a selective but substantial transmission of policy support into firms' real economic outcomes.

At the aggregate country level, our results suggest that cooperative enterprises benefiting from EU cohesion funds exhibit, on average, a 1.5% of higher variation in turnover (lower than the estimates reported by Mesquita (2025) and by Beņkovskis (2019)) for example, a 5.7% higher variation in operating income (higher than the estimates by Bachtrögler and Hammer (2018)), an 8% higher variation in total fixed assets per employee and a 3,9% higher level of employment (Table 4 and Table A5 in Appendix).However, only the coefficients associated to total fixed assets per employee and operating income are significant and, at the same time, they respect the parallel trend test.

The results are similar to those reported by Bachtrögler and Hammer (2018), even though their study shows that the intensity of the coefficient for Italian beneficiaries differs: weaker for the operating income (3%) and for the effect on fixed asset per employee (9%) but much higher and statistically significative for the change in employment (12.2). Indeed, European funds seem to positively influence cooperatives on operating income and investments more than other variables. This pattern of results is highly informative from both an economic and institutional perspective. First, the strong and robust impact on operating income suggests that Cohesion policy funding contributes to improving the profitability capacity of cooperatives rather than merely expanding scale. This finding is particularly relevant for cooperative enterprises, whose objective function does not prioritize profit maximization as much as the long-term economic sustainability of the organization and the fulfilment of members' needs. Second, the sizeable effect on fixed assets per employee highlights the role of Cohesion policy in fostering capital deepening and investment intensity within cooperative firms. This result is in line with the investment-oriented nature of many ERDF-funded measures and confirms that public support effectively translates into tangible and intangible capital accumulation.

Table 4 Main Results

	ln_Turnover	ln_Operating Income	Ln_Employment	ln_ Fixed Assets per Employee
Italy - Weighted Average of Group-Time ATT- Not Yet Treated	.0154	.0574	.0391**	.0801***
	(.0139)	(.0343)	(.0142)	(.0283)
N. observations	29870	29870	29870	29870
chi2(21)	254.641	200.297	308.761	105.820
P-Value	0.2276	0.5194	0.0757	0.9703
Parellel Trend Assumption	no	yes	no	yes
	ln_Turnover	**ln_Operating Income**	**Ln_Employment**	**ln_ Fixed Assets per Employee**
Southern regions - Weighted Average of Group-Time ATT - Not Yet Treated	.0213	.0816253	.0311005	.1736257***
	(.0238)	(.0532)	(.0232)	(.0467)
N. observations	11306	11306	11306	11306
chi2(21)	201.922	181.110	166.181	167.103
P-Value	0.5091	0.6420	0.7340	0.7285
Parellel Trend Assumption	yes	yes	yes	yes

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Authors' calculation

From a dynamic perspective, preliminary results suggest that, in terms of business profitability—such as operating income—the most significant ATT effects are observed in the very short term (2015) for Italy and in the long term (2020-2021) for the cooperatives in the South of Italy. In addition, investment-related effects (such as total fixed assets per employee) and employment appear to be postponed, at least after 2016, having such a long-term effect. These trends can be partially explained by the intrinsic impact of investments, because their yields typically happen over the medium-to-the-long term. Additionally, it may be linked to the structure of Cohesion policy funding programs: normally, at the beginning of the programming cycle, the calls are more focused on measures that directly impact business profitability (such as employment incentives and capital grants). Conversely, investment-related calls tend to be concentrated in later phases of the

programming cycle, whose effects as shown by the event-study estimates in Figures A10 and A11 in Appendix A.

From the analysis of the heterogeneous effects related to the project starting date, for operating income, the highest average effects (ATT) are found in cooperatives with projects in 2015. Conversely, in the case of total fixed assets per employee, a higher ATT is observed in cooperatives with projects starting dates in 2016 and 2017. The heterogeneity shown among different groups of cooperatives by project starting date confirms the findings previously observed in the study of dynamic effects.

A particularly notable result concerns the spatial heterogeneity of treatment effects. For the cooperatives located in Southern Italy, the intensity of the average effects (ATT) is much more pronounced than what it is observed at the national level.

Even though some coefficients are not significative or are not in line with the parallel-trend assumption, it emerges that cooperatives in Southern Italy benefiting from Cohesion funds show an overall positive variation, on average 2.1 % higher for the turnover (but not significative), 3.1% higher for employment change (but not significative) and , above all, a 17.4% higher level of total fixed asset per employee (strongly significative) than non-beneficiary cooperatives (Table 4 and in Appendix Table A6).

Overall, the results provide a consistent and relevant policy implication: EU Cohesion Policy funds contribute to strengthening the ability of cooperative enterprises to generate profitability from their core business and their investment capacity, with particularly pronounced effects in less developed Italian regions. Rather than generating uniform improvements across all performance indicators, policy support appears to operate through specific channels -profitability and capital intensification- that are closely aligned with both the design of Cohesion Policy instruments and the distinctive economic logic of cooperative enterprises.

5.3. Robustness check

To further assess the credibility of the baseline estimates, we conduct a set of robustness checks aimed at verifying whether the main findings depend on the specific matching–DiD design adopted in the core specification. In particular, we re-estimate treatment effects using a propensity score matching framework applied to the full sample, prior to the restriction imposed by the matched panel used in the staggered DiD analysis, and we compute the ATT while conditioning on the full set of covariates. As we can partly expect, the coefficient for Fixed Assets per Employees is significant and positive, consistently with our results (19.7%). The evidence that the investment-related effect survives a different identification strategy and a broader comparison group strongly

reinforces the conclusion that Cohesion Policy support is systematically associated with capital deepening in cooperative enterprises. This consistency across methodologies suggests that the impact on capital intensity is not driven by specific modelling choices but reflects the structural channel that EU funds use to operate. On the contrary, all the coefficient associated to turnover, employment and operating income are negative (Table 5). Differently, the results for Southern cooperatives are positive also for the operating income (Table 6).

Table 5 Robustness Check - Italy

	log of Turnover	**log of Operating Income**	**log of Fixed Assets per employee**	**Employees**	**Log of Employees**
Atet Coefficient	-.0422 ***	-.0026	.1979***	-663.303	-.1669**
	(.0114)	(.0134)	(.0189)	422.481	(.0061)
z	-3.71	0.20	10.44	-165	2.75
P-Value	0.000	0.844	0.000	0.099	0.006
N. Observations	184,389	184,389	184,389	184,389	184,389
AI Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Source: Authors calculations

Table 6 Robustness Check - South of Italy

	log of Turnover	**log of Operating Income**	**log of Fixed Assets per employee**	**Employees**	**Log of Employees**
Atet Coefficient	-.1098 ***	.0656***	.2153***	-6.6120	-.0048
	(.01534)	(.02114)	(.02785)	(5.912)	(.0097)
z	-7.16	3.10	7.73	1,12	-0.50
P-Value	0.000	0.002	0.000	0.263	0.617
N. Observations	81,069	81,069	81,069	81,069	81,069
AI Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$					

Source: Authors calculations

6. Discussion and conclusions

Harmonious and equal development among the regions of Europe is a fundamental objective of the European construction that deserves greater attention and progress in future European policies.

Italy is characterised by strong internal imbalances and, for this reason, receives a substantial share of these resources: the larger the amount allocated, the more efficient and effective the expenditure can be, and the greater the economic impact.

Cooperatives benefit from Cohesion funds in Italy for only 1% of the total public funding surveyed by the Open cohesion dataset, a measure that is certainly significant but less representative of cooperatives in the Italian context (Carini, 2023).

Using an econometric counterfactual evaluation, we analysed the impact of the Cohesion funds on cooperatives. The study is confined to the 2014-2020 programming cycle and considers the available financial statements of all active cooperatives from 2013 to 2022. Our estimates indicate a particularly significant and positive effect on operating income, investments (fixed assets per employee) and employment. On average, cooperatives benefiting from Cohesion funds experience a 5.7% increase in operating income and an 8% higher growth in investments per employee compared to non-beneficiary cooperatives. This last effect is particularly pronounced among cooperatives located in Southern Italy, where it's more than double. The robustness analysis further reinforces this interpretation, showing that the positive effect on capital intensity remains stable across alternative specifications, while more short-term performance indicators prove more sensitive to the composition of the control group. This pattern confirms that Cohesion policy operates mainly through structural investment channels in cooperative enterprises. A new phase is opening with the start of the new 2021/2027 programming period and, looking ahead, the next Multi Annual Framework (2028-2034): challenges and opportunities for cooperatives should not be missed.

In conclusion, our results suggest that Cohesion funds tend to improve the economic activities of cooperatives, implementing their use for innovation and employment. Definitely, increasing the accessibility of these funds for cooperatives can become a clear policy indication for improving the implementation of Cohesion funds in Italy and, ultimately, for reducing regional inequalities.

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